

Executive Summary:

This report provides a review of current systems and practices of management of polluted sites in India (task -1 as per the Terms of Reference) and an overview of international practices (task -2 per the Terms of Reference) in the area. The review covers individual aspects of legal, institutional and financial mechanisms using a framework of steps as envisaged for a rehabilitation process. This is followed by examining relevant cases, to help better understand how rehabilitation works in India. International practices have been studied with a view to understand how problems associated with polluted site rehabilitation have been solved in different parts of the world, and how some of the aspects of these frameworks could be adapted to the Indian context. The countries studied in detail are USA, Canada, Australia, Germany, Netherlands, EU (common administrative rules), and Romania. For the purpose of collecting data and information on India, various stakeholders across several agencies are interviewed, and legal statutes and publicly available information are reviewed. A desktop research guided by an international expert is conducted to strengthen the understanding on international practices.

1. The Methodology:

During the project inception, a “framework” is developed for facilitating the review of the rehabilitation process. This framework takes the form of a structured process with 14 steps and each step in the process having implications towards legal, institutional and financial aspects. The framework has been developed considering the practices amongst the developed countries that have an established framework for dealing with the issues of rehabilitation of contaminated sites. The framework is further refined during the course of the review. The requirements of each step of this framework have been evaluated from legal, institutional and financial perspective to understand the strengths and gaps of the current practices in India in the light of international perspectives.



Figure 1: Rehabilitation Framework

Each of the 14 steps has certain activities to be carried out and requires support from the legal, institutional and financial framework. Table below describes each step.

Table 1: Description of 14 steps of remediation:

Step	Description
1. Identification of probably contaminated sites	A legally mandated, structured procedure for identifying polluted sites and submitting their details for further investigation to authorities
2. Preliminary Assessment/Site Inspection- Investigations	A preliminary assessment of the site shall be conducted to understand if the site poses no/some threat to human health and environment and site inspection is then carried out for sites that have some threats by taking samples of air, water and soil at the site. Boundary of the site shall be determined and ownership of the site shall be reconfirmed. Based on samples collected sites will be scored depending on groundwater, air, soil pathways.
3. Notify, delineate the polluted sites, issue moratorium, fix the liability.	Once a site is confirmed to be contaminated, a notification to that effect must be declared publicly, that identifies the site as a contaminated site that is included in the National Priority List for rehabilitation. Designated institution to report a list of contaminated sites. Categories of sites may be inbuilt into the national priority list and similar categorization could be done for the notification process. Parallel to notification, parties responsible for contamination need to be identified and liability of carrying out remediation/paying the cost of remediation to be assigned on them.
4. National Priorities List (NPL) Site Listing Process	The programme managing institution shall maintain a list of confirmed contaminated sites which shall be called the National Priorities List (NPL). It shall also be responsible for applying the prioritization criteria to determine the order in which sites are to be rehabilitated
5. Remedial Investigation/Detailed DPR	A detailed assessment and the preparation of a Detailed Project Report (DPR) for the rehabilitation of the site shall be commissioned. The output of the report shall provide details of the technical remediation activity to be conducted, cost and time of rehabilitation, stakeholder engagement, and post remediation monitoring. The DPR shall provide multiple options for rehabilitation, with an analysis of the options and a recommended approach.
6. Detailed Cost, Plan and responsibility analysis: based on the DPR output.	The DPR shall present more than one option for rehabilitation of the polluted site. Each option will have impacts to costs, time, social issues and land related issues. The institution managing the NPRPS, the local agency, the local government such as the district collector, municipal body or the district magistrate, affected parties such as the owners, occupiers, NGOs, and those facing downstream impacts would need to be consulted to determine the best option to take forward.
7. Funding requirement identification: availability/generation of the funds.	Funds are required to undertake remediation and to manage the NPRPS. The programme would have to define the process of raising funds, maintaining funds and disbursing funds for remediation activities and programme management. At this point it is assumed that the liable party and the extent of liability have been determined from above step. An estimated cost of remediation would need to be raised on the basis of methodology that applies to the site and a demand for the same must be made to the liable party.
8. Remedial	An accredited private agency shall prepare a technical design for remedial

Step	Description
Design/Remedial Action	action at the site. The technical design for remedial action shall be approved by the local agency before proceeding for physical activity at the site.
9. Construction Completion. Complete Physical Cleanup	This step signifies completion of physical cleanup construction. An accredited private agency hired by local agency shall execute the actions necessary to complete the physical cleanup at the site as per DPR.
10. Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse.	This step is aimed at ensuring that remediation actions taken place provide for the long-term protection of human health and the environment.
11. Monitoring and Evaluation	The site shall be monitored periodically to ensure pollution limits are within the values as determined by the end goals of the rehabilitation plan and that the land is being used for the purpose as permitted by the end results.
12. Recover Costs	Where sites have been rehabilitated using government funds, fully or partially, an attempt has to be made to recover the costs from the liable party. This may also be possible for orphan sites also.
13. National Priorities List Deletion	Upon the completion of the Rehabilitation activities the site shall be marked in the database as 'rehabilitated' and any planned monitoring of the site shall commence
14. Site Reuse/ Redevelopment	Local government shall designate the site use as per the rehabilitation plan and handover the land for use. In case end goals were changed or rehabilitation was completed to an extent different from the original plan (with approval from all parties), the local government shall determine the final end use for the land and hand over the land to the rightful user. Control of the site shall be handed over to the appropriate party for the use permitted in the rehabilitation plan by order of the local government

The study covers review of current system with regard to legal, institutional and financial frameworks to deal with rehabilitation of polluted sites in India and abroad through a) desktop review and b) stakeholder interaction.

Desktop review for current practices in India has covered all relevant policies, acts and rules, Central Pollution Control Board's (CPCB) guidelines, publications, updated information on hazardous waste generation, recycling, incineration, state-wise availability of Common Hazardous Waste Treatment, Storage & Disposal Facility (TSDF), relevant court cases, latest available inventory of contaminated sites in India, planning commission reports, information from web sites and annual reports of State Pollution Control Boards (SPCB) etc. The table below provides the detail of documents reviewed under the study:

Table 2: Desktop Review-National References:

Documents	References
Policies	National Environment Policy, 2006 , National Policy on Resettlement, Rehabilitation, 2007, National Policy on Disaster Management 2009
Acts	The Environment (Protection) Act, 1986 , The National Green Tribunal Act, 2010 , The Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act, 1981, The Civil Liability for Nuclear Damage Act, 2010 , The Land Acquisition Act, 1894 amended 1984, Forest (Conservation) Act, 1980,

Documents	References
	The Industries (Development & Regulation) Act, 1951, Atomic Energy Act, 1962, The Indian Forest Acts, 1927
Rules	Environmental (Protection) Rules, 1986 and amendments thereof, Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 , Bio-Medical Waste (Management and Handling) Rules, 1998 , The Batteries (Management & Handling) Rules, 2001 , E-Waste (Management & Handling) Rules, 2011 , Dumping & disposal of Fly-ash Rules, 1999 , The Mineral Conservation and Development Rules, 1988 , Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 , Municipal Solid Wastes (Management and Handling) Rules, 2000 , The Public Liability Insurance Act and Rules, 1991
By-laws	West Bengal Municipal Act, 1993 (Functionally the same as Kolkata Municipal Act, 1980), The East Kolkata Wetlands (Conservation and Management) Act, 2006, East Kolkata Wetlands (Conservation & Management) Rules, 2006, The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004), Maharashtra Non-biodegradable Garbage (Control) Act, 2006, Maharashtra Groundwater Development and Management Act, 2009, Municipal Corporation of Greater Mumbai Bylaws, 2006, Karnataka Shops and Commercial Establishments Act, 1961 Karnataka Municipal Corporations Act, 1976, The Himachal Pradesh Municipal Act, 1994, The Uttar Pradesh Municipalities Act, 1916, The Uttar Pradesh Municipal Corporation Act, 1959
Publications	CPCB Publication – Hazardous Waste Management Series (HAZWAMS), Computation of Societal Risk Abatement Cost and Long Run Marginal Financial Cost with regard to Dioxin and Furan Emission Standards for Common Hazardous Waste Incinerator, Evaluation Study of Functioning of State Pollution Control Boards, Planning Commission, Government of India, September 2000, Findings of Menon Committee Report of Supreme Court of India, H.P.C, Report of the High Powered Committee on Management of Hazardous Wastes, Volume I, Volume II and Volume III (2001), National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India February 2009 Central Pollution Control Board Hazardous Waste management Division Delhi, Action Plan for Abatement of Pollution in Critically Polluted Area of Ludhiana City, Punjab Pollution Control Board, June 2010, State-wise Availability of Common Hazardous Waste Treatment, Storage & Disposal Facility (TSDF), LIST OF HAZARDOUS WASTE CONTAMINATED DUMP SITES IN THE COUNTRY (Having Preliminary Information)
Guidelines	CPCB, Inventorisation of Hazardous Waste Generating Units in Orissa, Hazardous Waste Management Series: Hazwams / 21/ 2002-03, CPCB Publication – Hazardous Waste Management Series (HAZWAMS), CPCB Guidelines for Conducting EIA: Site Selection for Common Hazardous Waste Management Facility, CPCB Guidelines for Proper functioning and Upkeep of Disposal Sites, CPCB Guidelines for the Selection of site for Land-filling, CPCB Guidelines for Transportation of Hazardous Wastes, Guidelines For Evaluation And Recognition Of Environmental Laboratories (Revised & Updated Version)
Reports	Report of the Working Group on Environment & Environmental Regulatory Mechanisms, Report of the Sub-Group on “Environment” for 12th Five Year Plan, 19. Pilot project on HW management in Karnataka for carrying state wide survey of industries on quantities and qualities of HW, by GIZ (ASEM), Hazardous Waste MGT Project Formulation Study in GUJARAT, INDIA, Environmental and Social Assessment (ESA) Study by ICT for MoEF, Overview Of The Current

Documents	References
	Situation On Brownfield Remediation And Redevelopment In China, the World Bank, Annual Reports of Karnataka, West Bengal, Andhra Pradesh, Madhya Pradesh, Punjab, Meghalaya, Tamil Nadu, Kerala, Rajasthan, Gujarat, Maharashtra Pollution Control Boards.

The international review is conducted primarily through desktop research. The following are reviewed from different countries:

Table 3: Desktop Review- International References:

Country	References
USA	Legal, institutional and financial mechanisms related to Superfund Programme, Brownfield Redevelopment Programme
Canada	Legal, institutional and financial mechanisms Environment Quality Act, Canadian Environmental Protection Act (CEPA), Federal Contaminated Action Plan (FCSAP)
Australia	Legal, institutional and financial mechanisms related to Contaminated Land Management Act
Germany	Legal, institutional and financial mechanisms related to Soil Protection Act
Netherlands	Legal, institutional and financial mechanisms related to Soil Protection Act, New Soil Development Policy, Soil Quality Decree
Romania	National Waste Management Strategy, Environment Protection Law, Environment Fund
Korea, Japan, China	Soil Environment Conservation Act, Soil Monitoring Policy of Korea, Japan's Soil Pollution Control Law and Japan Soil Contamination Counter-measure Law (SCCL), China's progress reports on review of national and international frameworks.

Stakeholder interaction covers face to face meetings, interaction over e-mail and telephone to get a real time understanding of the current practices related to rehabilitation of contaminated sites in the country. The table below provides a detailed list of stakeholders interacted:

Table 4: Detailed list of interactions with institutions in India:

Stakeholder Category	Stakeholder Consulted
Central and State Pollution Control Boards (Including Pollution Control Committees for Union Territories)	Andhra Pradesh Pollution Control Board, Central Pollution Control Board Central Pollution Control Board Zonal office , Gujarat Pollution Control Board, Haryana State Pollution Control Board, Karnataka State Pollution Control Board, Madhya Pradesh Pollution Control Board, Maharashtra Pollution Control Board, Odisha Pollution Control Board, Rajasthan Pollution Control Board, Tamil Nadu State Pollution Control Board, Uttar Pradesh Pollution Control Board, West Bengal Pollution Control Board
District (Local) Administration and Urban Local Body	Ahmedabad Municipal Corporation, Bruhat Bangalore Mahanagara Palike (BBMP), District Magistrate, Hooghly District of West Bengal, Greater Hyderabad Municipal Corporation, Kolkata Metropolitan Development Authority (KMDA), Kolkata Municipal Corporation (KMC), Ludhiana Municipal Corporation, Municipal Corporation Greater Mumbai, The Collectorate, Udaipur Urban Improvement Trust (UIT) [Under the Urban Development and Housing Department, Government of Rajasthan]

Stakeholder Category	Stakeholder Consulted
State Health and Environment Departments	Department of Environment, West Bengal
Generators of hazardous waste	Berger Paints India Ltd, Exide Industries Ltd.
Operators of TSDFs	Ramky Enviro Engineers (p) Ltd., Mumbai Waste Management Ltd., Tamil Nadu Waste Management Ltd., UPIL
Industries Department of the state government (including Industrial Development Board and SEZ)	Maharashtra Industrial Development Corporation, Delhi State Industrial and Infrastructure Development Corporation Ltd.
Industry Associations	Confederation of Indian Industry
Ministerial Bodies	Hazardous Substances Management Division (MoEF), Planning Commission, GoI
Non-governmental organisations (NGOs)	ToxicsLink, Hazard Center
Funding Agencies	Gesellschaft für Internationale Zusammenarbeit (GIZ)
Other Government Agencies or Authorities	National Highway Authority of India
Technical Institutions and Experts	Indian Institute of Toxicology Research, Lucknow, National Environmental Engineering Research Institute

2. A summary of findings:

The following table provides detailed observations from the review phase based on the 14-step process framework and considering legal, institutional and policy implication of each step.

Table 5: Summary Observations in the National and International Frameworks

Step	Existing Indian Framework	Existing international References
1. Identification of probably contaminated sites	<p>A draft definition of “contaminated” and “probably contaminated” site is being worked upon that may serve as the basis of identification of a probably contaminated/contaminated site.</p> <p>As per the current institutional structure provided by the legal framework, CPCB and SPCBs are authorized to investigate suspected cases of non-compliance with respect to the Hazardous Waste Rules (schedule 4), the Air Act (section 24, 25, 26, 27) and the Water Act (section 20, 21, 22, 23). This is a part of monitoring industrial compliance where non-compliance may lead to contamination, environmental damages and health hazards.</p> <p>Any party, media report, health department complaints may be considered by SPCBs for suspected cases of non-compliance.</p> <p>No obligation on SPCBs, large government agencies (railways, port trust etc) to conduct land survey and report contamination within their jurisdiction, no involvement of other relevant ministries such as ministry of urban development, agriculture, irrigation, health etc., no formal procedure for NGOs, general public</p>	<p>In USA sites are discovered by regional Environmental Protection Agency (EPA) offices, state agencies, and citizens who file a Preliminary Assessment (PA) petition to EPA as per. Section 105(d) of SARA. Whenever a petition is received, it enters into EPA's computerized inventory of potential hazardous waste sites for further actions.</p> <p>As per sections 31.33, 31. 43, 31.51 of Canadian EQA a person or municipality that has the custody of the land/anyone who is ceasing a property /changing land use need to report land contamination status and rehabilitation plan to Ministry of Environment.</p> <p>According to Part 5, Section 60 of the Australian Contaminated Land Management (CLM) act, “Duty to report contamination” requires land owners and persons who carry on “contaminating activities” to notify the Environment Protection Authority (EPA) of the contamination of land. If they fail to do so a penalty will be imposed.</p> <p>Article 8 of the German Soil Protection Act provides trigger values, action values and precautionary values of soil contamination to</p>

Step	Existing Indian Framework	Existing international References
	<p>to report contamination to SPCBs.</p> <p>No formal procedure of listing of the sites as and when complaints are received.</p> <p>No legal authority on any institution to be the custodian of the list of all sites, screen received complaints and declare a site as “probably contaminated”.</p> <p>No obligation on entities abandoning a site or changing land use of a site to conduct preliminary assessment and report to the managing entity.</p>	<p>determine if further investigation is required or if clean up measure is required or if it is a real concern and clean up measure is required urgently.</p> <p>Section 29 of Dutch Soil Protection Act provides criteria for "serious" and "non-serious" contamination based on detailed soil survey</p> <p>Section 37 includes criteria for urgent and non-urgent site remediation based on location specific current and future land use.</p>
<p>2. Preliminary Assessment/Site Inspection- Investigations</p>	<p>Under the Environment Protection Act (EPA) (section 11), the Air Act (section 24) and the Water Act (section 23), the enforcing agency (CPCB, SPCBs) has the authority to enter “any place” for the purpose of assessment and taking samples for analysis.</p> <p>Under the EPA (Chapter II) the central government can create new procedures for assessment and investigation of environmental damages.</p> <p>HWM rules schedule II provide HW constituent and concentration level to be complied with for soil, air, water samples collected.</p> <p>CEPI also provides pollution index used to rank sites according to the level of risk present due to pollution. However, there is no legal mandate to use this index for prioritization.</p> <p>The word “any place” does not define if it is a source site or a receptor site. A contaminated site is usually a receptor site.</p> <p>It does not explicitly clarify if entry is allowed to all private lands for the purpose of collection of samples i.e. ownership of the land is not clarified.</p> <p>The current enforcing agencies i.e. CPCB, SPCBs lack in institutional capacity – most SPCBs do not have NABL certifications for the parameters to be monitored by their laboratories, all SPCB regional offices do not have laboratories, all SPCBs have about 35-40% vacant seats under different technical and scientific posts. Firms to which the work is currently being tendered out are mostly international.</p>	<p>In US, Section 104(e) (1) of SARA explicitly grants EPA the authority to enter a property to conduct investigations, studies, and also cleanups.</p> <p>In Australia, Section 32 of the CLM act states that any entity/person authorized by EPA can enter a land under only if he has permission from the land occupier. If the occupier refuses entry then EPA would issue an order on the occupier to carry out the requirements under the order and the occupier may recover this cost under part 3 division no 6 of the Act.</p> <p>Section 31.63 of EQA in Canada explicitly grants any person authorized by the Minister of Environment under this Act to enter private property for site investigation and clean up purposes.</p> <p>In USA, the scope of the preliminary assessment is defined in Section 420 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) CERCLA refers to this section of the NCP.</p>
<p>3. Notify, delineate the polluted sites, issue moratorium, and fix the liability.</p>	<p>Provisions to notify a site under a certain category and to warrant further activities at a site as a means of pollution abatement are present in the Coastal Regulated Zones (CRZ) notification under EPA powers and in East Kolkata Wetlands (Conservation and Management) Act, 2006 applicable for wetlands.</p> <p>CEPI, though not a legal provision, has so far</p>	<p>As per Canadian EQA Section 31.58, for a contaminated land, the entity who had the study performed shall apply for registration in the land register through a notice of contamination containing a description of the land, the name and address of the applicant for registration and of the owner of the land, the name of the municipality in which the land is situated and a summary of the characterization</p>

Step	Existing Indian Framework	Existing international References
	<p>been applied successfully by CPCB to notify a critically polluted industrial site. Under the EPA section 9 the expenses incurred by an agency toward remedial measures may be recovered from the person responsible for the pollution.</p> <p>NGT Section 15 and 20 have provisions of providing compensation to the victims of environmental damages and for restoration of damages using the polluter pays principles.</p> <p>Articles 47, 48A of Indian constitution have delineated fundamental rights for environmental safeguards and protection of human health</p> <p>The Civil Liability for Nuclear Damage Act, 2010, holds the operator of a nuclear installation liable to restore damages.</p> <p>The Mineral Conservation and Development Rules, 1988 requires mining companies to remediate their lands before leaving.</p> <p>The E-Waste (Management and Handling) Rules, 2011 introduces the concept of "Extended Producer Responsibility places the onus on the producer to prevent his/her product from being a cause for pollution.</p> <p>No specific regulation for notification and delineation of a contaminated site is available or registration of a land as contaminated.</p> <p>No institutional authority is provided by the current legal framework to notify a site as a probably contaminated site and delineate the details of the land in the notification.</p> <p>No specific procedure and legal powers conferred to existing institutions to get into administrative/legal agreements with responsible parties to take the responsibility of remediation or to pay for remediation.</p> <p>No procedure to determine liability when a single responsible party cannot be identified or to determine liability when the act of contamination has taken place before enactment of the concerned legal framework.</p>	<p>study.</p> <p>EPA in USA also publishes notices in the Federal Register, listing which sites are being proposed for listing. As per Section 105(a) (8) (B) of CERCLA, EPA publishes notices to notify the public of sites EPA believes warrant further investigation.</p> <p>CERCLA 107 (a - c) identifies owner, operator of a site, transporter of waste to a site as the responsible party.</p> <p>As per Section 106 of CERCLA-EPA can order, or ask a court to order, PRPs to clean up the site when an imminent or substantial endangerment may exist.</p> <p>CERCLA recognizes retroactive liability (i.e. parties liable for acts taken place before enactment of CERCLA), joint liability (Any one party may be held liable for the entire cleanup of the site when the harm caused by multiple parties cannot be separated) and strict liability (a party cannot simply say that it was not negligent or that it was operating according to industry standards).</p>
<p>4. National Priorities List (NPL) Site Listing Process</p>	<p>CEPI provides pollution index used to rank sites according to the level of risk present due to pollution. CEPI is calculated based on the presence of a pollutant, its impact on people and ecology and additional risk element if any. However, there is no legal mandate to use this index for prioritization.</p> <p>No legally mandated ranking procedure is there that considers all types of pollution pathways, risk exposure of local community to determine the severity of contamination. No managing institution is identified by law to conduct the prioritization exercise. There is no legal</p>	<p>As per CERCLA section 105, EPA needs to apply HRS to score a site. The cut off for prioritization is HRS score 28.5 which is a RMS value of ground water, surface water, soil exposure and air pathway values from 0-100. The site with score less than 28.5 should receive a "no further remedial action planned"(NFRAP) recommendation.</p> <p>CERCLA also refers to Section 300.425(c) of the NCP by which NPL listing depends on inputs from U.S. Public Health Service that recommends removing people from the site, if states feel it is a top priority.</p>

Step	Existing Indian Framework	Existing international References
	<p>procedure to take inputs from other ministries, state level institutions, and state government departments while prioritizing.</p>	
<p>5. Remedial Investigation/ Detailed DPR</p>	<p>As described above, references of sample collection are available under hazardous waste management rules and CEPI.</p> <p>The current legal framework does not refer to any guideline on carrying out detail remedial investigation for preparation of DPR.</p> <p>No delegation of power is observed to the existing institutions in the hazardous waste management hierarchy to prepare DPR for the remediation work. Currently, due to local presence, for all funded activities of DPR preparation are being supervised by SPCBs who are tendering out the work to competent technical firms, mostly international.</p>	<p>EPA document-EPA/540/G-89/004 provides guidelines to conduct Feasibility Analysis and Remedial Investigation under CERCLA.</p> <p>CERCLA recognizes EPA to conduct remedial investigations through its regional offices or through contractors.</p>
<p>6. Detailed Cost, Plan and responsibility analysis: based on the DPR output.</p>	<p>There are no existing provisions in the legal, institutional and financial framework to address the requirements of this step.</p>	<p>Under superfund programme in USA the outcome of step 5 is The outcome of this step is Records of Decision (ROD) containing site details, characteristics, alternatives of remediation with methodology, technology and time details and the justification of the best alternative to go for approval by EPA review board. The approved ROD becomes the basis of the next steps.</p>
<p>7. Funding requirement identification: availability/ generation of the funds.</p>	<p>The National Environment Policy, 2006 suggests creation of a National Environment restoration Fund from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary contributions which may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.</p> <p>GPCB maintains an “environment fund” as a result of a Gujarat High Court order on a plea by a resident of Boriya Khurad village of Sabarkantha for restoration of environmental damages. Maintenance of this fund is the responsibility of the state government and the fund comprises direct payment of penalties, ascertained by the district judge, for damage caused to the environment.</p> <p>There are relevant fund structures available under different national programmes. Projects under National River Conservation Plan are funded on 70:30 cost sharing basis between MoEF and state government or a local body concerned. It is mandated that of the 30% share of state share at least 10% should come from public participation to promote the sense of ownership among beneficiaries.</p>	<p>In USA fund is sourced from i) cost recovery/cash agreements with the liable parties that go to the "special accounts" of EPA within the Superfund Trust Fund to pay for cleanup activities at the site for which it received the money (70%) and ii) trust fund (Refer: CERCLA section 122)- dedicated for remediation mostly used for orphaned sites (30%).</p> <p>In Romania, the Environmental Fund was set up by Law no. 73 in 2000, as a special fund, outside the budget to meet the objectives as set out by the National Waste Management Strategy. The law prescribes a structure and sources of the fund from taxes paid by users of natural resources and harmful chemicals. The fund is managed by a management board whose structure is also mandated by the law.</p> <p>In Canada, funding is through budget allocation. Budget 2009: Under Canada's Economic Action Plan (CEAP), the Federal Contaminated Sites Action Plan receives \$245.5 million till 2011. The funding includes \$80.5 million in new funding and \$165 million from existing funding (Budget 2004). Budget 2011 includes an additional \$68 million over two years for funding site assessments and program management.</p>
<p>8. Remedial</p>	<p>The acquisition of land for public purposes has</p>	<p>Under USA's superfund programme, as per</p>

Step	Existing Indian Framework	Existing international References
Design/Remedial Action.	been legally valid from the inception of the Constitution. The Constitutional provision for eminent domain may be found in Article 31A (1) of the Constitution. The Land Acquisition Act, 1894 amended 1984, sets out the provision for the government to acquire land where it appears to the government that the land is needed or likely to be needed for any public purpose. An important point is that the government may also acquire the land for the use of a Company.	SARA section 104 e (1-5) EPA can access a private land for preliminary site investigations, removal and remedial actions. The Act mandates that EPA should, in the first instance, seek to obtain access through consent. If consent is denied, EPA should use judicial process or an administrative order to gain access. The appropriate type of judicial process varies depending on the nature of the onsite activity. As per SARA where there is a "reasonable basis to believe there may be a release or threat of a release of a hazardous substance or pollutant or contaminant," courts are instructed to enforce an EPA request or order. In addition, a penalty not to exceed \$25,000/day may be assessed by the court for failure to comply with an EPA order or the provisions of subsection 104 (e) of SARA.
9. Construction Completion. Complete Physical Cleanup.	There are no existing provisions in the legal, institutional and financial framework to address the requirements of this step.	Under CERCLA, guidance on achieving the construction completion milestone is available in the "Close Out Procedures for National Priorities List Sites" guidance of USEPA. EPA evaluates and approves a Remedial Action Report marking completion of remediation. Remediation action completion depends of Remediation Action Guidelines for different measures e.g. for source remediation through in-situ treatment of soil clean up level as per ROD has to be achieved. For measure regarding containment of pollution, construction needs to be complete.
10. Post Construction Completion-Long term review plan, post remedial use, agreements for site reuse.	Current legal framework has conferred institutional powers to CPCB and SPCBs to monitor industrial pollution on a regular interval but has no specific mention of remediated sites.	Under superfund, a national strategy is developed called National Strategy to Manage Post Construction Completion Activities at Superfund Sites. This is as per sub-part A, section 300.5 of NCP. This includes Long-Term Response Action (LTRA) by EPA that generally applies to the first 10 years for monitoring of ground and surface water restoration, maintenance of remedial action, five yearly review and working with third parties for reuse of land. In US, CERCLA and NCP have defined the roles and responsibilities of EPA, PRPs, states, federal agencies to protect a rehabilitated land for long term.
11. Monitoring and Evaluation	Hazardous Waste Rules Schedule III, State Pollution Control Boards and the CPCB are required by law to monitor industrial pollution. As per the Disaster Management Act, 2005, the pollution control boards are identified as the agency for monitoring the developing severity of the disaster and ascertaining if an area is fit for re-entry. The guidelines mention that the	International practices cover monitoring and evaluation as a part of post construction activities.

Step	Existing Indian Framework	Existing international References
	decontamination activities would be done with the help of other agencies and industries.	
12. Recover Costs	<p>Existing legal provisions to assign liability are discussed in step #3.</p> <p>Guiding principles on for calculation of compensation of damage are provided by the Supreme Court with the landmark order of 12.12.1996 that directed that compensation be calculated on the basis of NPV (Net Present Value) of the forest as a resource.</p> <p>In supreme court case Vellore Citizens' Welfare Forum Vs Union of India AIR 1996 SC 2715, The Court issued directions to the Government to set up an authority called as "Green bench" as per section 3/3 of the Environment Protection Act to deal with the situation as well as to enforce the polluter pays and precautionary principles. The Court imposed pollution fine on the tanneries and directed the authority to compute the compensation payable for reversing damage to the ecology as well as for payment to individuals affected. The fine to be deposited under an Environment Relief Fund.</p>	<p>As per CERCLA section 107, EPA orders PRPs to have an agreement with EPA on work, cost recovery/cash out. CERCLA section 122:</p> <p>a) Administrative Order on Consent- between EPA and PRP where PRP carries out short term clean up, remedy design</p> <p>b) Administrative agreements between EPA and PRP for cost recovery/cash out where PRP pays the cash before or after actual remediation takes place by EPA</p> <p>For cost recovery EPA tracks the amount owed by potentially responsible parties (PRPs) in its accounting system. Generally, a PRP has a certain period of time in which to pay the amount owned. A penalty of thrice the remediation cost (to be incurred by EPA) is collected from the PRP on failure of payment for remediation. When a payment is overdue EPA works with the Department of Justice to collect the debt.</p>
13. National Priorities List Deletion	<p>In India, the remediation framework is at a nascent stage and hence this step is not introduced as yet.</p>	<p>Under superfund, EPA may delete a final NPL site if it determines that no further response is required to protect human health or the environment. Under Section 300.425(e) of the National Contingency Plan (55 FR 8845, March 8, 1990), a site may be deleted where no further response is appropriate if EPA determines that one of the following criteria has been met:</p> <p>a) EPA, in conjunction with the State, has determined that responsible or other parties have implemented all appropriate response action required.</p> <p>b) Remedial investigation has shown that the release poses no significant threat to public health or the environment and, therefore, remedial measures are not appropriate.</p>
14. Site Reuse/ Redevelopment	<p>As per the current legal framework, Land acquisition or allocation remains within the control of the state government and the state governments need to be involved even for site reuse after remediation.</p>	<p>EPA in USA developed the Return to Use (RTU) Initiative. The RTU Initiative is designed to remove barriers to appropriate reuse at those Superfund sites Barriers include lack of understandable information about the site; liability concerns; site ownership issues; and lack of clear information regarding what uses might be appropriate for the site. As part of the RTU Initiative, EPA provides the public with site reuse information sheets and works with surrounding communities to establish processes for determining appropriate reuses; supplies information to potential purchasers etc.</p>

3. Points for consideration in Task 3

Step-1: Identification of probably contaminated sites

The NPRPS shall be launched along with an initial exercise to prepare an inventory of polluted sites in India. The consultants preparing this inventory are also developing the procedure for identification and confirmation of pollution at a site. Going forward, this procedure and its associated guidelines and standards may be used for identification of new polluted sites. At this time, exercise to prepare the inventory is targeted at conducting an extensive study in a short period of time. Therefore, the procedure may need to be fine tuned to suit the needs of an ongoing program.

From a regulatory perspective suitable authority to institutions has been provided (under various Acts), that they may enter sites and conduct investigations to determine the presence of contamination. However there is no mandate or responsibility directed to institutions such as the SPCB or the CPCB to actively seek out and identify polluted sites or take a particular action whenever they become aware of presence of contamination at a site. India however has several sets of stakeholders who are directly or indirectly impacted by pollution at a site. These include citizens, local government, water, agricultural, health and environment departments. Apart from these there are large government land holders such as the NHAI, Airports Authority, Ports and Harbours Authority, Railways, Defence etc. The procedure to identify hitherto unknown polluted sites must at various levels seek to involve these stake-holding parties and the large land holders. This kind of involvement is clearly seen in the programmes of the USA.

Another important point related to identification is the use of screening levels. This is a feature of the German framework and helps to set initial priorities where necessary thus bringing a level of efficiency in the identification step.

Our preliminary analysis suggests that, ongoing identification activities may not involve intensive efforts since we are launching the program with an initial inventory. However there would be need to issue directives to formalize an identification process and set responsibilities among the CPCB and the SPCBs/UTPCCs.

Step 2: Preliminary Assessment/Site Inspection-Investigations

A key gap between the Indian practices and the international programs is that in India while the authority to enter sites and take samples for analysis is adequately provided for under the statues , there is no clear definition on whether there is a mandate to do so. Unless a mandate is present, this activity is not budgeted as a part of the activities of the specific regulatory boards for the year and therefore does not receive the necessary priority in terms of execution.

Both Indian and International practices do not rely on in-house technical capabilities of enforcement institutions for assessment related activities. While very primary assessment may take place through these institutions and their laboratories, more specific assessment is tendered out. In Australia under CLM, the EPA agency may direct the occupier to undertake assessment and provide a report to the EPA. The occupier in turn reaches out to firms with technical expertise. In India the market for firms with such technical expertise is not as open and well developed as in the countries studied.

In India, currently assessment related activities for contaminated sites are being tendered out to international firms. For this step capacity building initiatives in terms of infrastructure development at SPCBs, technical expertise of the local firms must need to address the constraints of administration to ensure effectiveness.

Step 3: Notify, delineate the polluted sites, issue moratorium and fix the liability

Indian regulations provide multiple avenues for notification of polluted sites. There have been examples where this has been done in the past such as for the critically polluted industrial sites. The delegated legislation built into the Environment (Protection) Act may be utilized to create a special

notification for polluted sites. As mentioned earlier in this report, the sites may be categorised and covered under a summary notification that applies to the category.

International programmes also put notifications onto the land record. There are several advantages to this, which also include the ability to make notification unambiguous, enforce restricted use covenants and to track the changes in land ownership for cost recovery purposes. In India, wherever land records are readily available, local government can be involved in the programme to update the necessary comments to notify land in the 7/12 extract. In other cases the overheads may not justify this.

International practices provide several methods for identifying liability as mentioned above. If the Hazardous Waste Rules, various municipal laws, and other environment legislation are to be taken as precedence, then the liability is usually placed on the occupier or the owner of the contaminated land. Existing mechanisms of assigning liability rely greatly on the judicial system, where the liable party, extent of liability and nature of compensation are all determined by the court or tribunal. This process does not take care of orphan sites, where the litigant may be an affected party or an NGO on behalf of the affected party. Assignment of liability under the NPRPS shall require the support of a legal cell, with necessary staff and resources to be able to pursue potentially liable parties for each case through the judicial process. While it will be possible to develop for the NPRPS a framework to determine the liable parties, it is unlikely that the assignment and confirmation of liability can be accomplished without judicial intervention. A specific procedure to approach the NGT may be required. International practices however provide options to the managing entity to issue an administrative order to the liable party or entering into a contractual agreement with the liable party to conduct remediation or to pay up the costs (to be) incurred before taking a judicial recourse. Judiciary will need a reference to method of calculation and estimation in a statute and will require that in case of NPRPS, any thresholds set by any act becomes null and void. Otherwise, they may be constrained to interpret the act over the program/administrative order. Perhaps, this will require an amendment in the Environment Protection Act.

Step 4: National Priorities List (NPL) Site Listing Process

The inventory creation study would result in collecting various parameters of importance for each polluted site. These parameters may be used with appropriate weight age to arrive at a priority score. In addition to the scoring process, the NPRPS managing body may receive regular inputs from SPCB, state and central health departments for immediate remediation requirement due to acute health outbreaks, other state priorities. This is in line with some of the international programmes where both technical parameters and stakeholder inputs are used in determining priority.

It is envisaged that only a national priorities list would need to be maintained for India. The CPCB or another central authority under the ministry may manage the list. This most likely be integrated with the database being provided by the inventory study, and will have the ability to publish information that is to be shared with various other institutions and the public through electronic means such as website.

Step 5: Remedial Investigation/Detailed DPR

In the Indian context as well as in the international context, the preparation of the DPR for rehabilitation takes into account various other factors apart from technical and financial feasibility in the development of options. These include liaison with local community and government to determine social costs, compensation and setting of end goals using a consensus. Institutions such as the SPCB and CPCB have demonstrated the experience in coordinating the various activities related to DPR preparation. The basic engineering and technical activities, however, have almost always been outsourced to third parties, most often international consortiums.

Capability development at state level agencies is a key need for effective scoping, tendering of engineering work related to DPR preparation to third parties. As in other countries, it is expected that this will further develop the market for third parties offering DPR preparation services.

State level agencies also need special cells that would be able to assess and approve the work done by the third parties. This is necessary to be able to engage the other stakeholders involved in the rehabilitation of the site and to get a consensus on the remediation option to move forward with. Legal authority currently extends to entering a site for the purpose of inspection and taking samples. DPR preparation may require extensive engineering work at the site, including the drilling of wells, therefore control of the land may be necessary. International practices show that getting control of land for the DPR related activities is often with the prior consent of the occupier/owner. The manner in which subsequent liability is placed on the parties ensures that the consent is either available or the occupier/owner is ready to conduct the remedial investigation on their own.

For India, we would need to develop the process where the local government is approached for permission to take control of the site for remedial investigations, DPR preparation and remedial actions. Directions from the local government would then be binding on the owner/occupier. It is envisaged that the cost of the DPR preparation shall be included in the overall cost of remediation and shall be recoverable from the liable party. This is true of international practices too.

Step 6: Detailed Cost, Plan and responsibility analysis: based on the DPR output

In the absence of any specific legislation on the topic, guidelines will need to be developed that define the setting of remediation goals based on various factors such as technical feasibility, estimated costs, budget, time, social and economic factors such as ownership, occupancy and land use (previous and future planned land use), and risks to health and environment. Administrative order to authorize and initiate work according to the plan and the assignment of responsibilities is a mechanism found in the USA programme. On similar lines, administrative orders from local government in India may be required to authorize the next step of rehabilitation. This is important because in some cases the delineation prepared earlier may need to be expanded and buffer zones introduced, that may require temporary resettlement of inhabitants or cessation of livelihood activities. Such cases would need to be authorized while adhering to the legal statutes related to resettlement and rehabilitation. From the cases studied for India, it is evident that responsibilities may lie or may be made to lie on other institutions such as the agricultural departments, water board, development board etc. Implementation of this step in the program will need to consider these responsibilities too.

Step 7: Funding requirement identification: availability/generation of the funds

International practices demonstrate that funding can come from three sources:

- 1) the polluter pays principle;
- 2) government funds that may have been raised through specific taxes; and
- 3) re-development incentives.

All these three methods find reference in the national policy of India. It is important to note that a mix of these mechanisms would be required to ensure that both orphan and non-orphan sites are addressed. Securing of funds may not necessarily mean a pre-payment by the liable party. Mechanism such as signing an agreement to pay, transfer of liability or placing on lien are useful approaches used internationally that allow for the rehabilitation process to continue using liquid funds available to the program. (Where there is a low risk that the party will default on payment eventually). Also provisions for increase in insurance limit for coverage of liability under different Public Liability Insurance Act may also be looked at.

International programmes have been built around a corpus of initial funding to launch the program and have been designed to extract maximum funding through the polluter pays principle.

Step 8: Remedial Design/Remedial Action

This step is expected to be fully covered by the parallel study on development of guidelines. From an administrative perspective, a process of approval may need to be developed for the state level institutions such as the SPCBs. This is to ensure that the design accurately corresponds to the finally selected option, and a detailed plan for the physical cleanup has been prepared with cognisance of risks and constraints. It may also be required to accredit third parties for their skill, capability and expertise related to this activity.

Step 9: Construction Completion. Complete Physical Clean-up

It is found that based on the technical nature of this activity, most international programmes only coordinate this activity while it is completed on ground by accredited third parties. This is also true of the design activity mentioned in step 8. In most cases the party undertaking the design activity also executes the physical cleanup of the site.

Specific guidelines being developed under a parallel study will be used for this activity. During the period when the physical clean up is being conducted, there will be maximum disruption at the site and multiple stakeholders will be effective. A state level institution such as the SPCB would need to coordinate this activity and manage stakeholder and community relations throughout. The responsible parties identified in step 6 would also be engaged and their contribution directed towards the rehabilitation activities as per the rehabilitation plan.

Monitoring of progress, deviations, changes in scope due to new findings and cost overruns would also need to be managed by the NPRPS at the state level.

Step 10: Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse

This step is of extreme importance in the India context, since this step is aimed at ensuring that remediation actions taken place provide for the long-term protection of human health and the environment. While international practices use multi -year monitoring processes to ensure that the site does not get re-contaminated, enforcement issues in the Indian context require the NPRPS to have different approach. The program may require more frequent and multi-institution audits for the site. The international practices of using both engineering and non-engineering (institutional controls) monitoring techniques may be adopted. These and other measures will need to form a part of the monitoring plan. Conditions for land-reuse may have changed from what was originally planned for rehabilitation. In India, it will remain the responsibility of the local government to determine the final use mode of the land and to issue the necessary directions to the parties involved. This can be expected to be done based on technical recommendation by the NPRPS (or the state agency such as SPCB entrusted with providing this information).

Step 11: Monitoring and Evaluation

As mentioned for the previous step, monitoring of rehabilitated sites will require a comprehensive approach. It will require a specific monitoring plan to be followed as per the rehabilitation guidelines prepared. Current monitoring activities that form part of the budgeted activities of the to SPCBs and the CPCB may third parties that have the necessary technical staff and laboratory facilities.

Step 12: Recover Costs

Cost recovery is an important aspect for financial sustainability of the NPRPS. Most international programmes rely on cost recovery under the polluter pays principle to keep the program ongoing. Current statutes in India clearly indicate that the costs of rehabilitation may be recovered from the responsible party and also provide for interest payment.

The Environment (Protection) Act provides for the costs to be recovered as arrears to land revenue or public demand. Various steps in the process require financing; this includes the costs of litigation too.

As in international programmes, the cost recovery module shall require the attempt to recover all the costs associated with rehabilitation from the responsible party.

Step 13: State and National Priorities List Deletion

This is an important step marking successful completion of remediation cycle. In India, the remediation framework is at a nascent stage and hence this step is not introduced as yet. But in international practices this step help to maintain and manage the priority list so that it does not get infinitely long over the years. This also helps to monitor successful application of a remediation programme.

This step should be considered under NPRPS to serve the same purpose.

Step 14: Site Reuse/ Redevelopment

As stated above, in India the remediation framework is at a nascent stage and hence this step is not introduced as yet. But in international practices, especially in USA both superfund and brown field programmes have well structured procedure for site redevelopment. Appropriate reuse of these sites can allow the community to regain lost land as valuable open space; add recreational amenities or commercial property; prevent sites from becoming targets for midnight dumping, vandalism, and destructive trespassing; remove any lingering disincentives associated with vacant sites; and increase values of surrounding property and augment the tax base.

EPA in USA developed the Return to Use (RTU) Initiative. The RTU Initiative is designed to remove barriers to appropriate reuse at those Superfund sites where construction of the cleanup remedy has been completed. Barriers to appropriate reuse include: lack of understandable information about the site; stigma of being a Superfund site; liability concerns; site ownership issues; and lack of clear information regarding what uses might be appropriate for the site. As part of the RTU Initiative, EPA, for example provides the public with site reuse profiles, information sheets, and assessments; works with surrounding communities to establish processes for determining appropriate reuses; supplies information to potential purchasers; and determines technical needs to properly design and reuse the site.

***Development of
National
Programme for
Rehabilitation of
Polluted Sites***

Final Report on Task - 1
Review of Current Systems
and Task – 2 Overview of
International Practices

January 2013



17 January 2013

Mr. Ajay Tyagi, Project Director
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110003

Ref: Contract No: MOEF/CBIPMP/2, Development of National Programme for Rehabilitation of Polluted Sites

Dear Mr. Tyagi,

Subject: Final Report on Task 1: Review of Current Systems and Task 2: Overview of International Practices

Subsequent to our presentation to the Technical Experts Panel and other stakeholders, for the project of Development of National Programme for Rehabilitation of Polluted Sites, we are pleased to present the **Report on Task – 1: Review of Current Systems and Task – 2: Overview of International Practices.**

We have performed a structured analysis of information to be able to present it in a form that is conducive to the achievement of the primary goal of this project, namely the Development of National Programme for Rehabilitation of Polluted Sites.

We have incorporated the comments on the draft report and presentation, which we received from you and other stakeholders from the Ministry and the World Bank.

Yours sincerely,

Prashant Vikram Singh
Executive Director
PricewaterhouseCoopers Private Limited

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Acronyms

APPCB	Andhra Pradesh Pollution Control Board
CEPI	Comprehensive Environmental Pollution Index
CPCB	Central Pollution Control Board
CBIPMP	Capacity Building and Industrial Pollution Management
CETP	Common Effluent Treatment Plant
DM	District Magistrate
DPR	Detailed Project Report
EIA	Environmental Impact Assessment
EDC	Eco-development Committee
EPA	Environmental Protection Act
FDA	Forest Development Agency
GIZ	Gesellschaft für Internationale Zusammenarbeit
GOI	Government of India
GPCB	Gujarat Pollution Control Board
HPCB	Haryana Pollution Control Board
HW	Hazardous Waste
IIT	Indian Institute of Technology
IITRC	Industrial Toxicology Research Center
JFMC	Joint Forest Management Committee
JnNURM	Jawaharlal Nehru National Urban Renewal Mission
LEAP	Local environmental action planning
MoA	Ministry of Agriculture
MIDC	Maharashtra Industrial Development Corporation
MoEF	Ministry of Environment and Forests
MoUD	Ministry of Urban Development
MoWR	Ministry of Water Resources
MPCB	Maharashtra Pollution Control Board
MSW	Municipal Solid Waste
MWML	Mumbai Waste Management Ltd
NAP	National Afforestation Programme
NCEF	National Clean Energy Fund
NEERI	National Environmental Engineering Research Institute

NEP	National Environmental Policy
NGO	Non-Governmental Organization
NGRI	National Geophysical Research Institute
NHAI	National Highway Authority of India
NPC	National Productivity Council
NPRPS	National Programme for Rehabilitation of Polluted Sites
NRCA	National River Conservation Authority
NRCP	National River Conservation Plan
NRHM	National Rural Health Mission
PCC	Pollution Control Committees
PIL	Public Interest Litigation
PLI	Public Liability Insurance
PPP	Public Private Partnership
PWD	Public Works Department
SFDA	State Forest Development Agency
SME	Small, Medium Enterprises
SPCB	State Pollution Control Board
SPMU	State Project Management Units
TNPCB	Tamil Nadu Pollution Control Board
TSDF	Treatment, Storage and Disposal Facilities
FICCI	Federation of Indian Chambers of Commerce and Industry
ASSOCHAM	The Associated Chambers of Commerce and Industry of India
ICMR	Indian Council of Medical Research
NHAI	National Highways Authority of India
ULB	Urban Local Body
UPPCB	Uttar Pradesh Pollution Control Board
UT	Union Territory
WB	World Bank
WBPCB	West Bengal Pollution Control Board

Introduction

Rapid urbanization and industrialization in India, as witnessed in the past two decades, has led to the generation of large quantities of solid and hazardous waste in several regions of India. As per the latest available data with the Central Pollution Control Board, there are 41523 industries that generate 7.90 million tonnes (mt) of hazardous waste across the country, with the top generators located in the states of Maharashtra (22.84%), Gujarat (22.68%) and Andhra Pradesh (13.75%) followed by Rajasthan, Tamil Nadu, Madhya Pradesh and Chhattisgarh States with a generation of more than 2.5 lakh tonnes per annum. Out of the total generation 3.98 mt is recyclable while 3.32 mt is suitable for dumping in landfill or disposable through sale for reuse and 0.60 mt needs incineration. There are 36 common hazardous waste treatment, storage and disposal facilities (TSDFs) in 16 States/UTs. The wastes generated in the remaining states have limited options for disposal due to barriers in interstate movement of hazardous wastes. This has led to areas contaminated by toxic and hazardous substances, which pose a risk to human health and the environment. These areas are what we commonly refer to as contaminated sites or polluted sites.

On the international front, while historically, the quantum of waste generation is higher in the developed countries, at the same time, practices for handling, disposal of waste and rehabilitation of polluted sites in these countries are found to be mature. Several OECD countries like USA, Canada, Germany, Australia and others have developed well established programs for rehabilitation of polluted sites. In USA, the Superfund Programme provides well structured legal frameworks in the form of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and The Superfund Amendments and Reauthorization Act (SARA), 1986 that have clear delineation of institutional authorities for specific activities related to remediation of contaminated sites, application of polluter pays principle for assigning liability and recovery of remediation costs, addressing funding mechanism to address emergency response situations. The Brownfield programme addresses the perspective of long term, effective reuse of remediated lands by community engagement and land development and provides comprehensive financial mechanisms through loan, grants available to the land developers. Similar comprehensive mechanisms are observed in Canada and Australia through execution of provisions in the Environment Quality Act and Contaminated Land Management Act respectively. Germany and Netherlands have comprehensive soil quality regulations and standards to ascertain the seriousness of contamination, need and urgency for remediation and remediation standards to be reached for appropriate reuse of land. In Romania a well structured environment fund with clear cut delineation of institutional responsibilities to manage the fund.

Globally, USA is one of the largest generators of hazardous waste. Hazardous waste generation in the USA has been approximately 37 million metric tons per year from 1993 to 2001. USA has around 1600 priority contaminated sites in the country while another 50+ are termed as proposed to be identified as contaminated. In Canada the waste generation was estimated at 8 million tonnes in 1986 which decreased to around 6 million tonnes annually by 2006. Dating back to the period of 1993-1998 Germany produced 13 million tonnes and had the highest reported hazardous waste generation load amongst all EU countries. As per the latest available statistics, all the federal states of Germany have initially listed down 90,517 potentially contaminated abandoned waste sites, 112,368 potentially contaminated abandoned industrial sites 202,885 potentially contaminated abandoned former armament production sites and 3,240 potentially contaminated abandoned military sites.

Considering the increasing trend of urbanization, industrialization and hence industrial hazardous waste generation in recent past, many developing countries like India, China have been looking to having an established framework to deal with rehabilitation of polluted sites in line with the international practices.

The Government of India, through the Ministry of Environment and Forests (MoEF) is implementing a project on Capacity Building and Industrial Pollution Management (CBIPMP) with financial assistance from the World Bank. The two-fold purpose of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites; and to support the development of a National Programme for Rehabilitation of Polluted Sites (NPRPS).

This report provides a critical analysis of the existing Indian and International systems with regard to legal, institutional and financial frameworks to deal with rehabilitation of polluted sites. The review leads to the understanding of the elements required to build upon the NPRPS for India.

For the review of the current systems from legal, institutional and financial perspectives in India and those in select countries USA, Canada, Australia, Germany, Netherlands and Romania we have followed 14-step framework for rehabilitation of polluted sites. The framework is presented below.



The table below provides the requirements of each of these 14 steps and the scope of review performed under each step under the legal, institutional and financial mechanisms.

Table 1: Structure and Approach of the Review based on 14 step rehabilitation process

Step	Description	Review aspects		
		Policy, laws	Institutions	Financing
1. Identification of probably contaminated sites	A legally mandated, structured procedure for identifying polluted sites and submitting their details for further investigation to authorities	Legal definitions and criteria of polluted sites where such definitions exist. Legal mandate of agencies to identify	Institutional framework (structure and capacity of institutions) for identification of polluted sites	Sources of funding in current efforts for identification of polluted sites

Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task - 2 Overview of International Practices

Step	Description	Review aspects		
		Policy, laws	Institutions	Financing
		contaminated sites where such mandates exist.	where such a framework exists.	
2. Preliminary Assessment/Site Inspection- Investigations	<p>A preliminary assessment of the site shall be conducted to understand if the site poses no/some threat to human health and environment and site inspection is then carried out for sites that have some threats by taking samples of air, water and soil at the site.</p> <p>Boundary of the site shall be determined and ownership of the site shall be reconfirmed. Based on samples collected sites will be scored depending on groundwater, air, soil pathways.</p>	<p>Legal procedures/ guidelines for preliminary assessment or site inspection of identified polluted sites to ascertain the type and level of contamination. (including legal mandate and authority of agencies to enter sites for the purpose of investigations where such authority exists)</p>	<p>Institutional framework (structure and capacity of institutions) for carrying out preliminary assessment of polluted sites where such a framework exists.</p>	<p>Funding sources from existing programmes or organisations for these activities, budget allocation of existing regulatory bodies.</p>
3. Notify, delineate the polluted sites, issue moratorium, fix the liability.	<p>Once a site is confirmed to be contaminated, a notification to that effect must be declared publicly, that identifies the site as a contaminated site that is included in the National Priority List for rehabilitation.</p> <p>Designated institution to report a list of contaminated sites. Categories of sites may be inbuilt into the national priority list and similar categorization could be done for the notification process.</p> <p>Parallel to notification, parties responsible for contamination need to be identified and liability of carrying out remediation/paying the cost of remediation to be assigned on them.</p>	<p>Existing legal mechanisms for notification of a site as “contaminated”, delineate a site with details of the contaminated land such as owner/occupier details, location details, type and extent of contamination and legal authority to issue moratorium.</p> <p>Regulations that identify liable parties, types of liability and extent of liability in the context of polluted sites or in related contexts.</p>	<p>Role and capacities of institutions in notification, tracing out responsible parties, ordering a responsible party to remediate or pay for remediation.</p>	<p>Understanding the process of identification of the polluter and calculation of his liability from the angle of Polluter Pays Principle.</p>
4. National Priorities List (NPL) Site Listing Process	<p>The programme managing institution shall maintain a list of confirmed contaminated sites which shall be called the National Priorities List (NPL). It shall also be responsible for applying the prioritization criteria to determine the</p>	<p>This step is an outcome of steps #1,#2 and #3 where legal procedures towards listing a site as a priority site, authorizing a body as the custodian of the list are reviewed.</p>	<p>No specific review from an institutional perspective</p>	<p>Not relevant</p>

Step	Description	Review aspects		
		Policy, laws	Institutions	Financing
	order in which sites are to be rehabilitated	In addition, rules and procedures for establishing the prioritization criteria, procedures for public hearing/comments are looked at.		
5. Remedial Investigation/Detailed DPR	A detailed assessment and the preparation of a Detailed Project Report (DPR) for the rehabilitation of the site shall be commissioned. The output of the report shall provide details of the technical remediation activity to be conducted, cost and time of rehabilitation, stakeholder engagement, and post remediation monitoring. The DPR shall provide multiple options for rehabilitation, with an analysis of the options and a recommended approach.	Legal procedures/guidelines for remedial investigation of sites entered in the NPL for preparation of detailed techno-economic feasibility of remedial options. Legal procedures authorising to relevant agencies to enter sites and conduct remedial investigation	Role and capabilities of institutions in DPR preparation. Procedures for accreditation of third parties for preparation of DPR, bidding and selection procedures of third parties and laboratories.	Existing programmes/organisations that fund remedial investigation/preparation of DPRs
6. Detailed Cost, Plan and responsibility analysis: based on the DPR output.	The DPR shall present more than one option for rehabilitation of the polluted site. Each option will have impacts to costs, time, social issues and land related issues. The institution managing the NPRPS, the local agency, the local government such as the district collector, municipal body or the district magistrate, affected parties such as the owners, occupiers, NGOs, and those facing downstream impacts would need to be consulted to determine the best option to take forward.	This step follows step #5.	No specific review from an institutional perspective, it follows step 5.	Not relevant.
7. Funding requirement identification: availability/generation of the funds.	Funds are required to undertake remediation and to manage the NPRPS. The programme would have to define the process of raising funds, maintaining funds and disbursing funds for remediation activities and programme management. At this point it is assumed	No specific review from a regulatory perspective	Any specific institution led mechanisms for funding remediation such as imposing penalty on responsible parties, ordering them to pay or	Identification of programmes and organisations that fund remediation of contaminated sites, realisation from polluters,

Step	Description	Review aspects		
		Policy, laws	Institutions	Financing
	that the liable party and the extent of liability have been determined from above step. An estimated cost of remediation would need to be raised on the basis of methodology that applies to the site and a demand for the same must be made to the liable party.		remediate etc.	funds of the Governments and all other sources of financing for such sites. Drawing a comparison with important Central Government programmes to understand if good practices can be implemented in this sector as well.
8. Remedial Design/Remedial Action	An accredited private agency shall prepare a technical design for remedial action at the site. The technical design for remedial action shall be approved by the local agency before proceeding for physical activity at the site.	No specific review from a regulatory perspective	Role and participation of institutions in remedial action and construction completion. Procedures for accreditation of third parties for preparation of DPR, bidding and selection procedures of third parties and laboratories.	No specific review from a financial perspective
9. Construction Completion. Complete Physical Cleanup	This step signifies completion of physical cleanup construction. An accredited private agency hired by local agency shall execute the actions necessary to complete the physical cleanup at the site as per DPR.	Legal authority to determine remedial goals and final use of land after rehabilitation. Guidance and model documents on completion and closure assessments that the regulatory framework would refer.	Please refer to step # 8.	No specific review from a financial perspective
10. Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse.	This step is aimed at ensuring that remediation actions taken place provide for the long-term protection of human health and the environment.	Please refer to step #9	Institutional framework and stakeholder management	Programmes/ organisations that fund post-remediation actions

Step	Description	Review aspects		
		Policy, laws	Institutions	Financing
11. Monitoring and Evaluation	The site shall be monitored periodically to ensure pollution limits are within the values as determined by the end goals of the rehabilitation plan and that the land is being used for the purpose as permitted by the end results.	Legal responsibility of agencies to conduct monitoring of polluted sites, remediated sites. Legal mandate for monitoring of contamination from natural disasters.	Role and capacities of institutions in monitoring and evaluation	Programmes/ organisations that fund monitoring and evaluation
12. Recover Costs	Where sites have been rehabilitated using government funds, fully or partially, an attempt has to be made to recover the costs from the liable party. This may also be possible for orphan sites also.	Legal provisions for the recovery of costs incurred in the remedial process from responsible party or parties. Role of insurance policies for liability coverage.	Institutional participation in cost recovery. Please refer to step # 7.	Understanding instances where recovery of cost has been possible
13. National Priorities List Deletion	Upon the completion of the Rehabilitation activities the site shall be marked in the database as 'rehabilitated' and any planned monitoring of the site shall commence	No specific review from a regulatory perspective	No specific review from an institutional perspective	No specific review from a financial perspective
14. Site Reuse/ Redevelopment	Local government shall designate the site use as per the rehabilitation plan and handover the land for use. In case end goals were changed or rehabilitation was completed to an extent different from the original plan (with approval from all parties), the local government shall determine the final end use for the land and hand over the land to the rightful user. Control of the site shall be handed over to the appropriate party for the use permitted in the rehabilitation plan by order of the local government	No specific review from a regulatory perspective	Please refer to #10	Understanding instances where post remediation site has been reused/ redeveloped and how it has paid back the cost of remediation, if possible

CHAPTER 1 Review of Current Systems in India

1. Review of Policy and Legal Frameworks

Until the mid 1970's there were very few initiatives in India to legislations for pollution control at the national level barring- The Orissa River Pollution Act (1954) and the Maharashtra Prevention of Water Pollution Act (1969), which were two some of the early state enactments in this field. By and large it was recognized that environmental protection was an inherent part of the process of development and government planning. Various states followed suit and prompted the central government to initiate legislation; the first one was for water pollution vis-à-vis the Water Act (1974). In the 1980, a high level government appointed committee ("Tiwari Committee") compiled and reviewed over 200 existing laws related to environmental protection. Their review found three major shortcomings in the Indian legislative setup:

- Many of the laws were an updated version of earlier laws which had primarily been used to promote development through resource utilization;
- The laws lacked statements of explicit policy objectives; and
- There were no procedures for reviewing the efficacy of the laws.

These translated into a gap in implementation of laws related to environmental protection into rulings. Overall, the report by the Tiwari Committee highlighted the complexity of statutory environmental protection in India.

Rules pertaining to environmentally safe disposal of hazardous waste came into effect in 1989 (Hazardous Waste Rules, 1989). Any industry dealing with hazardous waste disposal was supposed to have 'consent' from the Pollution Control Board. Enforcement of rules, however, was not adequate, with instances of waste dumped into rivers, by the side of the road or mixed with municipal solid waste.

A petition to the Supreme Court identified that the concerned Ministry was not in a position to address the situation and had difficulty in taking stock of the situation viz. (a) number of hazardous waste generating units in India and the quantity of hazardous waste generated; (b) quantities of hazardous waste coming into India for dumping / recycling; or (c) steps being taken by the concerned agencies to implement the rules. Therefore, in 1997 under the supervision of the Supreme Court, a high powered committee (MGK Menon Committee) on management of hazardous waste was set up. A report by the Menon committee was compiled and submitted to the Supreme Court in 2002, which described the situation as grim for India; and made recommendations on issues. The Supreme Court, however, was unable to deal with the report till 2003 when it set up the Supreme Court Monitoring Committee (SCMC) to follow through with the directions of the Menon report findings.

Among the many recommendations of the committee, the two recommendations specifically relevant to rehabilitation of polluted sites are a) the preparation of a nationwide inventory of dumpsites and b) preparation of a rehabilitation plan for these.

This section details the findings on policy and legal frameworks related to the management of hazardous waste as well as remediation of polluted sites.

In summary, the findings are presented in the table below. The subsequent sections present a review of existing legislations, policies based on the 14 step rehabilitation framework.

Table 2: A summary of legal review

Rehabilitation step	Policy/legal – Review Results
1. Identification of probably contaminated sites	<p>The legal framework need to define a site, a contaminated site with specific mention of type and level of contamination as per pre-fixed risk identification criteria in terms of trigger values based on air and water pathways.</p> <p>Currently there is no formal legalized procedure to identify and report a probably contaminated site.</p>
2. Preliminary Assessment/Site Inspection- Investigations	<p>Hazardous Waste Rules (schedule 4), the Air Act (section 24, 25, 26, 27), the Water Act (section 20, 21, 22, 23) mandate the SPCBs and the Pollution Control Committees of the Union Territories to investigate suspected cases of violation under these statutes. However, a specific regulation on monitoring of soil contamination is lacking in the current framework.</p> <p>Chapter II of Environment (Protection) Act (EPA) mandates central government to provide authority to CPCB and SPCBs to carry out preliminary investigation or hire technically competent agencies to carry out investigations. Chapter II of EPA also delineates procedures to take samples from site investigations and has provisions to develop new guidelines for site investigations that may be utilized under NPRPS.</p> <p>Legal provision on declaring a site as contaminated and is not clearly written down.</p>
3. Notify, delineate the polluted sites, issue moratorium, fix the liability.	<p>Notification and Delineation:</p> <p>The EPA section 3.3 empowers the ministry to create an authority and issue notification to address a specific issue such as the rehabilitation of polluted sites. Replicable provisions are found in the CRZ notification under the powers of the EPA where the central government may restrict activity at a site for a specified period towards pollution abatement. Similarly, East Kolkata Wetlands (Conservation and Management) Act, 2006 specifies the creation of East Kolkata Wetlands Management Authority that may prohibit activities related to development or extraction of resources in the wetlands.</p> <p>The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004) requires that every intent to use forest land for the non-forest activities must be approved by the Forest Advisory Committee set up by the central government.</p> <p>The CEPI moratorium on the critically polluted industrial clusters provides the details of each of sites, the nature of restrictions placed on activities on these sites, the duration of the notification (and restrictions), and the action to be taken by relevant authorities.</p> <p>Liability:</p> <p>The following provisions under the existing legal framework may be referred and replicated while developing NPRPS:</p> <p>The Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008, , sub rule (1) of Section 25 is clear in its mandate making the occupier, importer, transporter and operator liable for all damages caused to the environment due to improper handling of the hazardous wastes.</p> <p>Sections 15 and 20 of the National Green Tribunal Act delineate</p>

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Rehabilitation step	Policy/legal – Review Results
	<p>provisions for compensation to victims of environmental damage from hazardous waste handling, rehabilitation of environmental damage and application of precautionary principle and the polluter pays principle while passing any order for damage compensation.</p> <p>Under East Kolkata Wetlands (Conservation and Management) Act, 2006, if the East Kolkata Wetlands Management Authority determines that the character of a wetland has been changed, then the person responsible may be ordered in writing to restore the land to its original character or use mode.</p> <p>The Batteries (Management and Handling) Rules, 2001, uses introduces extended liabilities to include the producers, dealers, recyclers, auctioneers, importers and consumers of batteries as responsible parties to prevent environmental degradation. The Mineral Conservation and Development Rules, 1988 the liability for rehabilitation is placed squarely on the mine operator.</p> <p>The E-Waste (Management and Handling) Rules, 2011 introduces the concept of “Extended Producer Responsibility” in case of management of wastes.</p> <p>Section 6 of the Civil Liability of Nuclear Damages Act. 2010 provides statutory limits on liability. In respect of nuclear incidents in cases of a reactor having a thermal power above 10 MW, liability is to a maximum of Rs. 1500 crores. Further Section 6 (2) provides that the amount may be increased from time to time by a notification passed by the Government. Under Section 8 the Operator prior to commencing operation is required to take an insurance policy or provide such other financial security or combination of both to cover his liability under Section 6.</p>
4. National Priorities List (NPL) Site Listing Process	No formal listing procedure exists.
5. Remedial Investigation/Detailed DPR	<p>Guidelines for remedial investigation being developed as part of the on-going study shall be a part of the Indian legal framework. Provisions of Chapter II of EPA may be referred.</p> <p>Land Entry, Acquisition for Remedial Investigations, Remedial Actions and Post Remedial Use:</p> <p>The acquisition of land for public purposes has been legally valid from the inception of the Constitution. The Constitutional provision for eminent domain may be found in Article 31A (1) of the Constitution.</p> <p>The Land Acquisition Act, 1894 amended 1984, sets out the provision for the government to acquire land where it appears to the government that the land is needed or likely to be needed for any public purpose. As per the Act, in case of urgency (as directed by the government) the Collector may directly take possession of the land.</p> <p>Section 11 of the Environment (Protection) Act, 1986, the Hazardous Waste (Management, Handling and Transboundary Movement) Rules Section 23 of The Water (Prevention and Control of Pollution) Act 1974 and section 24 of The Air (Prevention and Control of Pollution) Act, 1981, confer powers on the enforcing agencies, to enter “any place” for assessment and collection of samples where they feel necessary. But none of the provisions clarify if the site a source or a receptor site.</p>

Rehabilitation step	Policy/legal – Review Results
	Notifications made by the central government under the Environment (Protection) Act, provide a list of 63 government officials/designations that are authorized to enter premises for inspection. The notification identifies the various other acts under which these officials have been appointed.
6. Detailed Cost, Plan and responsibility analysis: based on the DPR output.	No specific review from a regulatory perspective. Step # 3 to be referred
7. Funding requirement identification: availability/generation of the funds.	No specific review from a regulatory perspective. Step # 3 to be referred
8. Remedial Design/Remedial Action.	Guidelines for remedial action being developed as part of the on-going study shall be a part of the Indian legal framework. Provisions of Chapter II of EPA may be referred. Landry entry and acquisition are described under step # 5.
9. Construction Completion. Complete Physical Cleanup	No specific review from a regulatory perspective.
10. Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse.	No specific review from a regulatory perspective.
11. Monitoring and Evaluation	<p>The Hazardous Waste Rules identify the CPCBs and the SPCBs responsible for monitoring industry for compliance with the rules.</p> <p>As per the Disaster Management Act, 2005, the pollution control boards are identified as the agency for monitoring the developing severity of the disaster and ascertaining if an area is fit for re-entry. The guidelines mention that the decontamination activities would be done with the help of other agencies and industries. This provision may be referred under NPRPS.</p>
12. Recover Costs	Step # 3 to be referred.
13. National Priorities List Deletion	No provision for listing, maintaining, updating a list of site exists in the current framework.
14. Site Reuse/ Redevelopment	No specific review from a regulatory perspective

For details of all Acts and Rules please refer to appendix D.

1.1. Review of legal definitions and identification criteria of polluted sites

A legal definition of polluted sites is important. from two main aspects. The definition will allow for easier identification of polluted sites and encourage wider stakeholder engagement on the issue by parties with varying levels of technical capabilities. It may lower disputes and in cases where a dispute arises, the courts will benefit from a definition enshrined in the statute. With a legal definition, the designation or notification of polluted sites is less likely to be challenged by interested parties in court. Both these help make a national programme more efficient and simplify processes related to stakeholder management. Apart from the task of identification, the definition is also the starting point to authorize rehabilitation activities at a polluted site and equally, to what level should the site be remediated.

A legal definition of polluted sites that meets the above requirements does not exist in India. Many inferences can be made from the various statutes available, but a scientific definition that includes standards and risk criteria do not exist. Most of the instances where remediation has occurred in India or is in progress have been based on the confirmation of the presence of a hazardous contaminant, and acceptance of evidence that the contaminant has created or has the potential to create harm to humans, livestock or the environment.

Similarly, the current statutes do not provide a clear definition of act of remediation in the context of polluted sites. In determining the extent of liability for polluters, courts and tribunals have reached conclusions on the extent of remediation that must be taken up in individual cases. There are no definitions or criteria to designate the level to which the presence of certain contaminants must be reduced in order for the site to be rehabilitated to permit a specific end use.

The Environment (Protection) Act, 1986, or the EPA, Chapter 1, section 2, sub-section (e) defines “hazardous substances” as any substance that is liable to cause harm to human beings, other living creatures, plants, micro-organism, property of the environment. The phrase “liable to cause harm” makes this a broad flexible definition which is a useful basis for defining polluted sites. Sections 3, 6 and 25 confer broad powers and details the steps that the central government is required to take for laying down procedures and safeguards for the handling of hazardous substances. It

Environment (Protection) Act and Rules 1986

The EPA was the basis of Environmental (Protection) Rules, 1986 which set standards for emission and discharge of environmental pollutants from various industrial processes, and defined processes for preventing and abating environmental pollution by the central government. The state government may set more stringent standards. The rules also outline the procedure that the central government must follow while prohibiting or restricting the location of industries and carrying on of processes and operations in an area. The rules lay down the procedures for collection, submission of samples for analysis, and the form of laboratory reports thereon. It lays down the functions of laboratories and the manner of giving notices to the various industries, sectors and operations. The rules also provide for prohibitions and restrictions on handling of hazardous substances and require the filing of environmental statements. The present rules have been given effect by the central government by passing a number of notifications. There are standards regarding the iron ore industry, dying industry, organic chemicals manufacturing industry, plaster of paris industry, brick kiln sector, petroleum industry, sponge iron plants, sulphuric acid plants, diesel generator sets industry, among others.

provides for the detailed provisions under which the central government is empowered to make and enforce rules. Thus powers conferred under the Environment Protection Act on the Central Government are broad enough to develop at complete any regime of law for the remediation of polluted sites.

Schedule II of the Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008, provides a comprehensive list of waste constituents with concentration limits where they pose significant risk and are to be considered hazardous. Presence of these constituents above the permissible concentrations is being by the CPCB and the SPCBs as a current measure to determine if a site is contaminated and if it requires action for rehabilitation.

During the course of this study a draft definition for contaminated and ‘probably’ contaminated sites was under consideration of the MoEF. This is reproduced below.

Draft Definition of Contaminated Site

A. Definition for Contaminated site

Sites with confirmed presence of contaminants or substances caused by human at the concentrations that either pose a significant risk and/or impact to human health or keeping in view regard to present or future land use plan.

Notes:

I. Confirmed presence of contaminates shall be done through scientific studies/approved globally harmonized methodologies. The contaminants shall be as per the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.

II. Natural contaminants are not treated as contaminants or substances, which basically are anthropogenic.

III. Land would not be considered contaminated merely due to presence of hazardous substances in, on or under the land. The level of contaminants should be above risk level. Land may be contaminated even if it was contaminated partly or entirely by the migration of contaminants into, onto or under the land from other land.

IV. The risk may be considered based on human health and/or the environment; and may be accessed on the basis of present or planned future land use as well as use of ground water and surface water.

V. The risk approach may also be used with a combination of contaminants [interaction between contaminants] or certain quantities of contaminants, wherever applicable.

B. Definition for Probably contaminated site

Sites with alleged [apparent] [purported] but not scientifically proven the presence of contaminants or substances caused by human at such concentrations can either pose a significant risk to human health or environment with regard to present or future land use plan [pattern] or exceeding specific concentrations or guidelines values prescribed by the MoEF or Central Pollution Control Board from time to time.

Notes:

I. The contaminants shall be as per Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.

II. Natural contaminants are not treated as contaminants or substances, which basically are anthropogenic.

III. The risk may be considered based on human health and/or the environment; and may be accessed on the basis of present or planed future land use as well as use of ground water and surface water.

IV. The risk approach may also be used with a combination of contaminants [interaction between contaminants] or certain quantities of contaminants, wherever applicable.

On studying this draft the following points may be raised:

1. While this definition considers human health, it may miss out on the preservation of natural resources and ecosystems that support, inter alia, economic, social and human

development while facilitating ecosystem conservation, regeneration and restoration¹.

2. The term ‘caused by human’ is not consistent with note III where contaminants may migrate from other land.
3. The definitions leave the interpretation of ‘significant risk and/or impact’ open. We might need supporting standards to better define this term with introduction of precautionary and trigger values based on surface water, ground water, drinking water and air pollution pathways
4. While ‘current and future’ land use has been covered, we may need to define risk also in ‘present and future’ terms.
5. Ground water and surface water are covered, but the definition may be strengthened to be protective of sources of drinking water.
6. Examining this draft from a legal perspective:
 - A. the term ‘site’ would need to be defined.
 - B. ‘caused by human’ narrows down the definition
 - C. ‘Notes’ may not expand the definition. ‘Explanation’ may be permitted.

Among various Municipal Laws and Bye-Laws, the terms “any dirt, dung, bones, ashes, night soil, rubbish, filth, polluted and obnoxious matter” have been used for monitoring, collection and segregation of wastes. The definition of these terms is wide enough to include hazardous waste, which in turn poses the problem of intermingling of the two streams.

More recent municipal by laws such as those of Greater Mumbai, explicitly refer to the Hazardous Waste Rules for a definition of hazardous waste and also direct segregation of waste into six categories which may be referred in defining a contaminated site.

Categories of wastes

- 1) *Bio-degradable (wet) waste*
- 2) *Specified hazardous waste*
- 3) *Bio-medical waste*
- 4) *Construction and demolition waste*
- 5) *Bulk garden and horticulture waste including recyclable tree trimmings.*
- 6) *All other no biodegradable (dry) waste including recyclable and non-recyclable waste.*

1.2. Legal mandate of agencies to identify contaminated sites

The requirement under step is to have a formal, legalized procedure for reporting a site as probably contaminated. It strives to address the questions such as a) who would report contamination b) how would they report contamination c) who they would report contamination and d) what the managing body would do with the reported contaminations.

Meeting these requirements would entail the need for a regulatory framework for Government agencies, at central and state levels supported by regulatory bodies that own or control a land. This framework would obligate these agencies to survey and report contamination within their jurisdiction. It would also mean having a formal procedure/ window for general public to report contamination to a managing body. The managing body would in turn be mandated to review the

¹ As defined in the The UN General Assembly resolution 66/288. “The future we want”, Rio +20 Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task – 2 Overview of International Practices

contamination reports and maintain a comprehensive database of all reported contaminations for further action.

At present, identification of a site at a state level is through informal information obtained by the SPCBs from any party/media reports of health outbreaks around a polluted site, chance identification of pollution while carrying out regular compliance audit by SPCBs in critically polluted industrial sectors etc.

From the review of history of identification and reporting of contaminated sites in India, as delineated below, it is clear that there is no existing legal framework that addresses the requirement of this step.

Supreme Court Monitoring Committee (*the Menon Committee or SCMC*)

Based on the recommendations of SCMC in 2003 the Supreme Court directed the State Pollution Control Boards to prepare an inventory and rehabilitation plan for waste dumpsites within their jurisdiction. The inventories and plans were further to be cross checked by the Central Pollution Control Board and submitted to the Committee. This was the first instance of a legal/judicial mandate to identify contaminated sites. By 2006, fifteen states, namely Arunachal Pradesh, Bihar, Chhattisgarh, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Meghalaya, Mizoram, Manipur, Nagaland, Sikkim, Tripura, Uttaranchal and six Union territories, namely, Andaman & Nicobar Islands, Chandigarh, Daman, Diu & Dadra Nagar Haveli, Delhi, Pondicherry and Lakshadweep reported that there were no illegal hazardous waste dump sites in their respective areas. Thirteen states reported a total of 141 hazardous waste dumpsites as follows; Andhra Pradesh (40 in Hyderabad Region only), Assam (05), Gujarat (07), Karnataka (18); Kerala (01), Maharashtra (10 in MIDC Area), Madhya Pradesh (04), Orissa (21), Punjab (14), Rajasthan (01); Tamil Nadu (02), Uttar Pradesh (10) and West Bengal (08).

Comprehensive Environmental Pollution Index (CEPI)

In 2009, as a continued effort from 2003, the Central Pollution Control Board (CPCB) commissioned the application of the CEPI to 88 industrial clusters within the country. The list was determined by the CPCB in consultation with the Ministry of Environment and Forests. Collection of data related to environmental pollution is one of the mandated functions of the CPCB which provides it the ability to undertake such exercises.

These two instances demonstrate that there have been judicial mandates that have led to identification of contaminated sites in the country. These efforts for identification have been the basis for prioritizing some of the pilot rehabilitation activities undertaken by MoEF. Neither of these lists however is formed as a part of a continued, legally mandated reporting procedure by the general public or government agencies and it is not legally required to be actively updated by agencies such as the state pollution control boards or CPCB.

Some enabling provisions that may assist authorities to identify polluted sites are the permits / consents / authorizations that are granted under the Air Act, the Water Act, the Environment Protection Act and particularly under the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008. The Hazardous Waste Rules, Rule 5 (9) specifically requires the State Pollution Control Board to maintain a register of all conditions (including conditions for disposal) imposed for management of hazardous wastes.

1.3. Procedures and Legal Mandate for preliminary investigation activities

The purpose of this step is to understand the extent to which a “probably contaminated” site poses threat to human health and/or the environment. This is achieved through collection of samples of air, water and soil from the site and their laboratory analysis. Based on samples collected and tested, sites may be scored on degree of contamination and associated need for remediation. At this stage the ownership of the site may be confirmed along with confirmation on tentative boundary. This would therefore require:

- a) procedure to carry out preliminary investigations and site inspection
- b) an institution legally authorized to direct preliminary investigation
- c) an institution legally authorized to enter a site to carry out preliminary investigation
- d) procedure to prioritize sites for remediation based on its level of contamination
- e) an institution legally authorized to take decision on inclusion of a site based on the results of the preliminary investigation in the NPL
- f) declaring a site as contaminated.

Some of these requirements are addressed by the existing regulations of the country.

The Environment (Protection) Act 1986 (EPA) authorises the central government to decide which institution (Chapter II, (3), (2), (x), (xi)) will carry out assessment of a site. The Act also provides for the government to obtain services from accredited private agencies and parties for the purpose. This authority to outsource preliminary investigation work is extended to both the Central and State Pollution Control Boards (CPCB and SPCBs). Currently several SPCBs are outsourcing the assessment work to private laboratories due to shortage of manpower and lab facilities. The CBCB has also accredited private laboratories for the purpose.

Further, under the Hazardous Waste Rules (schedule 4), the Air Act (section 24, 25, 26, 27), the Water Act (section 20, 21, 22, 23), the SPCBs and the Pollution Control Committees of the Union Territories are obligated to investigate suspected cases of violation under these statutes. The CPCB is also empowered to undertake preliminary investigation as a part of its monitoring activities.

The existing legal provisions to enter a site to carry out investigations, remediation are presented in section 1.6 of this report.

The procedures for taking samples for investigation are clearly defined in the Environment (Protection) Act Chapter 3, section 11. These procedures are found to be robust and are effectively being used by the SPCBs in order to conduct their investigations. Chapter II of the Act also has provisions for the creation and maintenance of guidelines for these activities and as such new guidelines may be prepared for the national programme that would provide a consistent approach that is in line with the remediation methodologies being developed for the programme. Using this provision, new guidelines for carrying out preliminary investigation and ranking a site need to be adopted as a part of the statute.

However, once preliminary investigation is over, legal provision on “declaring” a site as contaminated and is not clearly specified..

1.4. Existing legal mechanisms for notification of sites and legal authority to issue moratoriums

This step of rehabilitation framework is aimed at designating a site as “contaminated” and to apply restrictions on the site to warrant further activities.

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Suitable and relevant legal mechanisms for notification and issuing moratoriums have been found to exist in India that may be replicated for management of management of contaminated sites in other statutes/enactments. These are listed below:

1. The Coastal Regulated Zones (CRZ) Notifications, 2001, These restrict industrialization and urbanization activities in eco-fragile areas like the Doon Valley, Dahanu etc under the powers of the EPA.
2. East Kolkata Wetlands (Conservation and Management) Act, 2006 specifies the creation of East Kolkata Wetlands Management Authority with functions and powers that specifically include measures to abate pollution in the wetlands. The act also defines one of the functions of the authority to be the enforcement of land use controls in these areas, albeit with approval from the district collector. The authority may also stop or prohibit activities related to development or extraction of resources, and may also demolish structures put up in the wetlands.
3. The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004) requires that every intent to use forest land for the purpose of non-forest activities must be approved by the Forest Advisory Committee set up by the central government. The rules provide the details of how to constitute the committee and the process and templates to be used by parties desirous of using forest land for non-forest activities. No state government may issue an order to change the status of reserved forest areas without prior approval from the committee. The primary objective of the act is to check further deforestation that may cause ecological imbalance and environment deterioration.

Among the various mechanisms studied, three distinct notification modes are evident, namely category based; group site and individual site.

1.4.1. Category based summary notification

Statutes such as The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004), and the East Kolkata Wetlands (Conservation and Management) Act, 2006 and The Coastal Regulation Zone Notification provide for a set of categories. These categories then have listed criteria related to the location and nature of areas with a summary of applicable activity restrictions. There is a direction to create central and/or local authorities that are tasked with identification and categorization of sites that meet the criteria mentioned in the notification. Therefore, newer sites that meet the criteria of a particular category, automatically get included from time to time and the activity restrictions prescribed in the statute/ notification start to apply to such sites.

As a part of the national programme an initial inventory of polluted sites is being prepared and at the same time processes are being developed to periodically update this inventory. The Environment (Protection) Act under section 3.3 adequately powers the ministry to create an authority and issue notification to address a specific issue such as the rehabilitation of polluted sites.

1.4.2. Group Site notification

The CEPI moratorium on the critically polluted industrial clusters was issued under the powers granted to the central government by the EPA. This is an example where a group of sites identified as a part of a concerted study were identified and an official notification was issued. The notification specifically provides the details of each of these sites, the nature of restrictions placed on activities on these sites, the duration of the notification (and restrictions), and the action to be taken by relevant authorities. Newer sites subsequently identified do not get included under the

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same notification; however the moratorium on any individual site within the group may be lifted without affecting the status of others.

1.4.3. Individual Site Notification

Notification of Eco-Sensitive areas and archaeological sites, are examples where the government utilizes its legal powers to notify a specific individual site and place certain restrictions that applicable to that site alone. While the nature of the notification and restrictions may be similar and follow a standard guideline, only one single site is included in the notification.

1.5. Regulations that identify liable parties, types of liability and extent of liability in the context of polluted sites

The importance of this step is to identify the party responsible for contamination of a site to a) recover the costs associated with remediation of a contaminated site right from preliminary investigation till completion of remediation b) to obtain payments (based on techno-economic feasibility analysis) for an upcoming remediation work in a contaminated site c) assign the responsibility of carrying out remediation and post remediation monitoring of a contaminated site.

Clear rules describing how a party can be assigned liability for polluting a particular site are lacking in the current system. Lack of clear rules presents complications based on current ownership of the contaminated land. In the current system, it is difficult to assign liability in case of legacy contamination, where contamination has caused by Industries who have long back abandoned the site and it is now being owned by a private entity that is not responsible for contamination. Another situation is when industries from a distance illegally dump hazardous wastes at a site owned by another entity or an orphaned site. Moreover, laws do not provide any consistent approach on whether “strict” or “absolute” liability is to be assigned. Pollution does not confine itself to the initial location where the problem first occurred. Contaminants may enter ground water, lakes and rivers, crops and be even carried by air. Another aspect where the currents laws lack is assigning retroactive liability i.e. assigning responsibility for polluting acts carried out even before enforcement of an appropriate regulation in this regard. Any.

The National Environment Policy, 2006 finds that criminal liability may not have proved sufficiently effective and offers the principles of “Legal liability”. *“The principle of legal liability may be viewed as an embodiment in legal doctrine of the “polluter pays” approach, itself deriving from the principle of economic efficiency.”* The policy also notes that alternative approaches to civil liability may apply such as “Fault Based Liability” and “Strict Liability”.

Reiterating these principles, the Environment (Protection) Act 1986, section 9, states that the expenses incurred by an agency towards remedial measures may be recovered from the person responsible for the pollution.

The Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008, section 16 places primary responsibilities on the occupier for safe and environmentally sound handling of hazardous wastes generated in his/her establishment, and attempts to address illegal dumping on the basis of enforcing compliance of waste management procedures. These rules also find the importer liable for waste that was generated outside the country and imported by way of intent to recycle or as a part of a larger product. Section 25 directly addresses the issue of liability. Although sub rule (1) of Section 25 is clear in its mandate making the occupier, importer, transporter and operator liable for all damages caused to the environment due to improper handling of the hazardous wastes, Sub rule (2) adds considerable confusion by stating that “any

financial penalties” levied by the state Pollution Control Boards for violation of the provision of the Rule shall require prior approval of the Central Pollution Control Board. This Rule has not been interpreted by any decision of court.

While the Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 have detailed directions for setting up, closure, emergency preparedness and other aspects related to atomic energy operations, the major problem with these rules is that they do not have any specified procedure for the actual waste disposal. The Rules do not prescribe any guidelines for site characterisation and merely provide that no person shall dispose of radioactive waste in a location other than that which is prescribed in the authorisation granted under Rule 3. Thus it is not clear on whom the responsibility rests for site selection for disposal of radioactive waste. Ideally, the government should conduct site characterisation surveys and decide upon the most appropriate location for disposal of radioactive waste. State and public participation in the planning and development of repositories is essential in order to promote public confidence in the safety of disposal of such waste and spent fuel.

The Civil Liability for Nuclear Damage Act, 2010, holds the operator of a nuclear installation liable on the basis of no fault liability. The only exceptions for liability are when nuclear damage is caused in certain force majeure circumstances or when nuclear damage is suffered by a person on account of his own negligence. In addition, there is a direct focus on the ownership of the nuclear material itself. Liability continues to reside with the originator of the material until another installation or operator has taken possession of the nuclear material. The act provides a ceiling on the amount for liability, however requires that liability in excess of the limit is to be borne by the government. It also directs the government for the establishment of a fund to meet its part of the liability.

The Public Liability Insurance Act and Rules, 1991 being one of the statutes which were legislated in the wake of the Bhopal disaster creates a statutory duty upon owners to take out insurance policies before they begin to handle any hazardous substance, with the purpose of providing immediate relief to victims in case of any accident that occurs while handling hazardous substances. The Act also lays down the procedure to make an application to the Court if the authority has reason to believe that the owner is handling hazardous material in contravention of the provisions of the Act. Thus, the Act provides a framework to ensure prompt payment to victims of an accident. Whether the amount insured will be sufficient to provide relief to all the victims affected by the incident is questionable.

The National Green Tribunal was set up under The National Green Tribunal Act, 2010 for the effective and expeditious disposal of cases relating to environmental protection and to give relief to persons affected. The act lays down the jurisdiction, powers and procedure of the Tribunal. The Act also provides for penalties for non-compliance with the orders of the Tribunal. It also lays down the procedure for recourse where offences are committed by companies or government departments. The Tribunal has jurisdiction over civil cases related to the environment and uses the various principles of liability to provide relief and compensation to the victims of pollution. Sections 15 and 20 of the Act delineate provisions for compensation to victims of environmental damage from hazardous waste handling, restitution of such environmental damage and application of principles of sustainable development, the precautionary principle and the polluter pays principle while passing any order.

However, the penal provisions under the Act limit the penalty to extend to only INR 10 Crore and INR 25,000/- a day for continuing default and/ or imprisonment which may extend to 3 years. The fine payable by Companies may extend to INR 25 crore and INR 1 lakh a day in case of continuing default.

The Batteries (Management and Handling) Rules, 2001, section 4 uses introduces extended liabilities to include the producers, dealers, recyclers, auctioneers, importers and consumers of batteries as responsible parties to prevent any untoward environmental degradation. This act places certain liabilities on each of these agencies, with the attempt to build a lead recycling process. The rules prescribe the duties of various stakeholders and but do not prescribe any remedial action, penalty or fine for contravention of such duties.

Certain NGOs are of the view that after the enactment of The Environment (Protection) Act, 1986, the affected party cannot prosecute the polluter directly. As per the act, the petitioner's case is against the regulator (in this case it is the SPCB or CPCB) who is responsible for maintaining the wholesomeness of the environment of the area. Thus, it has become an indirect approach. It is argued that India may have lost the ability to use tort law against the polluter with The Environment (Protection) Act, 1986. Prior to such enactment the polluters were directly prosecuted under the Public Nuisance Act and or other civil/ criminal law. Moreover under section 15/1 and 15/2 of the act the penalty or jail term for failure to comply or contravene the act is specified with no mention of compensation to affected parties.

An important element of East Kolkata Wetlands (Conservation and Management) Act, 2006 is that if the East Kolkata Wetlands Management Authority determines that the character of a wetland has been changed, then the person responsible may be ordered in writing to restore the land to its original character or use mode. Where the person defaults in performing the restoration at his/her own expense, the authority may undertake the restoration and recover the costs thereof as arrears of land revenue. The act also makes offences cognizable and non-bailable with penalties and jail terms, and additional daily fines for continued contravention of the act.

Municipal laws in certain cases do provide a basic framework for identifying the liable party. A case in example is the Karnataka Municipal Corporations Act, 1976 identifies joint and several liability of owners, the person primarily liable for the payment of water charges and occupiers of a premise for offence in relation to water supply. These offences however do include any activity that leads to the pollution of water.

The Himachal Pradesh Municipal Act, 1994, requires the owner, part owner, or occupier of any building or land in an unwholesome state to cleanse it, when sent a notice by the municipality. This is true for licensed establishments also, and the municipality with the state government's approval may ask the occupier to discontinue the use of the place and make alterations to render it no longer a nuisance. The liability under this is limited to fines ranging from INR 25 to INR 100 only. An important part of liability under this act is written in its bye-laws, that indicates that if the municipality requires the owner to undertake a piece of work and the owner defaults, the municipality would take up the work and recover the costs from the owner.

The Uttar Pradesh Municipalities Act, 1916 has a clause, where, in the instance of default by the owner, the occupier may also be held liable in the absence of the owner.

To build an effective national programme designed towards rehabilitation of polluted sites, the provisions delineated under several acts at different levels of jurisdictions need to be combined judiciously.

1.6. Legal authority to agencies to enter sites and conduct remedial investigation

Authority to enter a private land to take samples for preliminary as well as remedial investigations is of utmost importance with respect to decision making for remediation.

Inherited from the provisions for entry in Section 11 of the Environment (Protection) Act, 1986, the Hazardous Waste (Management, Handling and Transboundary Movement) Rules 23 (to be read with schedule VII) confer powers on the enforcing agencies, to enter premises for assessment and collection of samples where they feel necessary. In addition to this, The Water (Prevention and Control of Pollution) Act 1974 section 23 and The Air (Prevention and Control of Pollution) Act, 1981, section 24 both contain provisions for the enforcement authority (any person empowered by SPCBs) to enter 'any place'. A significant aspect of these provisions is that there is no specific limitation on whether the authority can investigate the source of the pollutant or the receptor. This is useful from the standpoint of remediation of polluted sites, as in this case the preliminary (and subsequent) investigations require access to receptor sites.

Notifications (S.O. 83(E), [16/2/1987] for inspection, S.O.84 (E), [16/2/1987] for taking samples) made by the central government under the Environment (Protection) Act, provide a list of 63 government officials/designations that are authorized to enter premises for inspection. The notification identifies the various other acts under which these officials have been appointed.

The Andhra Pradesh Forest Act, 1967, while not specifically preventing the act of pollution, does however list 'poisoning of water' as an offence under it. The act also provides for unrestricted entry by officials (Powers of the Forest Settlement office are under section 9 and are in relation to inquiries made under section 8) to private and government forest land for the purpose of inspection.

The Maharashtra Groundwater (Development and Management) Act, 2009 which was recently passed by the assembly provides for the setting up of the state groundwater authority that apart from other functions will also act to prevent the destruction of ground water resources by polluters that may include rural and urban bodies. The authority will also identify areas that are critical and have a high risk of pollution and accordingly manage permissions for extraction and recharging. The act also allows for the use of force to enter the premises where unapproved sinking, extraction and use and pollution of groundwater may be going on. The state government shall also make the rules for the measures by which the state authority shall restore the quality of water to required standards at the cost of the polluter.

1.7. Legal authority to determine remedial goals and final use of land after rehabilitation

The issue of land is relevant to the problem of managing and rehabilitating polluted sites. Laws for both acquisition and appropriation exist and are extensively used in various functions of the government.

In the context of rehabilitation of polluted sites there is a severe difficulty in acquisition of land (or its use) for remediation. When the polluted land does not belong to the polluter, then express permission is required to get access to the land in order to carry out remediation of the site. The bigger issue is the lack of regulation that permits the state to "acquire" private lands and remediate them, in the interest of the public. While eminent domain² is widely used in India, there are very clear and specific public uses of the land subsequent to acquisition by the state. For polluted site remediation, there may not necessarily be a subsequent public use, which would then require the states to sell or lease the land to another private party.

² Eminent domain is the principle under the constitution that legitimises the takeover of private property by the Government for public benefit. In the context of a polluted site, where there are no takers for performing the remediation effort for any of a variety of reasons, it may be necessary for the government to take over the land to clean it up and prevent damages to other nearby land or water resource or contamination of food produced on the site (in the case of polluted agricultural land).

In the absence of a specific law defining the disposal of land, the existing modes of legal acquisition are contentious within the context of polluted site rehabilitation. Another complicating factor is that land is a state subject. Any National Programme therefore would have to be integrated with land related laws and practices at the state level too.

The acquisition of land for public purposes has been legally valid from the inception of the Constitution. The Constitutional provision for eminent domain may be found in Article 31A (1) of the Constitution. The Land Acquisition Act, 1894 amended 1984, sets out the provision for the government to acquire land where it appears to the government that the land is needed or likely to be needed for any public purpose.

An important point is that the government may also acquire the land for the use of a Company. The act gives the Collector the authority to decide the amount of compensation to be awarded, for which purpose the claimants must respond to the notice to appear in person and present their claims. Interested persons may also present their objections. It is useful to note that in case of urgency (as directed by the government) the Collector may directly take possession of the land. The term 'urgency' is, however, not further defined, and it cannot be concluded if it would be applicable for rehabilitation of severely contaminated land. Should a party not be satisfied with the compensation amount they may approach the Court. Among other matters related to compensation the Court may not consider any increase to the value of the land acquired likely to accrue from the use to which it will be put when acquired. This has specific relevance to orphan sites, which upon rehabilitation, will increase in value.

The Industries (Development and Regulation) Act, 1951, does indicate that it is the responsibility and authority of the central government to determine licensing of industrial activity on the basis of proposed location of the industry. It does not specifically mention the factors to be taken into consideration for the purpose. As such, it does not provide any insights into any type of risk assessment activity conducted by the government in order to avoid location of industry in environmentally sensitive areas or near critical water bodies. While not specifically enforcing conditions for location of industry, The Environment (Protection) Rules, 1986 does provide a set of nine important factors that the central government must take into consideration while prohibiting or restricting the location of industries and carrying on of processes and operations in different areas.

The details above show that the current constitutional and legal frameworks provide the Government (or the collector as the representative of the Government) under certain circumstances the right to acquire a land. From the perspective of remediation of polluted sites, however, it is important to have a regulatory framework to empower the managing body (of the national programme) to i) issue request for consent from the current owner of the land to enter the land for all possible activities at a site till end of remediation or ii) to issue administrative order if consent is denied or iii) go to the court with a request for judicial order for the managing body to enter a site for completion of remediation iv) entering into a agreement or issue an administrative/judicial order to the current owner to take up remediation of the land as a potentially responsible party.

In the context of orphan sites, repeated default by owner/occupier or where an owner/occupier is bankrupt, this may require additional provisions empowering the relevant authority to acquire the land and dispose off after remediation.

It is also to be analysed if all remediation work needs the managing body to permanently acquire a land or it is a temporary displacement till the end of post- remediation activities.

1.8. Legal responsibility of agencies to conduct monitoring of polluted sites

The Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008, Schedule VII identifies the CPCBs and the SPCBs responsible for monitoring industry for compliance with the rules. From time to time the CPCB also issues direction for monitoring of specific sites that have been previously identified as critically polluted (such as those identified by the CEPI). The SPCBs are required to file periodic reports with the CPCB on the status of these sites. Where there have been instances of remediation activity, the SPCBs continue to monitor sites from time to time.

The Atomic Energy (Safe Disposal of Radioactive Wastes) Rules 1987 as mentioned above have a comprehensive framework for handling radioactive substances which is instructive insofar as radioactive substances are most a kin in their capacity to do damage to humans and the environment, to hazardous substances. It is relevant to note that Section 6 (v) requires authorized persons to evaluate risks and to monitor the environmental impact of the waste disposal operation.

The Disaster Management Act, 2005, under “Guidelines for Chemical Disaster” has provided for a complete network of disaster management authorities that include the central level, state level and district and local level governments, for effective management of disasters within the country. Under the role of stakeholders, the pollution control boards are identified as the agency for monitoring the developing severity of the disaster and ascertaining if an area is fit for re-entry. The guidelines do mention that the decontamination activities would be done with the help of other agencies and industries. Expanding the mandate of the state pollution control board in this manner is something that may also be considered for the NPRPS.

1.9. Legal provisions for the recovery of costs incurred in the remedial process from responsible party(s)

When a site is polluted there are losses to human life and health, livestock, water resources, revenue generating capability of the land, bio diversity, etc. Rehabilitation may include the reparation to all these apart from the removal of contaminants to a safe levels. Compensation may also be required to be paid to inhabitants or other parties whose livelihood is affected. This section examines the legal aspects of recovering various costs of rehabilitation from the responsible party and how the quantum of these costs is determined.

The National Environment Policy, 2006 encourages the use of economic principles in environmental decision-making. In some cases it is difficult to explain compensation amounts and compensation awardees. For effective compensation, the concept of natural resource accounting may need to be applied in a forward looking manner, as the effect of pollution is not limited to current losses, but the loss of future opportunities too.

The Mineral Conservation and Development Rules, 1988, is one of the few laws that contain a specific chapter (number V) on the duty to protect the environment. It prevents mining companies from leaving mine sites abandoned and requires them to conduct phased restoration, reclamation and rehabilitation of lands affected by their operations before they conclude operations at the mine. Thus the liability for rehabilitation is placed squarely on the mine operator.

Under Section 6 of the Civil Liability of Nuclear Damages Act. 2010 statutory limits on liability have been placed. For example, under this Act the Operator’s liability in respect of nuclear incidents in cases of a reactor having a thermal power above 10 MW, the liability is to a maximum of Rs. 1500 crores. Further, Section 6 (2) provides that the amount may be increased from time to time by a

notification passed by the Government. The most noteworthy and relevant provision under this Act is that under Section 8 the Operator prior to commencing operation is required to take an insurance policy or provide such other financial security or combination of both to cover his liability under Section 6.

The E-Waste (Management and Handling) Rules, 2011 introduces the concept of “Extended Producer Responsibility” in case of management of wastes. It also creates a regulatory frame work from cradle to grave of a product. These rules place the onus on the producer to prevent his/her product from being a cause for pollution by setting up collection centres as a part of a system to retrieve the product at the end of its useful life for recycling. Producers are also responsible for creating awareness about their product through publications, advertisements and packaging contents.

Under the Indian Forest Act, 1927, there are certain activities that are prohibited within the areas of reserved forests. The law states that those conducting these prohibited activities shall be punishable with imprisonment for a term which may extend to six months, or with fine which may extend to five hundred rupees, or with both. Also, the court may direct that compensation for damage done to the forest be paid by those convicted of conducting these prohibited activities.

In 1996, when the forest matter (T. N. Godavarman Thirumalpad Vs. Union of India Writ Petition (Civil) No. 202 of 1995) was being heard by the Supreme Court, India was losing its forests at an alarming rate. The State of Forest Report Published by the Forest Survey of India every two years had revealed rapid decline of the forest cover in almost all the states and particularly in the north-eastern states. The Supreme Court with the landmark order of 12.12.1996 expanded the definition of the forest for the purposes of the Forest (Conservation) Act, 1980 giving specific directions, which had far reaching impact in saving our forests. In this ruling the court directed that compensation be calculated on the basis of NPV (Net Present Value) of the forest as a resource. The court identified that there were multiple revenue and non-revenue (positive externalities) uses of the forest, and the liability of the erring party must extend to an economic value for duration of 50 years which takes into account the value of regeneration and not just restorative value alone. This decision paved the way for all future decisions on methods for determining compensation.

Under section 9 of the Environment (Protection) Act 1986 where there has been damage to the environment or there is a significant risk of damage, government agencies or those directed by them may perform restoration activities. The nature and extent of rehabilitation will be as per the government’s decision. The costs of these efforts may be recovered from the person responsible for the pollution along with suitable interest.

2. Review of Institutional Mechanisms

2.1. Approach to review

Our review of institutional frameworks has two parts, assessing (i) the current institutional structure to deal with rehabilitation of contaminated site and (ii) the technical, financial capabilities of these institutional to take up remediation.

The institutional structure to deal with the rehabilitation of contaminated sites in the country depends on the delegation of power by the legal framework. Our review of the institutional structure starts with the review of the legal provisions of the current legal framework.

Once clarity is there on the institutional structure, the next step is to assess if the institutions mandated to carry out certain activities under a remediation step have the capacity (technical and financial) to execute the activities.

Specifically our review aims at understanding if there is:

- i) a centrally authorized managing body to deal with remediation of contaminated sites in India
- ii) state representative(s) who coordinate and execute on behalf of the central body
- iii) if yes, then if these institutions are capable both with respect to their infrastructure and skill set to deal with issues related to remediation and identification of gaps thereof
- iv) if there are guidance notes, standards, model documents and procedures that facilitate discharge of the responsibilities

2.1.1. Review of current institutions

Our review reveals that there is no central managing body in the country mandated by the legal framework with the responsibility of dealing with remediation of contaminated sites. However, with respect to management of hazardous waste (generation, processing, treatment, package, storage, transportation, use, collection, destruction, conversion, recycling, reprocessing, offering for sale, transfer etc), the country's legal framework (reference rule 5 of Hazardous Waste Management, Handling and Transboundary Movement Rules, 2008, hereafter referred to as HWM Rules 2008)), delegates responsibilities to the State Pollution Control Boards (SPCBs) for execution of powers, the Central Pollution Board for supervision of SPCBs and the Ministry of Environment and Forest (MoEF) as the nodal agency for designing and formulating policies, rules, and delegation of powers. Land being a state subject as per the Indian legal framework, the responsibility of identification and allotment of disposal site remains with the Department of Environment of the state government.

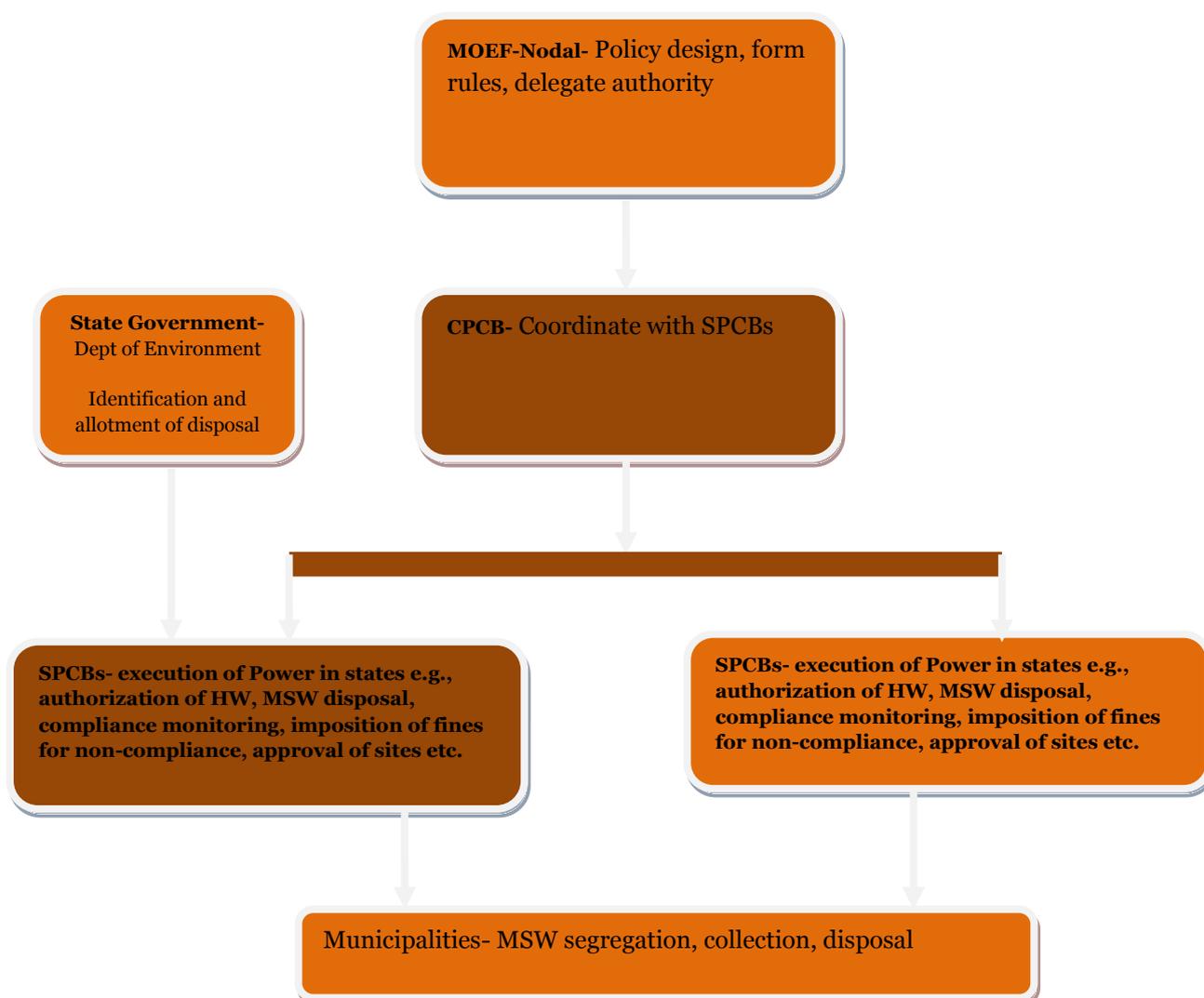
Another important rule to look at in this regard is the Municipal Solid Wastes (Management and Handling) Rules, 2000 (hereafter referred to as MSW Rules 2000), where a similar delegation of authority is observed. The Department of Environment of the state government being the nodal agency, municipalities are the executing agencies within their jurisdiction, SPCBs the coordinating agencies in the state, CPCB being the coordinating agency among the states (detailed in the figure on the next page).

Since both these Rules cover the entire gamut of hazardous waste management right from generation till segregation, disposal, reuse and sale, all these activities are pertinent to remediation of contaminated sites. Hence, our institutional review for remediation of contaminated sites has covered analysis of this existing structure and its capabilities with respect to remediation of contaminated sites. So our review covers the following aspects

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- a) Prevailing institutional structures and capacities for dealing with polluted sites and management of toxic materials and hazardous wastes, mechanisms for dealing with the problem of contaminated sites.
- b) In the absence of a specific agency mandated to deal with these issues (at national, state or local levels) responsibilities of different agencies managing related aspects such as health and revenue
- c) Role and involvement of relevant institutions outside the government and current practices for the management of liability issues.
- d) guidance notes, standards, model documents and procedures that facilitate discharge of the responsibilities

Figure 1: Current Institutional Structure for Waste Management



The findings are based on an assessment of information available in the public domain as well as inputs received during stakeholder consultations held as part of this study.

The analysis of the current institutional structure provided in the table below is based upon the provisions in the existing legal framework in the country. From the table it is apparent that the

responsible institutions under the ambit of hazardous and municipal solid waste management rules (as depicted in figure 1) do not have the mandate to carry out some of tasks that are critical to complete a remediation cycle.

Table 3: Analysis of concerns in the current institutional structure:

Concerns in the institutional structure	Observation
Does any of the provisions covered under HWM rules 2008 mandate identification and reporting of illegal dumping/ site contamination by SPCBs to CPCB/MoEF?	No
Does any of the provisions covered under HWM rules 2008 mandate SPCBs to trace down a polluter/ responsible party for a legacy illegal dump site?	No
Does any of the provisions covered under HWM rules 2008 mandate SPCBs to order the responsible party for removal/cleaning of HW dump?	No
Does any of the provisions covered under HWM rules 2008 mandate SPCBs to order for clean up/remediation of HW before an industry abandons a site?	No
Does any of the provisions covered under HWM rules 2008 mandate SPCBs to enter a land and conduct remediation?	No
Does any provision under MSW rules 2000 cover identification and reporting of illegal dumping/ site contamination by municipalities to SPCB?	No
Where there are industries within the jurisdiction of municipalities does any provision under MSW rules 2000 ensure that the segregated MSW that reach MSW dump site is devoid of any HW from the industries? In other words, do MSW rules ensure that the MSW dump sites are not contaminated with HW?	No

While, the Hazardous Waste Rules have identified various authorities and their corresponding responsibilities for the management of hazardous waste in India, management of contaminated sites requires the involvement of several other government agencies, in addition to those responsible solely for environmental protection.

This is necessary due to two critical issues that need to be addressed when dealing with contaminated sites

- Ownership of contaminated land and restriction on the use of such contaminated lands.
- Health impacts resulting from the contamination

These are important aspects that may not be regulated by the environmental protection agencies by themselves. It is important for these agencies, through the MoEF, to engage with other Ministries of the Government of India that deal with land development, land use, own large tracts of land for public use or deal with public health.

For example, in most of the cases in the country, identification of a contaminated site occurs informally by the SPCBs when there is a media report on outbreak of health hazards in a region due to contamination. But, there does not appear to be any formal procedure where the health department of the state government submits a formal petition to the SPCBs requesting their intervention or where SPCBs are obligated to obtain a periodic health outbreak report of the state from the health department.

Similarly, there do not appear to be formal procedures for state government departments on Agriculture/Irrigation, Water, Urban Development, Municipal Corporations and other large land holders such as Railways, Port Authority etc to formally submit reports /petitions to SPCBs on

contamination of land under their jurisdiction affecting agriculture, water and also coordinate with the SPCBs during actual remediation and reuse of land after remediation.

Hence the institutional structure as mandated by the legal framework will require:

- a) Clear mandate on responsibilities to be carried out by the existing institutions under each step of remediation
- b) Involvement of other ministries, state government departments and large government land holders to execute different steps of a remediation cycle

2.1.2. Review of capacity of current institutions

Based on information collected during our interactions with CPCB and SPCB and other stakeholders and also from their websites and annual reports, the table below presents the major areas of concern that need to be addressed while addressing the requirements of the steps of the remediation cycle.

Table 4: Analysis of concerns in the current institutional capacity

Concern in the institutional capacities	Observation
Do the CPCB and all SPCBs have the required skill set in required number needed to conduct remediation? (e.g., engineers, hydro-geologists, chemists)	No
Do CPCB and all SPCBs have adequate laboratory infrastructure to conducts sample analysis required in pre and post remediation stages?	No
Do CPCB and all SPCBs have adequate fund to handle entire remediation in case of emergency response situation?	No

2.2. Findings from review

The table below provides a summary from review of institutional mechanisms, to corroborate these observations, a detailed and step wise analysis is provide in the subsequent sections.

In table 8 at the end of this section, details of various institutions and their involvement/ relevance to NPRPS, going forward, has been presented.

Table 5: Summary of review of institutional mechanisms

Rehabilitation step	Institutional – summary findings
1. Identification of probably contaminated sites	<p>The current legal provisions do not confer powers to the existing institutions in the hazardous waste management hierarchy to regularly identify and report contaminated sites.</p> <p>There is no provision to formally include other large government departments (urban development, agriculture, irrigation, public health etc), agencies, land holders, NGOs and general public to formally report a suspected case of contamination.</p>
2. Preliminary Assessment/Site Inspection- Investigations	<p>The legal provisions under the EPA, the Air Act, the Water Act and the Hazardous Waste Management Rules confer authority to CPCB and SPCBs to enter a site and collect samples.</p> <p>However, SPCBs are lacking in laboratory infrastructure, staff strengths and skill sets to carry out the assessments on their own,</p>

Rehabilitation step	Institutional – summary findings
3. Notify, delineate the polluted sites, issue moratorium, and fix the liability.	<p>There is no institutional authority provided by the current legal framework to notify a site as a probably contaminated site and delineate the details of the land in the notification.</p> <p>CEPI has so far been applied by CPCB successfully to identify and notify critically polluted industrial units. Though it is not a part of any legal mandate but may be extended to include contaminated sites in general.</p> <p>Institutional structures and activities of Forests Authority, The Coastal Zone Regulatory Authority, and Wetlands Authority may be referred while determining the institutional requirements for notifying a site as probably contaminated.</p>
4. National Priorities List (NPL) Site Listing Process	<p>Followed from step#1, lack of regulatory mandate to identify contaminated sites by the existing institutions lead to the fact there currently there is no institute designated as the custodian of the priority list of contaminated sites.</p>
5. Remedial Investigation/Detailed DPR	<p>No delegation of power is observed as per the legal framework for the existing institutions in the hazardous waste management hierarchy to prepare DPR for the remediation work.</p> <p>Currently, due to local presence, for all funded activities of DPR preparation are being supervised by SPCBs who are tendering out the work to competent technical firms, mostly international.</p> <p>SPCBs lack in-built institutional capacities in terms of staff skill set, strength and laboratory set up to carry out the activities on their own,</p>
6. Detailed Cost, Plan and responsibility analysis: based on the DPR output.	<p>This step is an outcome of step5 and the decision is taken based on DPR outputs. Though as stated above there is no delegation of power to the existing institutions, the decisions for all the on-going funded projects are taken by a technical review committee at the Ministry that consists of representatives from the Ministry, Funding Agency, CPCB and concerned SPCBs.</p>
7. Funding requirement identification: availability/generation of the funds.	<p>In general no fund structure or an institutional structure to manage the fund for remediation purposes is available.</p> <p>GPCB has an environment fund structure and a team structure to manage the fund as a part of a ruling of the Gujarat High Court on a plea by a resident of Boriya Khurad village of Sabarkantha to assess and restore environmental damages and compensate affected people.</p>
8. Remedial Design/Remedial Action.	<p>The legal provisions do not confer any power to CPCB or SPCBs to enter a site enforce remediation or enter the land for carrying out remediation.</p> <p>The level of expertise required to carry out the requirements of the step in most situations is only available with some of the international remediation firms. SPCBs lack infrastructural and technical capabilities.</p>
9. Construction Completion. Complete Physical Cleanup	<p>This step follows step 8.</p>
10. Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse.	<p>This step requires development of partnerships with state government, CPCB/SPCBs, parties interested in the land and the local community. However, the country is currently at a nascent stage of developing a remediation framework and no such structure or precedence exists in the country for review.</p>

Rehabilitation step	Institutional – summary findings
11. Monitoring and Evaluation	Hazardous Waste Management Rules authorize CPCB and SPCBs to monitor industrial pollution though no specific mention of contaminated sites is provided. As stated in the above steps, capacity building of SPCBs in terms of laboratory set up, staff skill set and manpower may be considered to meet the technical requirements of the activities carried out in this step.
12. Recover Costs	There is no existing institutional structure laid down in the legal frameworks to trace down the responsible parties and recover costs from the liable parties in the form of administrative orders to them or entering into a financial agreement with them.
13. National Priorities List Deletion	The requirement of step 4 needs to be addressed first in order to reach this step.
14. Site Reuse/ Redevelopment	This step follows step 10.

2.2.1. Institutional framework for identification of polluted sites where such a framework exists

From the perspective of an institutional structure, no institutions coming under the ambit of hazardous waste/municipal solid waste management is mandated to identify and report contaminated sites in their jurisdiction and thereby being the custodian of an updated list/inventory of contaminated sites in the country.

Most SPCBs that we interacted acknowledges that there is lack of a clear legal mandate and a structured procedure for identification of polluted sites. In the majority of cases, identification of contaminated sites resulted from discovery and reporting by an external source –NGOs, local community near the dumpsite, media reports etc. SPCBs undertook an assessment of contaminated sites in 2003 as a response to a judiciary directive by the Supreme Court and not as a part of regular regulatory requirement. Also, the identification was based primarily on obvious signs of contamination such as visual discoloration (from chromium contamination) etc and not through a structured sample analysis procedure.

However, SPCBs under the hazardous waste management rules are authorized to monitor non-compliance with regard to these rules whenever such a case is reported to them. This provision if made more specific to contaminated sites may cater to the requirement of regular identification of contaminated sites by SPCBs.

Some SPCBs have developed internal processes for determining contamination at sites. For example, APPCB has National Accreditation Board for testing and Calibration Laboratories (NABL) certified laboratory infrastructure that they use for sample analysis for determination of type contamination whenever they are aware of existence of an illegal dump. However, due to lack of mandate, infrastructure and standard procedure all SPCBs are not following this method.

From interactions with municipal corporations it is apparent that there also exists lack of jurisdictional powers of the municipal corporations to review the wastes generated from small and medium scale industries within their jurisdiction. While some of these smaller industries may be disposing wastes through the municipal corporations and other urban local bodies, there is no clear mandate provided to these municipal institutions to check for hazardous waste contamination.

Another important set of institutions that contribute in identification of contamination are NGOs. NGOs help highlight local issues of pollution and bring severe cases to the attention of the

government agencies for timely resolution. However, the legal framework does not put forward a formal procedure for identification of sites by NGOs and to notify to a managing body.

From the perspective of institutional capacity the following things were observed:

- In most of the cases in the country, it is likely that the contaminated sites form due to illegal dumping of wastes. Illegal dumps occur mainly due to high cost of transportation of wastes borne by the waste generating units to the disposal/treatment facilities and due to lack of staff strength at the SPCBs delaying the process of approval of the hazardous waste generating units to dispose of their wastes to the treatment facilities. The case study provided in the box below describes such a situation.

Unutilized TSDF capacity due to lack of capacity at SPCBs

(source: Minutes of Meeting with Ramky, for details please refer to appendix)

One of the concerns of the existing TSDF facilities is under-utilization of their capacities. This occurs mainly due to lack of compliance by industries in transporting their recyclable/incinerable hazardous wastes to the TSDF facilities. In states like Maharashtra, Gujarat and Andhra Pradesh about 70% of the recyclable/incinerable wastes are transported to Ramky's TSDF facilities whereas in Tamil Nadu, West Bengal the figure is around 20%. Lack of capacity at SPCBs leading to delays in approval of authorization to industrial units for transportation of hazardous wastes to the TSDF facilities, may be a cause. For example, there are about 1200 industrial units in Tamil Nadu that have applied for authorization from TNPCB to transport the hazardous wastes to Ramky facilities but only about 250 have obtained approval.

- SPCBs further recognized that in the absence of a standard methodology for identification of contaminated sites, identification of sites from one state to another may differ in procedure and may not be convincing to appellate authority that it is an actual case of contamination due to lack of standardization.
- It is observed through desktop review and interactions with SPCBs that most the SPCBs lack in laboratory infrastructure number and skill set of technical staff (e.g. hydro-geologists, engineers) to conduct sample analysis to identify a site as probably contaminated and confirming a site as contaminated etc. In such situations, currently the only option the SPCBs have to overcome this is to sub-contract their work to a technical competent agency.
- With respect to infrastructural capacity, CPCB and SPCBs need to have an well established laboratory infrastructure (e.g. certification from NABL), technically competent staff in adequate number to deal with activities like collecting samples from sites, maintaining a computerized comprehensive list of probably contaminated and contaminated sites, screening priority sites etc. For this technically competent staff in engineering, hydro-geology, and computer database management is required. The table below shows that almost all the SPCBs reviewed have i) inadequate laboratory infrastructure – all the regional offices do not have regional laboratories (refer the first two rows) ii) none of the SPCBs is availing the sanctioned staff strength i.e. there are vacant posts in the SPCBs that may be filled in with required skill set (refer the last two rows).

Table 6: Laboratory infrastructure and average staff strength in SPCBs

SPCB Infrastructure ³	Karnataka	West Bengal	Andhra Pradesh	Madhya Pradesh	Punjab	Meghalaya	Tamil Nadu	Kerala	Rajasthan	Gujarat	Maharashtra
Regional Offices	34	10	24	25	12	0	31	3	13	22	12
Regional Labs	8	5	10	12	2	0	14	1	12	7	6
Sanctioned staff	710	330	NA	NA	546	103	NA	NA	363		739
Staff strength	294	246	278	NA	406	57	697	NA	193	440	657

NA: not available

2.2.2. Role of institutions in notification

Notifications for sites are authorized by the Ministry of Environment and Forests. At present the only notification that has been done from the perspective of polluted sites is the notification of critically polluted industrial clusters using the CEPI guidelines. The institutional roles played included those of the technical assessor and advisor, the CPCB and the notifying authority, the MoEF. The notification while made to the general public through the official gazette, is directed to the enforcing agencies, the SPCBs and UTPCCs. This is because of two reasons. First, the nature of moratorium to be placed on the sites is to be effected through action and monitoring of the SPCBs and the UTPCCs. Secondly, the notification explicitly directs the SPCBs and UTPCCs to create an action plan for the critically polluted sites that fall within their areas. While CEPI does not come under a legal mandate, it has so far been applied by CPCB successfully to identify and notify critically polluted industrial units. A similar institutional structure may be followed for identification and notification of contaminated sites in general.

As mentioned above, some of the notifications may have directives issued to the SPCBs or the UTPCCs for further actions. Notification could be from the Ministry or from the state government. This may lead to the creation of committees under the board to specifically address the topic of notification, or the creation of the committee may be directed by the notification. Examples of such committees are “A committee for approval of Ship Recycling Facility Management Plan (RFMP)” in Gujarat or the “Expert Committee for Formulation of Guidelines for suitable air pollution control system in respect of alum manufacturing industries” in Maharashtra.

Other types of notification issued by the government (as discussed in the legal section earlier) also direct the creation of specific authority institutions, such as the Forests Authority, The Coastal Zone Regulatory Authority, and Wetlands Authority etc. Actions and follow-up required for notification may be included as a part of institutional responsibilities for existing (or new for the purpose of NPRPS) institutions.

2.2.3. Role of institutions in DPR preparation

The existing legal framework does not confer any power to any institution for preparation of a DPR. However, for all the funded (by the multilateral funding agencies, central government etc) activities currently going on in the country, all DPR work gets executed through the SPCB due to their local presence. Currently it is the SPCB that evaluates the work done by the agencies hired by them and this is carried out as a part of their existing procurement practices.

Remedial investigation or DPR preparation is a technical activity requiring both diverse technical skills as well as extensive laboratory resources. It requires extensive on field sample collection,

³ From Annual Reports and Websites of SPCBs

laboratory analysis of samples collected, technical knowledge on remediation methods to be adopted as per the results of the sample analysis and future use of land and financial assessment of technology options. So, right combination of staff strength and skill set is required at SPCBs to cater to the requirement of this step. A summary of annual reports⁴ from some of the SPCBs yielded the following information; about 35% of technical and around 40% of scientific positions remain vacant in the SPCBs (please refer to figure 2). And, as described above, all regional SPCB offices do not have laboratory facilities.

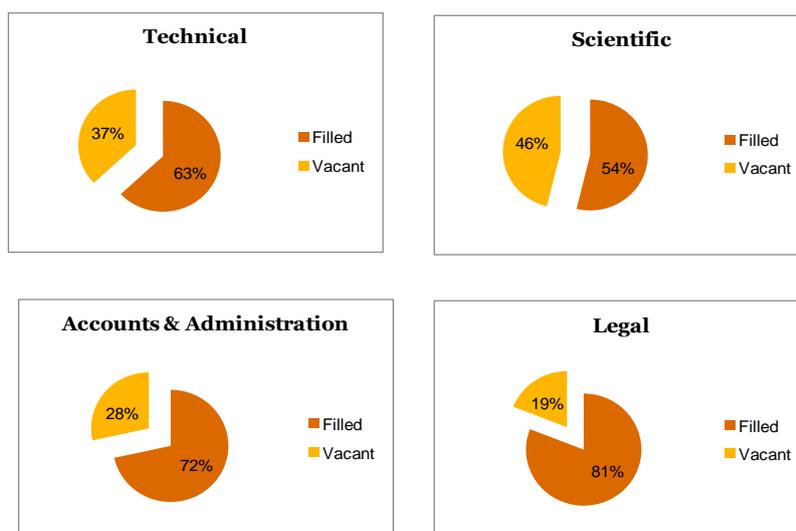
Again as per a recently concluded analytical quality control (AQC) exercise by the Central Pollution Control Board (CPCB), only 35% laboratories in the country could provide hundred per cent accurate analysis of water samples. As sample analysis forms the basis for decision making in terms of urgency of remediation, laboratories with required certifications and providing accurate results are of immense importance. More recently both Haryana and Maharashtra have made proposals to their respective state governments for increase in technical staff as well more laboratories.

DPR preparation has usually been tendered out by the SPCB or the CPCB (or its zonal office) as the case may be. Institutions that undertake DPR preparations are primarily international consortiums that include accredited laboratories or well known institutions such as Indian Institute of Technology (IIT)-Kanpur, and National Geophysical Research Institute (NGRI) in India. Most of the equipment and related resources are locally subcontracted.

In the current context, there are no guidance documents, procedures standard formats available as reference for DPR preparation and further steps. However, concurrent studies undertaken under CBIPMP are expected to meet these requirements.

Review of the DPRs is done in a systematic manner by the SPCBs or the UTPCCs involved. These institutions are also responsible for developing the decision matrix for remediation of the site for which the DPR is being prepared. The SPCBs or the UTPCCs also work to bring together the multiple stakeholders such as municipalities, local community, municipal development authorities etc either through public hearing or through individual meetings organized by the SPCBs with the identified stakeholders that may have inputs in the defining the scope of the DPR and/or the coverage of the extended outcome.

Figure 2: Vacancy in technical, scientific, administrative, legal posts in SPCBs



⁴ Maharashtra, Punjab, Karnataka, West Bengal, Meghalaya – 2008, 2009, 2010 reports from their websites. Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task – 2 Overview of International Practices

2.2.4. Specific institution led mechanisms for cost recovery and funding of remediation

Recovery of costs aims at reimbursing the costs incurred by an institution (for example: MoEF/CPCB/SPCBs) during the cycle of remediation and also compensation paid to the affected parties from the parties responsible for the contamination that leads to environmental damage and health hazards.

Under section 1.9, it has been observed that there are existing legal frameworks that consider assigning liability on responsible parties using polluter pays principle and collecting penalties from them. However, there is no existing institutional structure laid down in the legal frameworks to recover costs from the liable parties. No institution is mandated to trace down a responsible party and order a responsible party to clean up a site or to get into an agreement with the responsible party to do the clean up or pay for the cleanup action. The SPCBs, under the legal provisions, however, can issue an order to close down the water and electricity supply to the responsible industrial units to stop further contamination from their operations. SPCBs may also issue 'No further development' or closure notices to polluting industries. A case in point is GPCB, which has issued closure notices to several industries that repeatedly violate different aspects of the applicable pollution norms. The closure notices issued by GPCB to industries that violated various provisions of the EPA and other environmental acts are summarized in the following table⁵:

Table 7: Closure notices issued by GPCB

Act	Upto 31-3-09	Up to 31-3-10	Upto 31-3-11
Section 5 of EPA	98	117	124
Section 5 of EPA read with HWM Rules 2008	995	1024	1067
Section 31 A of Air Act	1649	1775	1985
Section 33 A of Water Act	3151	3444	4048

Closure notices have also been issued to responsible entities when the particular site is identified as polluted specifically to expedite the commencement of remediation measures. In the last two years GPCB has issued six closure notices to four dye and dye intermediaries and two pesticides units.

A district level approach was implemented in the state of Rajasthan successfully, where the RPCB, under a directive from the District Collector and the District Environment Committee, also undertook an assessment of HW generating units in their jurisdiction. The District Magistrate then instituted a committee to inspect select industrial units. Based on the findings of this report, the District Collector suspended the working committees of three industrial units. This approach highlights the involvement of different executive and judicial offices within a state to address the issue of contaminated sites and take collective action to prevent contamination of sites and manage contaminated sites.

Even without a straight forward mandate under the legal framework, some SPCBs have been able to successfully apply the Polluter Pays Principle actively, making the polluting entity responsible for taking up remediation of the polluted site. There are some specific cases where polluters have been asked to pay up for the pollution caused by them as in the case in Andhra Pradesh for bulk drug industries as described in the case study box below:

⁵ Source: GPCB annual reports for the years 2009-10 and 2010-11

Box 5: Successful application of polluter pays principle (source: Minutes of Meeting with APPCB, for details please refer to the appendix)

The APPCB found a cluster of bulk drug industries situated near an identified contaminated site in Andhra Pradesh responsible for the contamination. The industries were traced based on lab analysis that demonstrated that (soil) composition from the dumpsite contained chemicals that most likely originated from those bulk drug industries. Since the specific entity responsible for contamination could not be determined, the APPCB, applying the Polluter Pays Principle, penalized all the industries in the bulk drug industrial cluster.

One concern that has been expressed in this regard is the high remediation cost; in case of the priority remediation site identified in Tamil Nadu, responsible entities were small-scale tanneries that had declared bankruptcy. Hence the TNPCB contemplated undertaking remediation activities (with financial assistance from MoEF/World Bank – since application of PPP would not be possible) as it considered this site to be a significant hazard for the local population.

Hence there is a requirement of a fund allocated for urgent remediation activities. This fund structure and the structure of the institution to manage the fund is absent in the provisions of the current legal framework.

The GPCB was the only SPCB that stated the availability of an “Environment Fund” in the state which is used for financing remediation activities of polluted sites. Maintenance of this fund is the responsibility of the state government and the fund comprises direct payment of penalties, ascertained by the district judge, for damage caused to the environment. This decision was part of a ruling of the Gujarat High Court on a plea by a resident of Boriya Khurad village of Sabarkantha, and directed the district judge and collector to form a team in every district to assess damage to environment, agriculture and water resources and for compensation of affected people.⁶ The assessment team consists of GPCB members, collectorate, secretaries of forest and environment department, irrigation and water resources department, animal husbandry department, and leaders of concerned gram panchayat or municipality for the purpose of assessment of pollution and impact on environment.

2.2.5. Role and participation of institutions in remedial action and construction completion

While SPCBs have the right to enter a site for inspection, they do not have the legal mandate to enforce remediation or enter the land for remediation. In most states, any situation that requires urgent remediation action is yet to be encountered. Some SPCBs recognized that the legal framework needs to be modified to allow the SPCBs/ other authorities to take remedial action as deemed necessary.

Construction completion or the actual physical remediation of the site involves a significant amount of engineering activities at the site. The technology and expertise required is unlikely to be available locally. All current remediation initiatives have involved international firms that in turn subcontract local engineering firms and heavy machinery and equipment hiring firms. Hiring of international firms again follows the existing procurement processes of the SPCBs. Currently there is no accreditation procedure that exists with the SPCBs that may lead to a list of national and international firms competent and accredited by SPCBs to perform all remediation acts on behalf of the SPCBs within their jurisdiction. The two states where the pilot programs for rehabilitation under CBIPMP are being conducted have indentified the need to develop in house engineering

⁶ http://articles.timesofindia.indiatimes.com/2009-09-23/ahmedabad/28065109_1_district-judge-gpcb-gujarat-pollution-control-board

capabilities at SPCBs to be able to effectively manage the scope development and tendering process for construction activities. Building these capabilities is included as a part of the programme. Most other SPCBs however continue to remain short staffed in areas that are needed to manage tendering of large engineering work.

2.2.6. Institutional framework and stakeholder management

Several stakeholders have pointed to the need for a framework to determine and establish site-specific remediation requirements that have been brought out by several stakeholders. Taking the CBIPMP pilot rehabilitation sites as examples, the SPCBs perform the important role of bringing together the various stakeholders and managing their expectations. Three important objectives are met through the stakeholder management being conducted by the SPCBs

- Decisions on remediation goals and site reuse receive inputs from all affected parties and the final decisions are arrived at in consensus with these parties. The involved institutions include the local government (or urban local body) responsible for land and development, water and environment and other resource departments including agriculture, welfare and industrial departments.
- SPCBs are able to receive authority to proceed with the steps involved in the rehabilitation process from the various government departments. This include temporary authority or temporary changes to land use permissions (such as in the case of the Noor Muhamad Kunta site)
- Certain aspects of the rehabilitation process may fall under the gamut of other government departments such as the development authorities or groundwater authorities. The SPCBs are able to garner resources and other support from these stakeholders to assist with the rehabilitation activities.

In addition, involvement of civil society, NGOs and other local institutions has brought about community engagement and social approval for rehabilitation projects.

2.2.7. Role of institutions in monitoring and evaluation

The CPCB and SPCBs are required by the Hazardous Waste Management Rules to monitor industrial pollution. This responsibility is delegated in the Hazardous Waste Rules Schedule III but no specific reference to the remediated sites is mentioned in the existing framework.

Most of the SPCBs have expressed concerns about the availability of man power for adequate monitoring of sites. Monitoring activities include the monitoring of sites where the SPCBs have directed the industry to take measures to prevent or reduce pollution that is at levels above those defined in the Hazardous Waste rules. While this is not exactly the same as periodic monitoring of remediated sites, the activities involved and the institutional capabilities required are of a similar nature. The scope of activities performed by the SPCBs has increased over time leading to a greater requirement of personnel for scientific, engineering and administration functions – which is yet to be fulfilled in its entirety. Some SPCBs have also expressed concerns on the available skill sets of existing personnel and have also highlighted the need for trainings. Some SPCBs have reported that adequate infrastructure (e.g. laboratory facilities) is not available.

Data from some of the SPCBs (as indicated in table 6 above) indicates between 1 and 13 laboratories within a state i.e. SPCB's area of jurisdiction. Usually this is in the form of one central laboratory and several regional laboratories. Most of regional SPCB offices do not have laboratories. In many cases the number of labs is far shorter. This has the potential to introduce delays and inefficiencies in monitoring. Also the facilities at the central laboratory are usually different from those available

at the regional laboratories, which mean that regional offices would have to dispatch samples to the central laboratory for specific services.

A few SPCBs have also observed that a forum, where SPCBs can share experiences/good practices, will be beneficial. For instance, TNPCB has recently implemented a system for online, real time emissions monitoring of certain sensitive industries. Personnel from other SPCBs have visited TNPCB to observe this system. The availability of a forum would allow sharing of such knowledge amongst a wider audience.

Table 8: Institutions and their involvement

S.No	Entity/ Roles	Commentary on present role	Commentary on relevance and potential for involvement in future
1.	<p>Institutions for Environmental policy / planning</p> <p>a) The Ministry of Environment and Forest (National level policies and planning)</p> <p>b) State Departments of Environment (and forest)</p>	<p>a) MoEF is the nodal agency for the planning, promotion, co-ordination and overseeing the implementation of the country's environmental and forestry related policies and programmes.</p> <p>b) The State Departments of Environment (and Forest/ecology) have a mandate to work towards the preservation of the natural environment and resources including water, air and soil quality; conserve and protect flora, fauna and other natural resources; enforce environmental Acts and Rules made by the central and state governments and to coordinate various environmental policies and programs that are being conducted by the state governments. Apart from these the important functions undertaken by the DOE are the award of Environmental Clearances to industries/projects, coastal management and overseeing the activities of the state pollution control boards.</p>	<ul style="list-style-type: none"> The MoEF is the relevant apex body that may be involved in the oversight of the National Programme for Rehabilitation for Polluted Sites. Its strength lies in its coverage of multiple aspects related to conservation of the environment including prevention and mitigation of pollution due to industrial and other activities. This institution is also at the appropriate administrative level to conduct inter-ministerial interactions and central-state discussions on the topic of rehabilitation of polluted sites. The Ministry can delegate its powers authority to conduct the activities of the national programme to a specially constituted Authority. Management of funds can also be taken care of with full transparency at the ministerial level.
2.	<p>Institutions for Environmental compliance / policy enforcement</p> <p>a) Central Pollution Control Board (CPCB)</p> <p>b) SPCBs/PCC</p>	<p>a) CPCB acts as a central body with “an overall mandate” for environmental planning and its management</p> <p>b) SPCBs are responsible for advising the state governments on pollution related issues implement and enforce national standards, making them more stringent if warranted by local conditions and authorize hazardous waste disposal per rules under the EPA. We also find that larger percentage of SPCB staff comprises administrative support as against engineers and scientists. This coupled with a shortage of laboratories and similar resources may be a major roadblock in the development of the NPRPS.</p>	<ul style="list-style-type: none"> There is need a for central authority to maintain the following <ul style="list-style-type: none"> -Standards for rehabilitation -Guidelines for the rehabilitation process -National database of priority sites - Reviewing and Monitoring rehabilitation activities at the state level - Reviewing cost recovering mechanisms <p>These may be met by the CPCB's current portfolio as the coordinator of activities in individual states is in line with what is expected for the program in the future.</p> <p>The SPCBs or the UTPCCs are the on-ground enforcers of</p>

S.No	Entity/ Roles	Commentary on present role	Commentary on relevance and potential for involvement in future
			<p>compliance with environment laws today. Their reach into the local community of people and industry, experience in execution of local projects and relations with other government departments in their administrative areas make them ideal candidates for the program implementation in the field in terms of:</p> <ul style="list-style-type: none"> - Identification of sites and reporting to CPCB/MoEF - Conducting sample analysis for preliminary analysis - Screening and hiring of expert firms for carrying out detailed remedial investigation and DPR preparation - Review of DPR and submission to CPCB - Screening and hiring of expert firms for remediation - Monitoring progress of remediation - Tracing down responsible parties - Issuing administrative orders to responsible parties or entering into financial agreements - Carrying out post remediation monitoring of sites - Coordinating with local government, local community , interested land developers for land reuse
3.	<p>Other government entities:</p> <ul style="list-style-type: none"> a) Ministry of Urban Development b) The Ministry of Health and Family Welfare c) National Highways Authority of India d) Departments of Agriculture and Food under the Ministry of Agriculture 	<ul style="list-style-type: none"> a) The Ministry of Urban Development (MoUD) is nodal Ministry in charge of various aspects of Urban Development including urban water supply, sanitation & municipal solid waste in the country. b) The Ministry of Health and Family Welfare is responsible for the overall health of the people. Health risks such as those caused by pollution are also to be considered within the mandate of this Ministry. c) It is responsible for the development, maintenance and management of National Highways entrusted to it and for matters connected or incidental thereto. d) Two important responsibilities of Departments under 	<ul style="list-style-type: none"> a) With rapid urbanization and increase in industrial activity, management of hazardous waste is an issue that has become increasingly important for urban centres. It is likely that contamination from hazardous waste may have resulted in the creation of legacy or orphan sites. The nature and extent of contamination on these sites needs to be communicated to MoUD and should be given due consideration during the execution of the responsibilities described above. b) The Ministry of Health and Family Welfare needs to be involved in the management of health related impacts resulting from contamination of sites. While various

S.No	Entity/ Roles	Commentary on present role	Commentary on relevance and potential for involvement in future
	<p>e) State Industrial Development Corporation:</p> <p>f) Municipal Bodies</p>	<p>the Ministry of Agriculture are:</p> <ul style="list-style-type: none"> • Land reclamation • Soil conservation. <p>These are important mandates given the overall responsibilities of these Departments related to agriculture and food production, since it serves to address the critical requirements of land within Ministry.</p> <p>e) The responsibility of these State Industrial Development Corporations is the facilitation and development of industry in the country. They are therefore directly involved in the growth of the economy. At the same time they are also responsible for the judicious use of resources, sustainable development and prevention and mitigation of damage to the environment.</p> <p>f) Municipal corporations have environmental responsibilities along the following lines:</p> <ul style="list-style-type: none"> • They are mandated to monitor the industrial units located within their jurisdiction. While not many industries may be sited within municipal limits, there are cases where specific industries are located within urban areas, and may be generating hazardous waste in these units. • They are responsible for the collection, disposal and management of municipal solid waste within their jurisdiction. There may be contamination from hazardous waste in the waste collected by these entities, also resulting in contamination of municipal landfill. • They are involved in the urban and land 	<p>programs related to different health aspects have been initiated through different Departments, a systematic engagement with the Ministry of Environment and Forests or any environmental enforcement agency seems to be lacking. This engagement and coordination will be key to managing the collateral damage on health arising out of contamination of sites.</p> <p>c) Contamination from hazardous waste may have resulted in the creation of legacy or orphan sites, and the nature and extent of contamination on these sites may be communicated to NHAI and may be given due consideration during the execution of the responsibilities described above.</p> <p>d) These institutions participate as key stakeholders in the rehabilitation process, as a primary resource (along with groundwater) that falls within their area of responsibility is either altered or destroyed through pollution. Agricultural land may in some cases be rehabilitated to a level where economic activity other than agriculture may be the only option possible. In such cases the involvement, consensus and approval of these institutions may be important and necessary.</p> <p>e) These entities are important stakeholders in the management of polluted sites as owners of land that may be subjected to contamination. They also have a role to play in assigning responsibility for contamination (if it happens as a result of industrial activity occurring within their jurisdiction), and assigning responsibility for remediation, including affixing the financial liability. They also have ground level experience with cases of pollution and have handled several tenders and overseen creation of DPRs for remediation. Currently, the EIA process provides for a supervisory role for such entities where they are responsible for the management of industrial estates. The EIA process exempts individual units within an industrial estate from</p>

S.No	Entity/ Roles	Commentary on present role	Commentary on relevance and potential for involvement in future
		<p>development activities within their jurisdiction.</p>	<p>having to undergo the EIA process and its related submissions where the industrial estate has performed an EIA at the estate level. This puts the onus on the entity managing the industrial estate to ensure that the units within it comply with the requirements related to management of waste and other aspects of environment protection.</p> <p>f) Municipal Bodies need to be aware of any contaminated sites before determining their land use. They may also have to deal with legacy contaminated sites within their jurisdiction that were created as a result of activities occurring at industries that, though now located outside their jurisdiction, may have operated within municipal limits in the past.</p> <p>Given their close involvement and control over land and development activities, municipal bodies (or local rural government bodies) may be well placed to for a more active involvement and participation in the NPRPS going forward. They will play both consultation roles as well as the role of granting authority.</p>
4.	<p>Industrial entities</p> <p>a) Manufacturing entities</p> <p>b) Solution providers for TSDFs</p>	<p>a) These entities are the source of hazardous waste, and are the determinants of the fate of the waste generated within their facilities. While there exist regulatory requirements for the disposal of hazardous waste through only authorized TSDFs, the existence of contaminated sites and illegal dump sites of hazardous waste are evidence that not all waste generated within industrial units is disposed off through authorized facilities.</p> <p>b) These entities operate the TSDFs required for safe disposal of hazardous waste.</p>	<p>a) Manufacturing entities may play the role of recyclers going forward. It is possible that strong economic incentive to manage waste better would lead to better management of wastes including a market of recycling of wastes.</p> <p>b) Technical remediation in many cases may involve the transport of wastes to TSDF facilities. Current issues faced in accessing TSDF facilities include high cost of transportation and treatment. These would need to be addressed both as a measure to make the NPRPS more efficient as well as to further facilitate better management of industrial waste to prevent the creation of new polluted sites.</p>

For details of all stakeholder consultation MoMs, case studies, reviews please refer to appendix D.

3. Review of Financial Mechanisms

Financing of polluted sites in India has been facing severe financial constraints. The absence of a dedicated fund for remediation and Government of India led programme has been one of the major reasons for this financial constraint. The matter has got aggravated since invoking the “polluter pays” principle has not brought the required respite. This may be attributed to reasons such as inability to identify the liable polluter, inability of the polluter to pay, orphan sites, and sites polluted prior to the set up of the specific rules regarding waste management.

From review of large national programmes that are currently running in the country in the areas of pollution abatement, urban planning and public health relevant financial mechanisms and funding structure are identified for application in NPRPS.

3.1. Mechanism(s) for budgeting of rehabilitation work

The key institutions dealing with activities related to pollution prevention and mitigation are the CPCB and the SPCBs. Their budgeting process is a direct outcome of their institutional mandate, and therefore reflects activities related to enforcing compliance with hazardous waste management laws. Below is the list of the various cost heads budgeted for the SPCBs and the CPCB. This is a general list arrived at by reviewing the annual reports of various SPCBs.

Table 9: Budget, sources of income, expenditure in SPCBs

Budget Head	Income	Expenditure
Pollution Assessment - Survey & Monitoring, Lab Management, Development of standards and guidelines, Training, Information (Database) Management, Library, Pollution Control Enforcement, Pollution Control Technology, Mass Awareness, Publications & NGO activities & Hindi (Raj Bhasha), Hazardous Waste Management	Income from Sales/Service, Grant/Subsidies, Fees/Subscriptions, Income from investments, Income from royalty, publications etc, Interest earned, Water Cess, Consent Fees, Annual Licence Fees, Monitoring and Analysis Charges, Lab empanelment fee, Regulatory Fines/ Pollution Costs, CETP membership fees	Monitoring, R&D, Hazardous Waste Management, Biomedical waste management, Training

As per CPCB’s annual report of 2011-2012, the total budget allocation covering all the above mentioned heads was to the tune of INR 40 crores where INR 100 lakhs are allotted to capacity building towards hazardous waste management in terms of enhancing laboratory capacity, monitoring TSDF performance etc.

It is observed that the budgeted activities include some of those that are relevant from the perspective of site identification, initial investigation and monitoring activities. For the NPRPS we envisage a possible enhanced role to be played by SPCBs and CPCB that may require increased budget allocation. These activities may take the form of annually budgeted activities that would need to be sanctioned for each board.

3.2. Sources of funding currently employed for remediation of polluted sites

Creation of a National Environment Restoration Fund has been considered in the NEP, 2006. The policy states that a fund will be created using the economic resources from the net proceeds of economic instruments, user fees for access to specified natural resources and voluntary contributions. The Fund may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies. Some other economic instruments proposed under NEP 2006 are:

- Strengthening the natural resource accounting with a view to its adoption in the system of national income accounts
- Strengthening the system of collection, collation and analysis of all significant and relevant environmental monitoring data
- Preparation of statutory financial statements by developing and promoting the use of standardized environmental accounting practices and norms in for large industrial enterprises to encourage greater environmental responsibility in investment decision-making, management practices, and public scrutiny
- Adopting proper appraisal practices before financing projects by financial institutions to cover all environmental risks
- Integration of environmental values into cost-benefit analysis while making public investment decisions.

The National Clean Energy Fund has been established under MoEF to fund various clean energy projects in India. Cess collected from companies that are producing or importing coal is used as a corpus for the fund. 10 priority hazardous waste sites have been identified by Central Pollution Control Board (CPCB) and for the remediation of these sites a total government support from NCEF shall be to the extent of 40% of the total project cost. An amount of INR 60 crore i.e. 5 crore per site for 12 sites is also being funded from the NCEF for the preparation of DPRs for the selected contaminated sites. The financial support given for preparation of DPR will be included in computing the overall ceiling of 40% of the total cost. The remaining 60% of the project cost might be borne by the state government along with a private sector partner, if any, under a Public Private Partnership (PPP) model.

The NPRPS programme is being implemented to develop and strengthen human and technical capacity for undertaking environmentally sound remediation of polluted sites and to support the development of a policy, institutional and methodological frameworks. The projects under this programme are being financed by the World Bank. This fund is mainly used for technical assistance and pilot investments. The remediation projects would generally have a life span to the tune of 10 years to allow achieving the result of demonstration from the remediation effort, and to strengthen human and organizational capacities at central and state level. To finance these long-term remediation projects a fund structure similar to NCEF may be adopted for emergency response situation and for orphaned sites. However, cost recovery mechanisms from responsible parties based on polluter pays principle forms the backbone of financing mechanism for rehabilitation of contaminated sites.

3.3. Cost recovery mechanisms

Gujarat - The state of Gujarat oversees the operation of an “Environment Fund” which is used for financing remediation activities of polluted sites. The fund’s corpus is used for making payment to

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the responsible entity once the polluted site is cleaned up. Gujarat Pollution Control Board (GPCB) commissions an independent study prior to declaring a polluted site as cleaned.

GPCB has till today used the following 3 models for remediation of private lands. These are as follows:

Identification of the group as polluter - In one instance upon identifying a contaminated site, GPCB technicians were able to identify that a nearby industrial group with multiple independent units were possible sources for the contamination. The association was approached and they were told to either identify the individual unit responsible or be responsible as a group. The association agreed to pay for the remediation as a group. Remediation goals were set by GPCB and an external agency carried out the remediation.

Use of finger printing of the polluting industry - In the second instance through waste fingerprinting, the source unit for a contaminated site was identified. They were issued a show cause notice and they were asked to deposit money into a fund managed by GPCB or face closure. This fund was then utilized to complete the remediation.

Identification of the buyer as responsible party - In a third instance there was a large pharmaceutical company that had acquired a piece of land and was to start operations on it. It was found during the consent process that the land was contaminated. GPCB held the buyer liable for not carrying out due diligence during the buying process. They only moved ahead when the current buyer agreed to and subsequently performed remediation at the site with their own funds.

Andhra Pradesh - Andhra Pradesh Pollution Control Board (APPCB) conducts regular night surveillance to find out illegal dumping and identify the polluters. There have been cases where APPCB has been able to track down on such polluters and made them pay for the cleanup. One such example is as follows:

Penalty for illegal dumping by bulk drug industries - About 5 -6 years back in the deep forest area of Dhurpalli, there was illegal dump identified by APPCB through satellite imagery and information from newspaper collectors. Nearby there was a cluster of bulk drug industries and the composition of the dump had chemicals originated from those bulk drug industries. Unfortunately, no one industry unit could be pinpointed from the laboratory analysis of the dump. APPCB conducted meetings and requested the responsible unit (s) to come forward but no one did so. Then APPCB had no option but to penalize all the industries at 3 times the cost of cleanup at a TSDF (INR 3 crore) and sent the directive to CPCB for approval. CPCB approved a penalty amount of INR 2 crore which was eventually paid by the bulk drug association.

Sale of solvents - The solvents from the bulk drug industries have a high calorific value. Recently the bulk drug industries have gone for tie ups with the cement industries for use in energy generation. APPCB has tested the solvents and found that okay for using it for energy generation and hence given the consent. This is a win-win situation for the bulk drug industries where they do not have to pay for incineration anymore and need only to pay for transportation and thus reducing the cost drastically. This has reduced incidences of illegal dumping from the bulk drug industries.

Table 10: Review of other financial mechanisms

Program	Details	Findings relevant to developing financial mechanisms
MoEF's initiative on TSDFs	To speed up the procedure of setting up TSDF in states, MoEF has implemented a comprehensive scheme, with approval of Planning Commission, to provide financing support to the state governments and industrial associations. Under this funding mechanism a maximum 2 crore is funded by the government and the remaining fund will be provided by state government and the private entity. TSDFs will be set up on a Public Private Partnership (PPP) basis. The principle to be followed is BOO: Build, Operate and Own	This financial mechanism has been driven by legal direction introduced under the Hazardous Waste Rules. The rules identified the duties of various government authorities. This has led to the development of the TSDF scheme where the central government, the state government, the SPCB and a private entity share the stake in the development of the TSDF. This scheme highlights the shared contribution of multiple agencies in the development of facilities, and this approach can be further examined to determine financial mechanisms for rehabilitation of orphan sites, and for a certain set of administrative activities that the new programme would need to execute on an ongoing basis
Jawaharlal Nehru National Urban Renewal Mission (JnNURM)	This is a programme that is proposed for urban development in the cities. Projects that were eligible to be funded under the mission included water and sanitation projects, solid waste management, urban transport, buses, etc. The Mission also funds project management related administrative costs to the states and has a window for capacity building grants too. Under the mission, funding is done in a predetermined ratio, based on the size of the city, by the central government, state government and ULBs. Based on category of city, central assistance varies from 35% of project cost to 90%. The source of funding is as additional central assistance from the Central government for its share. The portion of state government and ULBs is also through budgetary support. The state has the flexibility to pass on its share to the ULB as a loan and not grant. ULB also has the option to partner with private sector companies and do the project on PPP. In some states, since ULBs are financially weak, the ULB's contribution is also being given by the state government.	A mission mode program where mission funds are made available in a predetermined ratio, act as a stimulus incentive for infrastructure investments by local government and ULBs. The mission contributions are based on categorization by location. Thus areas lagging in development get a higher percentage of funding. This example shows that prioritization of fund application may be built into the financial mechanisms, thereby critically polluted sites or orphan sites and sites falling in similar risk categories may be able to receive partial funding to incentivize the rehabilitation process under such a mechanism. This programme also demonstrated the PPP model in projects related to infrastructure, and it may be found useful in the context of rehabilitation projects too.
National Health Rural Mission	Ministry of Health and Family Welfare, Government of India	This programme subsumed existing programmes and enhanced

Program	Details	Findings relevant to developing financial mechanisms
(NRHM)	<p>(GoI), is the implementing agency of this programme. Government of India under this programme aimed to do necessary corrections in the existing health care system throughout India particularly in the field of nutrition, health and hygiene and also for mainstreaming the prevailing systems of medicine to facilitate health care with a special focus on rural people. The Mission is conceived as an umbrella programme subsuming the existing programmes of health and family welfare. Under NRHM, GoI provides funding for key components in the high focus states. States would fund interventions in district and village level through District funds under the Integrated Financial Envelope. There is a concept of ‘funneling’ funds to districts for better integration of the programmes under the Mission. Under this programme funds are released to states through Standing Committee of largely in the form of Financial Envelopes, with weightage to the high focus states.</p>	<p>the scope of activities related to health and family welfare. For the NPRPS this is relevant because, the new programme would need to integrate rehabilitation activities alongside the existing measures for waste management.</p>
National River Conservation Plan (NRCP)	<p>To conserve and to conduct the pollution abatement works in all the major rivers of the country the National River Conservation Plan was evolved. The implementing agency is National River Conservation Authority (NRCA) under National River Conservation Directorate in Ministry of Environment and Forests. Under this programme the towns on the polluted stretches of the river where water quality for bathing is worse than the prescribed limits were selected on a priority basis. The various schemes that were eligible for funding are Sewage treatment schemes, Non-sewage treatment schemes, and other pollution abatement schemes.</p> <p>Under this programme a Shared financing mechanism is followed. Projects under NRCP are funded on 70:30 cost sharing basis between MoEF and state government or local body concerned. It is mandated that of the 30% share of state share at</p>	<p>This programme demonstrates implementation by a specially created authority within the MoEF. It also mandated financial participation from local agencies and the public. Relevant to this study is the creation of SPMUs and SIAs to organize the execution of project and the clear distinction placed on the authority and mandate on specific institutions to execute core and non-core schemes.</p>

Program	Details	Findings relevant to developing financial mechanisms
	<p>least 10% should come from public participation to promote the sense of ownership among beneficiaries. All operation and maintenance (O&M) of assets created is the responsibility of the state government or urban local bodies (ULBs). There is a provision that the Local Bodies may raise loans from financial institutions such as HUDCO to contribute towards their share.</p> <p>State Project Management Units (SPMUs) in this programme may appoint a State Implementing Agency (SIAs) to coordinate, supervise, guide and manage the programme and projects. The Core Schemes will be directly handled by these agencies while the Non Core Schemes will be handled by ULB, Irrigation Department and others as decided by the SPMU. State implementing agencies can hire external expert/ agencies with the help of a bidding system.</p>	
The National Afforestation Programme	<p>The National Afforestation Programme (NAP) Scheme was initiated to speed up the decentralised approach and fund transfer mechanism and to converge all afforestation schemes of the 9th Plan. The overall objective of the scheme is to develop the forest resources with people's participation, and with a focus on improvement in livelihoods of the forest-fringe communities, especially the poor.</p> <p>NAP Scheme aims to support and accelerate the ongoing process of devolving forest protection, management and development functions to decentralized institutions of Joint Forest Management Committee (JFMC) at the village level and Forest Development Agency (FDA) at the forest division level. The Scheme will be implemented by a three-tier institutional set-up, namely State Forest Development Agency (SFDA) at the state/ UT level, Forest Development Agencies (FDAs) at the forest division level, and Joint Forest Management Committees (JFMCs) or Eco-development Committees (EDCs) at the village</p>	This scheme provides relevant inputs on the transfer of funds along a decentralized network. Although the size of funds disbursed at the end of the chain are small in comparison to those required in rehabilitation process, this scheme provides for an institutional structure all the way down to the village level.

Program	Details	Findings relevant to developing financial mechanisms
	<p>level. The schemes are funded by MoEF, Government of India through FDA. As per the procedure of NAP 50% of total approved cost is released in the first instalment to the SFDA's at the start of the financial year, second and final instalment against is released after receipt of Utilization Certificate showing at least 50% expenditure of the previous grant(s). The interest amount if any, accrued on the bank deposits of these funds is treated as part of the SFDA's additional resources and would be adjusted towards further instalments of the grant. There is no provision of diverting fund from one SFDA to another SFDA.</p>	

4. Selected case studies to illustrate the existing mechanisms for rehabilitation

In this section, we present a review of various environmental related incidents/ accidents that have been addressed through various judiciary interventions over last few decades.

The cases are a mix of those from Supreme Court, various high courts, National Green Tribunal and others. A detailed analysis is presented in Table 11 at the end of this section.

4.1. Key findings from analysis of cases

4.1.1. Commonality across cases

Prioritization of Sites

We did not find structured (identification and) prioritization system in place currently for hazardous waste dumpsites. Previously the process came about by either a Public Litigation, visual observation, reports of health issues or complaints. We also found that several Pollution Control Boards do not link the complaints or observation with an active list of polluted sites, either at the level of Regional Offices or at the Head Office. One exception to this finding is the HAWA project. The project has successfully updated the list of illegal HW dumpsites for the Bangalore Urban & Rural districts in co-ordination with the Karnataka State Pollution Control Board. It utilized a systematic methodology for identification, utilized risk assessment tools and practices, as well as an indicative timeline for conducting further activities.⁷

We did not come across risk assessment based practices for identification and assessment of contamination. Some of the activities on identification and assessment are outsourced to external agencies such as the National Productivity Council (NPC)⁸, National Environmental Engineering Research Institute (NEERI), etc. In some states subsequent to the outsourcing of work on investigation of dump sites, we did not find any follow up or routine investigation for reassessment of dumps sites. It is therefore likely that polluted sites have been generally identified as a result of an external agency impetus such as involvement of a Non Governmental Organization (NGO) or community mobilization and raising public awareness. Prioritizing of sites has been on the basis of judicial directive rather than on the basis of comparative risk assessment.

Assigning Responsibility

In the cases reviewed the challenges to conduct remediation were three-fold: 1) assigning responsibility for pollution damage or neglect 2) authority – such as to issue an Order to undertake a remediation action, and 3) quantifying liability – that is to ascertain the total cost of damages to people, livestock, and environment.

We found from these cases that State Pollution Control Boards (SPCB) had no legal authority to direct the polluter to undertake a remediation activity. While it was possible to identify the polluters that have contributed to legacy pollution from the past land records, and nature of operation only the Courts have the authority to issue an order.

The polluter always has the option to apply to an Appellate Authority such as the National Green Tribunal, or the court against the SPCB direction. Similarly the SPCB can also seek support from

⁷ <http://www.hawa-project.org/activities03.htm>

⁸ <http://www.npcindia.org/>

the same authorities if the landowner is unwilling to undertake remediation in line with its (SPCB) direction.

In case of an orphan site, the SPCB can only inform the concerned District Magistrate (DM) regarding the issue and for the need for site rehabilitation, and it is up to the local administration to take this forward.

Measuring the extent of rehabilitation

In each of these cases there was no mechanism to determine the extent of remediation done. This was due to the absence of common remediation standards. Each of these cases used their own standards and remediation goals, and the closure of complaints, payment of compensation and restoration of land or water body use were used to determine completion of the remediation activity.

4.1.2. Some unique issues

Land with mixed ownership

In some cases part of the contaminated land was privately owned while part of it was owned by the Public Works Department (PWD). This introduced added complexities, in terms of assigning liability, access for remediation activity, and determining final land use. Moreover the private lands belonged to industry in the past, which had contaminated it during their processes.

Partial Payment of Rehabilitation Costs

It was found that in certain cases, the polluter was unable to pay for remediation, since the cost of remediation was too high and there were no assets that could have been appropriated. The State Pollution Control was able to get partial funding from through state or central government grants or schemes.

Interventions from International Agencies

While we have mentioned the outsourcing of several activities of the remediation process to technical organisations within the country, we also found cases where International agencies have come forward to support the rehabilitation activity. This is done both through funds as well as through sharing of technical know how. The rehabilitation of sites under the NCEF has been discussed earlier.

4.1.3. Examples of what has worked

In the case of an orphan site, the direct involvement of the District Magistrate demonstrated the states ownership towards public lands, thereby allowing the creation of special committees and stakeholder communities. This led to better collaboration among agencies and provided momentum to the rehabilitation efforts. As the agency responsible for land management the district administration was able to notify the site as polluted and issue a moratorium, both very important activities of the remediation framework.

A successful landfill closure project received further viability through a secondary methane capture project. This demonstrated that opportunities for Public Private Partnership (PPP) can be successful in such projects. Additionally here the subsequent development of green landscaped spaces provided a positive externality to nearby citizens who happen to be key stakeholders for rehabilitation.

Although unable provide adequate compensation to parties affected by tannery operations, the authority set up by the central government (under the Court's direction), offers the opportunity to set up preventive measures against further pollution.

4.1.4. Examples of what has not worked

Lack of effective tracking by the enforcement agencies, results in pollution issues going unnoticed until they are reported by the public. Where one would expect the state agency to investigate and create the case for rehabilitation, this activity was conducted independently by an NGO. Possibly, both monitoring and assessment capabilities of the enforcement agencies may have been inadequate here.

Even having the judiciary rule in favour of rehabilitation, in the case of ground water pollution, both, the amount of compensation and the action taken by the polluter may not be sufficient. Since the source of funds was from auctioning the property of the polluter, the amount was inadequate to cover remediation. Moreover litigation over the order continues inordinately, with no recourse.

Table 11: Cases studied

Case	Reason for Selection	Key findings	Relevance to NPRPS
Supreme Court			
<i>Research Foundation for Science, Technology and Natural Resource Policy v. Union of India (UOI) and ORS. MANU/SC/0528/2012,</i>	This case specifically deals with the import of hazardous waste and application of Basel convention and fundamental constitutional rights.	The case refers to BASEL Convention, Articles 21, 47 and 48A of the Constitution and the Hazardous Waste Management Rules 1989. In cases such as this the judiciary was able to bring international conventions such as Basel Convention into the context of its decision. The judiciary also directed the central government to make efforts to bring Hazardous Waste Management Rules 1989 in line the Basel Convention and articles 21, 47 and 48 A of the constitution. The case highlights how the judiciary is able to identify that existing rules may not be considering the provisions of the fundamental rights in the constitution.	Options for the NPRPS include developing a programme based on the strengths of existing legislations, as well as developing a program using new (or modified) legislations keeping in view of the constitutional provisions and international conventions.
<i>M. C. Mehta v. Union of India AIR 1987SC 1086</i>	This case demonstrates the judiciary's application of "Absolute Liability"	The Court held that when an enterprise is engaged in hazardous activity, resulting in an accident, like release of a toxic gas, the enterprise shall be absolutely liable to compensate the victims of the same, There shall be no exceptions under this rule like those under the rule of strict liability.	The legal framework of the programme may build upon this favourable precedence of application of 'absolute liability'.
<i>Research Foundation for Science, Technology and Natural Resource Policy v. Union of India (UOI) and Ors (2005) 13 SCC 186</i>	Application of the precautionary principle and the polluter pays principle	This refers to Environment (Protection) Act 1986 The Hazardous Wastes (Management and Handling) Rules 1989. As per the court's ruling, the liability of the hazardous waste importers to pay the amounts to be spent for destroying the	In this case the precautionary principle and polluters pays principle are upheld as fundamental law of the land. These principles would be an integral part of the national programme and this case may be used as a

Case	Reason for Selection	Key findings	Relevance to NPRPS
		goods in question cannot be doubted on the basis of applicability of precautionary principle and polluter pays principle. The ruling reinstates the fact that these principles are part of the environmental law of India.	successful precedence.
<i>Tirupur Dyeing Factory Owners Association vs Noyyal River Ayacutdars Protection Association and Ors</i> AIR 2010 SC 3645	Application of the precautionary principle and the polluter pays principle	Public Interest Litigation was filed by the Noyyal River Ayacutdars Protection Association, for seeking directions from the court for preservation of ecology and keeping the Noyyal river in Tamil Nadu free from pollution. As per the court's ruling, industries are bound to meet the expenses of removing the sludge of the river and also for cleaning the dam. It becomes the responsibility of the members of the appellant Association that they have to carry out their industrial activities without polluting the water.	The outcome of the court's decision upholds the fact that the principles of "polluters-pay" and "precautionary principle" have to be read with the doctrine of "sustainable development".
<i>Vellore Citizens' Welfare Forum v. Union of India</i> AIR 1996 SC 2715	Application of polluter pays principle as a part of financial mechanism	This case refers to Environment Protection Act where polluter pays principle was applied. The Court issued directions to the Government to set up an authority called as "Green bench" as per section 3/3 of the Environment Protection Act to deal with the situation as well as to enforce the polluter pays and precautionary principles. The Court imposed pollution fine on the tanneries and directed the authority to compute the compensation payable for reversing damage to the ecology as well as for payment to individuals affected.	The judgment upholds the polluter pays principle making the pollutant tanneries liable to pay compensation for the damages caused to the environment as well as to pay pollution fine, to be deposited under an Environment Relief Fund.

Case	Reason for Selection	Key findings	Relevance to NPRPS
Various High Courts			
<i>Ramgopal Estates Pvt .Ltd., rep .by Managing Director K. S. Hemanth Kumar vs. The State of Tamil Nadu, rep. by Commissioner and Secretary to Govt., Industries Department 2007(2) CTC369</i>	Here the judiciary dismissed a petition with a view on “Sustainable Development” to be read with doctrine of precautionary principle and polluter pays principle.	<p>This case refers to articles 14, 21, 39, 47, 48A, 51A (g) of The Constitution of India and the Environment Protection Act 1986.</p> <p>The case observes and upholds the fact that the principle of precaution involves the anticipation of environmental harm and directs to take measures to avoid it or to choose the least environmentally harmful activity.</p> <p>The writ petition was dismissed. The Court held that the proposal of setting up the Petrochemical Park shall be subject to the environmental clearance by the Union of India under the provisions of the environment (Protection) Act, 1986 . The concept of sustainable development shall be put into force, applying the yardstick of (i) Precautionary Principle; and (ii) Polluter Pays Principle, while issuing the environmental clearance for each and every activity proposed to be undertaken.</p>	The judgment talks in great detail about the Precautionary Principle as well as the Polluter Pays Principle. It was held that Sustainable Development was the only way a balance could be maintained between the need for industrialization and eco-environmental maintenance. While developing the legal framework for the a national programme, these provisions need to be kept in mind.
<i>Om Prakash Bhatt and Others v. State Of U.P. And Others</i>	Application of polluter pays principle during remediation of environmental damages.	<p>The case refers to Articles 48A and 51 A (g) of the Constitution of India and other cases such as Vellore Citizens Welfare Forum v. Union of India.</p> <p>Residents of the hills of Garhwal, felt threatened by the invasion by the State Organisation, Garhwal Mandal Vikas Nigam to the Bugiyal (meadows and pastures), who had put up lodging houses for tourists on the slopes of the bugiyal and indiscriminately imported plastic and non-</p>	The outcome of the case highlights the polluter pays principle, indicates the types of parties to be held liable and upholds the constitutional rights.

Case	Reason for Selection	Key findings	Relevance to NPRPS
		<p>biodegradable material that was adversely affecting environment of the hills.</p> <p>The Court directed the Nigam and the Chief Conservator of Forests (Mills) to un-do the damage and to protect the environment. The Court in this case laid down a very important principle that remediation of the damaged environment is a part of the process of sustainable development and as such the polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology.</p>	
<i>PravinbhaiJashbhai Patel and Anr. v. State of Gujarat and Ors 1995(2)GLR1210</i>	Determining compensation amount based on polluters turnover and creation of a fund	The Court took into consideration the fact that the citizens had been suffering due to the pollution for a number of years and hence awarded a lump sum payment to be made by the 756 industrial units, calculated at the rate of 1% of their one year's gross turnover for the year 1993-94 or 1995-96, whichever more and that amount was to be kept apart by the Ministry of Environment to be utilised for the works of socio-economic uplift of the affected villages.	In this example, compensation to affected parties is not paid directly the affected party, it is instead being earmarked by the Ministry for projects that provide socio-economic benefits. Financing mechanisms developed for the NPRPS may be designed keeping in mind the compensations that would need to be paid out to affected parties, apart from the cost of the rehabilitation of the site.
<i>The reports and application of 113 villagers of Digwal village and The Chairman, District Legal Services Authority vs. Management of Global Bulk Drugs and Fine Chemicals Ltd .</i>	This is a good example of Judicial initiative to enforce the Polluter Pays principle	<p>The case refers to Articles 21, 48A and 51A (g) of the Constitution of India.</p> <p>Petition was filed to find a solution to the acute industrial pollution in the area, due to the release of industrial wastes by Global Bulk Drugs and Fine Chemicals Ltd. The villagers complained of the water not being potable and thus even agricultural lands being adversely affected. The deponent confirmed the discharge of effluents but also</p>	The legal and institutional framework under the national programme may be built upon this case where there is a clear mandate by the legal framework that provides authority to a state level body to assess the size and impact of the environmental damage caused by the polluter and the amount of damage compensation to be collected from the polluter.

Case	Reason for Selection	Key findings	Relevance to NPRPS
		<p>maintained that the necessary precautions were taken.</p> <p>The Court upheld the polluter pays principle and also maintained that the Constitution confers upon its citizens the right to free air and water. The Court directed the District management to find out the amount of damage caused to the villagers and the respondent to pay for the same. The Court also held that monetary constraints of the respondent should not come in the way of the court to award damages according to the polluter pays principle.</p>	
National Green Tribunal			
<i>Gram Panchayat Totu vs. State of Himachal Pradesh</i>	Application of Municipal Solid Waste Rules	On a complaint of obnoxious fumes from a fire at a Municipal Solid Waste dump, the tribunal upheld the decision to set up the MSW plant and landfill site at village Bharyal in Tara-Devi Totu bye pass; however, it was directed that the said plant should be set up only after following the mandatory requirement stipulated in The Municipal Solid Waste (Management and Handling) Rules 2002 as well as after obtaining Environmental Clearance under the provisions of EIA notification.	This case demonstrates the participation of different units of government at different levels to pursue the application of environment laws for new projects. The site identification steps that shall form part of the national programme are likely to benefit from including local government at suitable levels in the responsibility to identify and report polluted sites.
<i>Hindustan Coca Cola Beverages Pvt. Ltd. Vs. West Bengal Pollution Control Board APPEAL No. 10 of 2011</i>	Absence of Powers to collect Bank Guarantee from Industry	While directing the industry as well as the board to ensure that sources of hazardous waste must be detected and cleaned up, the tribunal upheld that the West Bengal Pollution Control Board had no powers to direct the petitioner to deposit a Bank Guarantee	This case demonstrates that robust financial measures would need to be developed to the national programme including cost recovery procedures that are fully backed with legislation. Ad-hoc financial measures hold potential polluters liable for risks related to pollution may not stand the test of the courts.

Case	Reason for Selection	Key findings	Relevance to NPRPS
Other Case Studies			
<i>Site in Kanpur (Noraiakheda area) polluted by tanneries</i>	An Orphan Site- This case and Vellore case described above are examples of the court micro management of HW issues. No specific orders for remediation were passed. However orders to set up CETPs for mitigation and abatement were passed.	Eastern districts of Kanpur (Noraiakheda area) feature about 350 industrial leather tanneries, many of which discharge untreated waste into local groundwater sources and the Ganges River. The pollutants mainly include metal contaminants such as chromium, mercury, and arsenic. Following reports of outbreak of skin diseases and visible change in the colour of groundwater, a local Non Governmental Organization (NGO) in January 2006 sought attention of the relevant authorities on possible contamination of groundwater citing “pollution issue owing to indiscriminate industrial waste disposal”. This resulted in an increased public awareness of the issue. The direct involvement of the district magistrate (DM) led to an establishment of a multi-stakeholder committee comprising of representatives from various concerned government agencies and civil society to oversee the pollution issue.	In terms of identification, the case came to light because of an external impetus to the existing institutional structure, i.e. active work of a local based Non Governmental Organization (NGO) and remediation outcome was highly dependent on forming partnerships across networks since the area of concern had no known ownership. Access to sites for the purpose of determining the existence/ extent of contamination was not an issue. Overall, while many factors led to identification of a polluted area/site, there was no specific pre-defined trigger that may be highlighted. For notification, delineation of the polluted site, issuance of moratorium, fixing of liability - the onus of the ‘playing’ the part of a regulator was taken up by the district magistrate (DM). Such participation from the local government will be will need to be effectively employed and coordinated by the programme in the future.
<i>Nibra ((An ongoing effort under NCEF)</i>	A legacy site	Nibra, a village in district Howrah of West Bengal, is built upon contaminated land that has hazardous waste dumps (consisting of chromium) created by neighbouring industries that were existent 15 to 20 years ago. The case came to light based on prior knowledge of contamination by the concerned agencies mainly through visible discoloration of soil due to chromium contamination. There was no identification and/or	With the current available information, it has been difficult to ascertain the roles of different elements that are involved or would be involved for the remediation process except for the Central Pollution Control Board, West Bengal Pollution Control Board, and the land dwellers (villagers). Nibra has been prioritized for remediation under NCEF funding programme and identification was due to prior

Case	Reason for Selection	Key findings	Relevance to NPRPS
		<p>prioritization methodology followed. The detailed project report to enable remediation is under preparation.</p>	<p>knowledge of the legacy site. Though it may be possible to identify the polluters that have contributed to legacy pollution from the past land records, the current legal framework does not have a provision that enables or authorizes the concerned agencies to trace back to industries that were potentially responsible for causing contamination, make them liable and pay for the remediation activity. In other words, notification, delineation of polluted site(s), issuance of moratorium, and fixing of liability is at a moot point. The concerned agencies have demonstrated an ability to take action in case of either non-responsiveness of responsible party or inability to identify and contact responsible party, by putting the area on the priority list of sites under the NCEF.</p>
<p><i>The Gorai dumpsite (Mumbai Suburbs)</i></p>	<p>A municipal waste dump site</p>	<p>The Gorai dumpsite, located in the western suburbs of Mumbai, spreads over an area of 19.6 ha and was operational since 1972. The site is adjacent to Gorai creek and close to habitation. Approximately 2.34 million tons of waste up to an average height of 26 m is at the site. The Gorai closure project envisaged converting about 19 hectares of land at Gorai dumping ground into green landscaped spaces. The existing practice of open dumping that has been followed since 1972 had caused significant environmental damage in neighbourhoods adjoining the disposal site, including potential contamination by hazardous</p>	<p>The identification resulted due to prior and established knowledge of the site. The Municipal Corporation of Greater Mumbai (MCGM) showed leadership in addressing the challenge of disposal of municipal solid waste (MSW). The outcome was highly dependent on forming partnerships such as the Public Private Partnership (PPP) model based on Design, Build, Own, Operate, and Transfer (DBOOT) model and facilitation by the IL&FS. The most important value of this project is the demonstration impact of a successful and balanced PPP project which can be modified</p>

Case	Reason for Selection	Key findings	Relevance to NPRPS
		waste dumping. The creek waters were polluted due to inflow of leachate and the air quality had deteriorated from the frequent burning of garbage at the dumping ground. The Municipal Corporation extended a partnership with the IL&FS who in turn recommended levelling and reforming the existing heap of municipal solid waste (MSW) and incorporating environmental mitigation measures.	for local requirements and replicated across the open dumpsites in the Country.
<i>Daurala (Meerut, UP)</i>	Rehabilitation vis-à-vis Polluter Pays Principle	The source of pollution in Daurala (Meerut, UP) was chemical manufacturing associated with the pharmaceutical and pesticides industries in the region. The pollutants mainly included lead, aluminium, nickel and cyanide. In terms of identification, the case came to light because of an external impetus to the existing institutional structure, i.e. active work of a local based Non Governmental Organization (NGO), followed by a comprehensive health survey (covering 15,000 persons) conducted by an external partner - Janhit Foundation in 2004-2005; the result of which provided a clear and direct linkage between the health issues of the villagers and the presence of pollutants in the water sources situated in the vicinity of one 'DCM group' of factories. All in all the survey data was so thoroughly complied that the DCM group had no room for deniability. Due to media coverage, the National Human Rights Commission took suo moto notice of the Daurala issue and directed the UP government to respond	For purpose of identification of the site and the polluter, technical knowhow was utilized for demonstrating that a particular site is the source of off-site or downstream pollution. This helped in forwarding Orders to landowners (or other responsible parties) and fixing liability to undertake remediation planning. State entities failed in terms of monitoring, compliance, and enforcement which resulted in unchecked dumping of liquid waste in the first place, exhibiting a possible gap in the existing institutional capacity. A bottom up approach consisting of mobilization of local populace, marshalling of non-governmental support, and external partnership such as with the Blacksmith Institute helped turn the picture around and raise public awareness for the contamination issue and led to a remediation outcome.

Case	Reason for Selection	Key findings	Relevance to NPRPS
		<p>on the matter. In mid 2005 the DCM group officials met with the Daurala residents and listened to their demands. As a result of this consultation, a 12 point action plan was presented to the industry on an approach to be taken to set site-specific remediation requirements; and the industry agreed to implement the action plan by December 2007.</p>	
<p><i>Groundwater pollution in Bicchri (Rajasthan)</i></p>	<p>Rehabilitation vis-à-vis Polluter Pays Principle</p>	<p>Situated about 12-15 km from Udaipur, the groundwater of Bicchri, spread over an area of 300 hectares, is stark red due to indiscriminate surface dumping of sludge. The site was a small industrial estate (791 acres) manufacturing dyes and dye intermediaries. The site was ordered closed by the government in 1990 after villagers and several Non Governmental Organizations (NGO) (e.g. Ubeshwar Vikas Mandal) filed a Public Interest Litigation (under the PIL Act, 1991) against the polluting company; however some factories continued their operations till 1995. Indiscriminate surface dumping of sludge, along with irrigation with contaminated groundwater since 1989-90, has contributed to devastating soil contamination. Up to 70 wells used by some 10,000 residents have been rendered useless, and the 22 villages in the vicinity are without drinking water. After a Supreme Court (SC) order (1996), concerned officials have tried hard to clean up the water but till date it remains a significantly polluted area mainly due to three reasons: 1) clean up of</p>	<p>In terms of identification, the Bicchri case came to light because of an external impetus to the existing institutional structure, i.e. active NGOs and residents of the area. The case presents lessons not only in terms of severity of ground water contamination, but also where neither the Centre nor the State took clear responsibility (NEERI, July 12, 2012). The remediation planning was marred by the slow institutional process such as long term judicial involvement from the time of the litigation to pending implementation of a remediation action vid a Supreme Court Order. Although by the powers vested by the judiciary, the concerned agencies took away the factory property as basis for cost recovery, it was not sufficient clearly suggesting an impetus to look for long term financing options for remediation.</p>

Case	Reason for Selection	Key findings	Relevance to NPRPS
		<p>groundwater is difficult, and 2) the cost is prohibitive - the estimated cost of the clean-up at Bicchri is approximately INR 40 crore. The Supreme Court (SC) ordered the clean-up of groundwater after auctioning of the factory's property, which resulted in generating funds equivalent to INR 500,000 only; and 3) even after 16 years of the "final judgment of this court (date of judgment 13th February, 1996) the litigation has been deliberately kept alive by filing one interlocutory application or the other in order to avoid compliance of the judgment". The National Environmental Engineering Research Institute has been assigned the task of cleaning the water.</p>	
<p><i>Vellore Citizen Welfare Forum</i></p>	<p>Precautionary Principle</p>	<p>The Vellore Citizen Welfare Forum filed a Writ Petition as public interest litigation, alleging that the tanneries and other industries in the area were discharging untreated effluent into the agriculture fields, roadsides, waterways and open lands. The untreated effluents were finally discharged in the river Palar that served as the main source of water supply to the residents of the area. The Petition further alleged that the entire surface and sub-soil water of river was polluted resulting in non-availability of potable water to the residents of the area. The operation of the tanneries in the state of Tamil Nadu resulted in severe environmental degradation. A survey conducted by the Tamil Nadu Agricultural University Research Centre, Vellore, concluded that approximately 35,000</p>	<p>It is observed that the although the compensation was very low in view of the substantial and long term environmental impacts, the Court prevented future contamination by utilizing an international norm of the precautionary principle in context of the Indian law and considered its application mandatory in the interest of sustainable development. The precautionary principle, asserts "that a lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious and irreversible damage if the action is not taken". The Court observed that the tanneries, which were of vital importance in terms of</p>

Case	Reason for Selection	Key findings	Relevance to NPRPS
		<p>hectares of agricultural land in the tanneries belt had turned out partially or totally unfit for cultivation. These tanneries used about 170 types of chemicals in the Chrome tanning processes. These chemicals included common salt, lime, sodium sulphuric, chromium sulphate, fat liquor, ammonia and sulphuric acid besides dyes which are used in large quantities. Furthermore, an independent survey conducted by a Non Governmental Organization (NGO) found that 350 wells out of total 467 used for drinking and irrigation purposes were polluted, while a total of 59 villages were affected by the pollution. The Tamil Nadu Pollution Control Board also submitted that their Board persuaded for the last 10 years to control the pollution generated by these tanneries. These tanneries were given option by the Board that either to construct common effluent treatment plants (CETPs) for a cluster of industries or to setup individual pollution control devices, which was not fully enforced.</p>	<p>generation of foreign exchange and employment avenues; had no right to destroy the ecology, degrade the environment and cause a health hazard. Hence, it could not be permitted to expend or even to continue with the present production unless appropriate action taken by the industry itself. The traditional concept that development and ecology are opposed to each other was no longer acceptable. "Sustainable Development" would be the answer. In this context, as held by the Supreme Court in the Vellore tanneries pollution case, "The Precautionary Principle" and "The Polluter Pays Principle" need to be combined to achieve "Sustainable Development."</p>

CHAPTER 2 Overview of International Practices

In this chapter we provide our detailed findings of the international practices in the area of polluted site management and rehabilitation. The chapter follows a country-wise approach where the pollution/ polluted site management frameworks and practices in each country are examined from a legal, institutional and financial perspective. We have then identified the relevance of these practices to the Indian context.

At the end of this chapter we provide a tabular summary of the findings in order to present a comparison of the various international practices. In each of these countries we found that specific steps in the remediation process such as assignment of liability and financing of remediation activities take different paths for orphan and non-orphan sites. Throughout this chapter we expressly make note of the difference between practices for orphan and non-orphan sites wherever they exist. The same is also true for the tabular summary at the end.

5. USA

5.1. Overview

With robust and well documented systems and processes for hazardous waste management and site rehabilitation, the USA makes for a useful selection among countries to be studied for their practices in this area. There are very clear definitions of the institutions involved along with their authority and responsibilities towards each step in the site rehabilitation process. This is also evident from the way liability is sought using the concept of 'potentially responsible parties'. The process supports the involvement of private agencies with commercial interests, through a capable supervisory role of government agencies. This develops further economic efficiency while aligning the incentives of each stakeholder towards achieving the end goal of site rehabilitation. An example of the bureaucratic efficiencies in USA is demonstrated by the case study on Massachusetts Military Reservation provided in section 5.5.

The chronology of USA's attempt towards management of hazardous waste dates back to 1980 with the enactment of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Pursuant to CERCLA section 105, in the year 1982, 418 sites were identified as priority contaminated sites. Over the years, new sites have been added to the list and successfully remediated sites have been deleted from the list. The current status is as follows:

Table 12 Current Status of polluted sites listed under CERCLA

Status	Non-Federal (General)	Federal	Total
Proposed Sites	55	4	59
Final Sites	1146	158	1304
Deleted Sites	345	15	360

Table 13 Federal and Non-Federal milestones

Milestone	Non-Federal (General)	Federal	Total
Partial Deletions	40	17	57*
Construction Completions	1054	70	1124

Sites that have achieved these milestones are included in one of the three NPL status categories. * 73 partial deletions have occurred at these 57 sites.

The United States rehabilitation efforts are governed by the Superfund Programme, established in 1981. It may be described as the “environmental program established to address abandoned hazardous waste sites” also it is another name for the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), a federal law designed to clean up sites contaminated with hazardous substances. It provides authorization to conduct removal actions where immediate action needs to be taken; enforce against potentially responsible parties; ensure community involvement; involve states; and ensure long-term protectiveness.

To conduct removal actions, the programme describes a detailed cleanup process that involves elaborate processes starting from site identification for remediation, determining the remediation standards till post remediation use and land development.

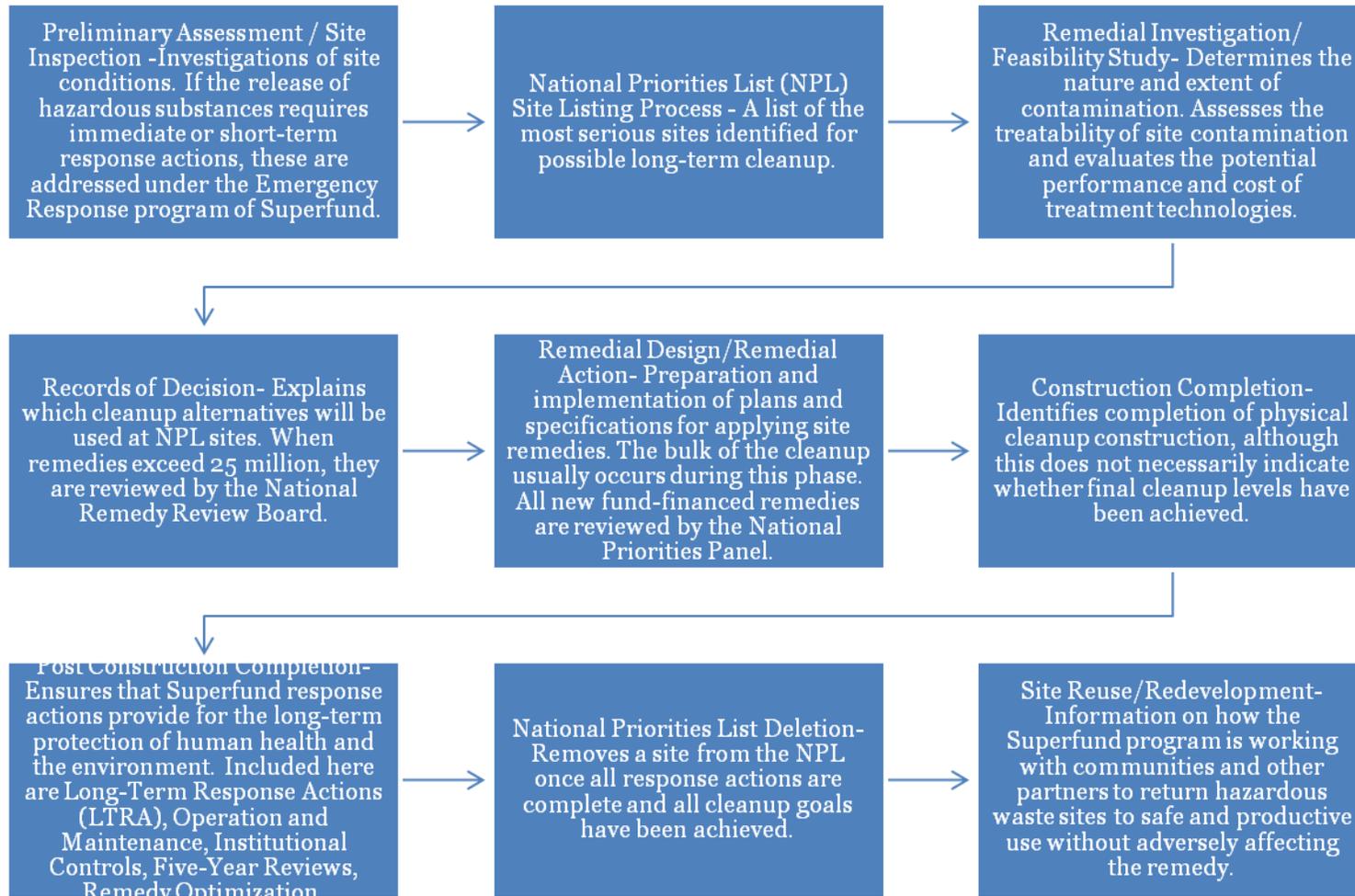
A flow of activities of the remediation process along with the roles and responsibilities is presented in Table 12 on the next page:

The Brownfield redevelopment process generally follows four steps:

- a) **Pre-development:** this step includes identification and refining a redevelopment area, conducting Due Diligence, securing access to the Property and identifying sources of financing. If upon due diligence there appears to be no contamination, then redevelopment activities begin or if the site is potentially contaminated, Phase II site investigation starts.
- b) **Securing the Deal:** These steps include contract negotiation, securing finance and establishing a Remedial Action Plan, secure the Property and entering into formal commitment
- c) **Cleanup and Development:** Approvals are taken for carrying out clean up, clean up and construction take place followed by property sale or lease and finally completion and formal opening of the redeveloped property
- d) **Property Management: Long-Term Operations and Maintenance of Remedial Systems**

CERCLA authorized the Environmental Protection Agency (EPA) to identify potentially responsible parties (PRP), who are responsible for contamination of sites and compel the parties to clean up the sites. A potentially responsible party is a possible polluter who may eventually be held liable under CERCLA for the contamination or misuse of a particular property or resource. Four classes of PRPs may be liable for contamination at a Superfund site: the current owner or operator of the site, the owner or operator of a site at the time that disposal of a hazardous substance, pollutant or contaminant occurred, a person who arranged for the disposal of a hazardous substance, pollutant or contaminant at a site; and a person who transported a hazardous substance, pollutant or contaminant to a site, who also has selected that site for the disposal of the hazardous substances, pollutants or contaminants.

Under Superfund, EPA can require the PRP to conduct the cleanup under EPA oversight. Alternatively, EPA can conduct the work itself using a special trust fund and sue the responsible parties for the cost. Superfund imposes "joint and several liability," meaning that any one responsible party, or group of parties, can be held liable for the complete cleanup costs. In turn, they can bring "contribution" suits against other companies that also qualify as responsible parties for that site, thus spreading the cleanup costs.

Table 14 Activities in the remediation process

Superfund enabled the revision of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), which provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP provides the detailed blueprint for implementing CERCLA requirements and establishes legal requirements enforceable by the EPA. Under the auspices of the NCP, a National Priority List (NPL) of hazardous waste sites was established. The NPL primarily serves as an information and management tool for the EPA, and helps the EPA prioritize sites for remediation. The NPL includes the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and is updated periodically. These updates include both addition of newly identified sites and deletion of sites that have been remediated and possess no further threat to human health or the environment, or a different clean-up authority can be used for remediation of the site. The identification of a site for the NPL is intended primarily to guide EPA in determining which sites warrant further investigation to assess the nature and extent of the risks to the human health and environment; identifying what CERCLA-financed remedial actions may be appropriate; notifying the public of sites which EPA believes warrant further investigation; and Notifying PRPs that EPA may initiate CERCLA-financed remedial action.

As of the end of Fiscal year 2011, the Superfund program has ensured that exposure is under control at 1,348 National Priorities List (NPL) sites and prevented the migration of contaminated groundwater at 1,051 NPL sites. The program remains committed to the “polluter pays principle”. The EPA secured private party commitments of more than \$3.3 billion in FY 2011 to fund clean-up work. Of this amount, potentially responsible parties agreed to conduct more than \$3 billion in future response work (the highest annual amount in the history of the program), and to reimburse EPA for \$298.6 million in past costs.

5.2. Legal and Policy Framework

A brief description of the most significant legislations that support the hazardous waste management and remediation are provided below:

- **Resource Conservation and Recovery Act (RCRA)** - The Resource Conservation and Recovery Act (RCRA) gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. A 1984 amendments to RCRA focused on waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. Some of the other mandates of this law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.
- **Clean Water Act (CWA)** - The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry and water quality standards for all contaminants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. EPA's National Pollutant Discharge Elimination System (NPDES) permit program controls discharges. Point sources are discrete conveyances such as pipes or man-made ditches.

- **Toxic Substances Control Act (TSCA)** - The Toxic Substances Control Act of 1976 provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint.
- **Clean Air Act (CAA)** - The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. The setting of these pollutant standards was coupled with directing individual states to develop state implementation plans (SIPs), applicable to appropriate industrial sources in the state, in order to achieve these standards. The Act was amended in 1977 and 1990 primarily to set new goals (dates) for achieving attainment of NAAQS since many areas of the country had failed to meet the deadlines.
- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** - The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, generally referred to as Superfund) authorizes the Environmental Protection Agency to respond to releases or threatened releases of hazardous substances that are regulated by the laws described above. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA's authority is triggered by a "release," or a "substantial threat of a release" of a hazardous substance into the environment. The law authorizes two kinds of response actions. Short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response. Long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on EPA's National Priorities List (NPL).
- **The Superfund Amendments and Reauthorization Act (SARA)** amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on October 17, 1986. SARA reflected EPA's experience in administering the complex Superfund program during its first six years and made several important changes and additions to the program. The changes included increased stress upon the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites, required Superfund actions to consider the standards and requirements found in other State and Federal environmental laws and regulations, provided new enforcement authorities and settlement tools, increased State involvement in every phase of the Superfund program, increased the focus on human health problems posed by contaminated sites, encouraged greater citizen involvement in making decisions on how sites should be cleaned up; and increased the size of the trust fund to \$8.5 billion. SARA also required EPA to revise the Hazard Ranking System (HRS) to ensure that it accurately assessed the relative degree of risk to human health and the environment posed by uncontrolled polluted sites that may be placed on the National Priorities List (NPL).
- **Brownfields and Land Revitalization Programme-** A Brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. The Program is designed to empower states, communities, and other stakeholders in economic redevelopment to work

together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields. Cleaning up and reinvesting in these properties increases local tax bases, facilitates job growth, utilizes existing infrastructure, takes development pressures off of undeveloped, open land, and both improves and protects the environment. EPA's investment in the Brownfields Program has resulted in many accomplishments, including leveraging more than \$14.0 billion in brownfields cleanup and redevelopment funding from the private and public sectors and leveraging approximately 60,917 jobs.

Some key clauses of the CERCLA and SARA are provided below:

Table 15 Key clauses of CERCLA and SARA with a link to activities

Actions	Summary	CERCLA
Responding to hazardous waste site situations / Liability for the costs of cleanup	<p><u>Non-Orphan Site</u></p> <p>EPA can do short or long-term cleanups at a site and later recover cleanup costs from potentially responsible parties (PRPs) under section 107. EPA can also gather information, get access to a site, and seek penalties for non-compliance with orders and agreements.</p> <p><u>Orphan Site</u></p> <p>EPA cleans up orphan sites when potentially responsible parties cannot be identified or located, or when they fail to act.</p>	Section 104
PRPs doing the cleanup (liability)	EPA can order, or ask a court to order, PRPs to clean up the site when an imminent or substantial endangerment may exist. EPA is authorized to seek penalties for non-compliance with order. This section also sets forth procedures for cost reimbursement.	Section 106
Recovering EPA's cleanup costs (liability)	<p><u>Non-Orphan Sites</u></p> <p>EPA can recover its cleanup costs from PRPs. Section 107 also describes defenses to liability and exemptions to liability.</p> <p>Under CERCLA § 107, a person, including a local government, may be considered a PRP if the person:</p> <ul style="list-style-type: none"> Is the current owner or operator of the contaminated property; CERCLA section 107(a) (1) Owned or operated the property at the time of the disposal of the hazardous substance; CERCLA section 107(a) (2) Arranged for the hazardous substances to be disposed of or treated, or transported for disposal or treatment; CERCLA section 107(a) (3) or Transported the hazardous substances to the property. CERCLA section 107(a) (1) <p><u>Orphan Sites</u></p> <p>For orphan sites, the Superfund law originally paid for toxic waste cleanups through a tax on petroleum and chemical industries, the tax went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. However the last full fiscal year (FY) in which the Department of the Treasury collected the tax was 1995. This fund was exhausted by the end of FY 2003; since that time funding for orphan</p>	Section 107

Actions	Summary	CERCLA
	sites has been appropriated by Congress out of general revenues.	
Federal Facilities	Requires federal agencies with National Priorities List (NPL) sites to investigate and clean up the contamination.	Section 120
Settlements	EPA and the Department of Justice can enter into settlement agreements (administrative orders on consent or consent decrees) with PRPs to cleanup a site or pay for cleanup conducted by EPA.	Section 122
Access to private land	<p>EPA needs access to private property to conduct investigations, studies, and cleanups. The Superfund Amendments and Reauthorization Act of 1986 (SARA) explicitly grants EPA the authority to enter property for each of these purposes.</p> <p>It provides that entry is permitted for "determining the need for response, or choosing or taking any response action under this title, or otherwise enforcing the provisions of this title."</p> <p>Places and properties subject to entry under(Section 104(e) include any place any hazardous substance may be or has been generated, stored, treated; disposed of, or transported from; any place a hazardous substance has or may have been released; any place which is or may be threatened by the release of a hazardous substance; or any place where entry is needed to determine the need for response or the appropriate response, or to effectuate a response action under CERCLA</p>	Section 104(e)(1) of SARA

Liability Exemptions: (for local government/person)

CERCLA contains liability exemptions, affirmative defenses, and protections which may apply to a local government when it:

- Acquires contaminated property involuntarily by virtue of its function as a sovereign, CERCLA § 101(20)(D);
- Qualifies for a third party defense or innocent landowner liability protection, CERCLA §§ 107(b)(3), 101(35)(A);
- Qualifies as a bona fide prospective purchaser (BFPP) when it acquires the contaminated property, CERCLA §§ 101(40), 107(r)(1); or
- Is conducting or has completed a cleanup of a contaminated property in compliance with a state cleanup program, CERCLA § 128(b).
- CERCLA § 101(20)(D) provides that a unit of state or local government will not be considered an owner or operator of contaminated property (and thus is exempt from potential CERCLA liability as a PRP) if the state or local government acquired ownership or control involuntarily.
- CERCLA §§ 101(40) and 107(r)(1) provide that a BFPP is a person or tenant of a person who acquired the property after January 11, 2002 and meets the following threshold criteria:
 - All Appropriate Inquiries (AAI) were performed prior to purchase of the property pursuant to CERCLA § 101(35)(B);
 - All disposal of hazardous substances occurred before the party acquired the property; and

- The party has “no affiliation” with a liable or potentially liable party
- CERCLA § 107(b)(3) provides a “third party” affirmative defense to CERCLA liability for any owner, including local governments, that can prove, by the preponderance of the evidence, that the contamination was caused solely by the act or omission of a third party whose act or omission did not occur “in connection with a contractual relationship.”

Table 16 Types of Liability

Liability Type	Description
Retroactive	Parties may be held liable for acts that happened before Superfund's enactment in 1980.
Joint and Several	Any one potentially responsible party (PRP) may be held liable for the entire cleanup of the site (when the harm caused by multiple parties cannot be separated).
Strict	A PRP cannot simply say that it was not negligent or that it was operating according to industry standards. If a PRP sent some amount of the hazardous waste found at the site, that party is liable.

USEPA's Soil Screening Guidance:

The Soil Screening Guidance (SSG) presents a framework for developing risk-based, soil screening levels (SSLs) for protection of human health. The framework provides a flexible, tiered approach to site evaluation and screening level development. The Soil Screening Guidance is a tool developed by EPA to help standardize and accelerate the evaluation and cleanup of contaminated soils at sites on the National Priorities List (NPL) where future residential land use is anticipated. SSLs are not national cleanup standards. SSLs alone do not trigger the need for response actions or define “unacceptable” levels of contaminants in soil. In this guidance, “screening” refers to the process of identifying and defining areas, contaminants, and conditions, at a particular site that do not require further Federal attention.

Generally, at sites where contaminant concentrations fall below SSLs, no further action or study is warranted under the CERCLA. Where contaminant concentrations equal or exceed SSLs, further study or investigation, but not necessarily cleanup, is warranted. The decision to use the Soil Screening Guidance at a site will be driven by the potential benefits of eliminating areas, exposure pathways, or contaminants from further investigation. By identifying areas where concentrations of contaminated soil are below levels of concern under CERCLA, the guidance provides a means to focus resources on exposure areas, contaminants and exposure pathways of concern. SSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. Three options for developing screening levels are included in the guidance, depending on how the numbers will be used to screen at a site, and the amount of site-specific information that will be collected or is available. Details of these approaches are presented in the User's Guide (EPA, 1996a) and the Technical Background Document (TBD) (EPA, 1996b). The three options for using SSLs a) are applying generic SSLs, b) developing simple, site-specific SSLs, c) developing site-specific SSLs based on more detailed modeling.

5.3. Institutional Framework

The lead agency responsible for the implementation of the Superfund Program is the Environmental Protection Agency. The key objectives of the EPA are:

- The public is protected from significant risks to human health and the environment where they live, learn and work;

- National efforts to reduce environmental risk are based on the best available scientific information;
- Federal laws protecting human health and the environment are enforced fairly and effectively;
- Environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy;
- All parts of society -- communities, individuals, businesses, and state, local and tribal governments -- have access to accurate information sufficient to effectively participate in managing human health and environmental risks;
- Environmental protection contributes to making our communities and ecosystems diverse, sustainable and economically productive; and
- The United States plays a leadership role in working with other nations to protect the global environment.

In addition, the individual states possess a department that is responsible for environmental quality protection and management. The states complement the EPA's oversight and enforcement authority, since cleanup performed under RCRA (as opposed to CERCLA) may be delegated to the State Agency. The statutes for clean-up under the RCRA and CERCLA are almost identical.

The EPA Organizational Structure consists of a series of departments at the headquarters in Washington DC, and 10 regional offices spread across the country that have a mandate for enforcement as well as setting standards and guidance documents. The key departments within the EPA Organization are given below.

The Office of Solid Waste and Emergency Response provides policy, guidance and direction for the Agency's emergency response and waste programs. It develops guidelines for the land disposal of hazardous waste and underground storage tanks, and provides technical assistance to all levels of government to establish safe practices in waste management. It administers the Brownfields program which supports state and local governments in redeveloping and reusing potentially contaminated sites. It also manages the Superfund program, which responds to abandoned and active hazardous waste sites and accidental oil and chemical releases.

The Office of Water (OW) ensures drinking water is safe, and restores and maintains oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

The Office of Air and Radiation (OAR) develops national programs, policies, and regulations for controlling air pollution and radiation exposure. OAR is concerned with pollution prevention and energy efficiency, indoor and outdoor air quality, industrial air pollution, pollution from vehicles and engines, radon, acid rain, stratospheric ozone depletion, climate change, and radiation protection. OAR is responsible for administering the Clean Air Act, the Atomic Energy Act, the Waste Isolation Pilot Plant Land Withdrawal Act, and other applicable environmental laws.

The Office of General Counsel (OGC) is the chief legal adviser to EPA, providing legal support for Agency rules and policies, case-by-case decisions (such as permits and response actions), and legislation.

The Office of Enforcement and Compliance Assurance (OECA) aggressively goes after pollution problems that make a difference in communities through vigorous civil and criminal

enforcement that targets the most serious water, air and chemical hazards. OECA also advances environmental justice by protecting vulnerable communities.

The Office of Administration and Resources Management (OARM) provides national leadership, policy, and management of many essential support functions for the Agency, including human resources management, acquisition activities (contracts), grants management, and management and protection of EPA's facilities and other critical assets nationwide.

Appendix 1 provides a snapshot of the state and central level organizations involved in contaminated site remediation in USA.

A brief overview of some of the state agencies is provided below.

- a) **Florida:** The Florida Department of Environmental Protection, the lead agency for environmental management and stewardship, is divided into three primary areas: Regulatory Programs, Land and Recreation, and Water Policy and Ecosystem Restoration. Florida's environmental laws allow sites to be developed, projects to be built and facilities to be operated if there is reasonable assurance they will comply with those laws. Permits and other authorizations issued by the Florida Department of Environmental Protection (DEP) establish detailed conditions (compliance standards) under which these activities can be conducted while preserving air and water quality. Being 'in compliance' means obtaining the proper written authorization to conduct an activity, if specific permission is required, and adhering to the conditions of that authorization and other applicable rules and laws. DEP promotes compliance by developing sound rules with public input, writing clear and enforceable permits, providing technical assistance and public education and having a strong field inspection presence in our district offices and other delegated local programs, and evaluating environmental data to check the performance of regulated activities. DEP also promotes compliance through enforcement. Enforcement is punishment for non-compliance and may be in the form of penalties that hit the pocketbook, compensation required for damages, or implementation of 'in-kind' projects that prevent pollution or otherwise enhance the environment.
- b) **New York:** New York State laws contain mandates to protect the public health and safety. The New York State Department of Environmental Conservation (DEC) implements and enforces these legislative mandates, which are the fundamental source of DEC's powers. DEC regulates all aspects of hazardous waste management in the state, including: generators; transporters; and treatment, storage and disposal facilities. It includes the Used Oil Program and Universal Waste Program. Through it is a solid waste programme, it provides technical and regulatory assistance to the regulated community. Through the Brownfields (contaminated and abandoned properties) program, it enhances private-sector cleanups of Brownfields. Under the State Superfund Program (SSF) (Inactive Hazardous Waste Disposal Site Remedial Program) - DEC identifies and characterizes suspected inactive hazardous waste disposal sites and investigates and remediates those sites which pose a significant threat to public health or the environment.
- c) **California:** The California Environmental Protection Agency is charged with developing, implementing and enforcing the state's environmental protection laws that ensure clean air, clean water, clean soil, safe pesticides and waste recycling and reduction. Within CAL/EPA, The department of Toxic Substances Control protects the environment from harmful effects of toxic substances through the restoration of contaminated resources, enforcement, regulation and pollution prevention. The State Superfund covers sites for which there are no cleanup options through the responsible party and which threaten the people or the environment of California. DTSC's Emergency Response Program provides immediate assistance during sudden or

threatened releases of hazardous materials. In addition, DTSC continues to have lead responsibility for cleanup and enforcement at several high profile federal Superfund sites where it sometimes even provides day-to-day operation at these sites.

5.4. Financial mechanisms

CERCLA was enacted to provide the Environmental Protection Agency (the “EPA”) with a set of tools to effect hazardous waste cleanup including a stringent liability regime, strengthened by the federal courts, that assigns cleanup expenses to nearly any landowner, disposal operator, transporters, or generators of hazardous waste associated with a polluted site. CERCLA also includes a provision empowering the EPA to order private party cleanups and to employ a number of conciliation devices and incentives to generate private party cooperation, including the use of alternative dispute resolution procedures. The EPA may also bear certain cleanup expenses, and assigning proportionate shares of responsibility among “Potentially Responsible Parties” (“PRP”)s at multiparty sites. The EPA discovers and remedies hazardous waste sites with federal funds that are designated for cleanup, commonly known as the “Superfund” – a term often used to refer to CERCLA, as well as to refer to the Hazardous Substance Superfund.

Polluter pays principle – The Superfund assigns liability for costs associated with cleaning-up sites contaminated by hazardous wastes. CERCLA is a notable milestone in the development of the polluter pays principle in the United States and commentators have noted that: “the polluter pays principle is one of the central objectives or goals of CERCLA. The EPA has discretion in the degree to which it uses coercion to compel cooperation, ranging from accommodation to prosecution. Efforts of the EPA are enhanced by its reliance on strong legal doctrines and administrative powers to compel responsible parties to bear most or all of the costs of remediation under the principle

Recovery of charges/ penalty - The amount of damages (upto three times) paid by any of these parties included under CERCLA's broad definition of “polluter” is also broad in Superfund actions. Federal courts applying joint and several liability under CERCLA, irrespective of that party's actual contribution to the aggregate contamination means that, although liability will not necessarily fall on just one party at a multiparty site, the EPA can chase those with “deep pockets,” regardless of their level of contribution to the contamination, beyond the minimum requirement.

Overall fund size - The Superfund Amendments and Reauthorization Act of 1986 (SARA), made several important changes and additions to CERCLA including increasing the funding of Superfund to \$8.5 billion and providing for studies and the use of new technologies

Financing Mechanism - Until the mid-1990s, most of the funding came from a tax on the petroleum and chemical industries, reflecting the polluter pays principle. Approximately 70 percent of Superfund cleanup activities historically have been paid for by parties responsible (PRPs) for the cleanup of contamination. The only time cleanup costs are not borne by the responsible party is when that party either cannot be found or is unable to pay for the cleanup. For those sites, the Superfund law originally paid for toxic waste cleanups through a tax on petroleum and chemical industries. The chemical and petroleum fees were intended to provide incentives to use less toxic substances. Over five years, \$1.6 billion was collected and the tax went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. The last full fiscal year (FY) in which the Department of the Treasury collected the tax was 1995. At the end of FY 1996 the invested trust fund balance was \$6.0 billion. This fund was exhausted by the end of FY 2003; since that time funding for superfund sites for which the potentially responsible party (PRP) could not be found has been appropriated by Congress out of general revenues.

Despite the name, the Superfund trust fund lacks sufficient funds to clean up even a small number of the sites on the NPL. As a result, the government will typically order PRPs to clean up the site themselves. If a party fails to comply with such an order, it may be fined up to \$25,000 for each day that non-compliance continues. A party that spends money to clean up a site may sue certain other PRPs under the CERCLA. A related provision allows a party that has reimbursed another party's response costs to seek contribution from other PRPs, during or after the original lawsuit. An "orphan share" is the share of waste at a Superfund site that cannot be collected because the PRP is either unidentifiable or insolvent.

A nonbinding allocation of responsibility (NBAR) is a device, established in the Superfund Amendments and Reauthorization Act that allows the EPA to make a nonbinding estimate of the proportional share that each of the various responsible parties at a Superfund site should pay toward the costs of cleanup.

Section 109 of CERCLA provides the EPA with authority to assess civil penalties for a number of violations:

- Administrative - \$25K for violation of a CERCLA requirement, order, consent decree, or Interagency Agreement (IAG)
- Ongoing Violations - \$25K for each day a violation continues

Please refer to Appendix 2 for further details.

5.5. Case studies exemplifying the legal, institutional and financial mechanisms

Case Study 1 - Camp Edwards Massachusetts

History: Massachusetts Military Reservation became a site of environmental concern in the 1980s when groundwater contamination was first discovered migrating off the southern portion of the base. These groundwater plumes emanated from areas of previous activity mainly associated with the former Otis Air Force Base (now Otis Air National Guard Base). In 1996, in response to public concern regarding the impacts on soil and groundwater from activities on the northern portion of MMR, the National Guard Bureau began an investigation to look for possible contamination.

Legal Framework: In response to the public concerns, the Environmental Protection Agency (EPA) issued the first of four Administrative Orders in 1997 under the Safe Drinking Water Act, which allows for preventive measures to protect drinking water sources, in order to protect the aquifer that lies beneath MMR. It required the NGB to investigate the nature and extent of contamination at and emanating from the training ranges and Impact Area on Camp Edwards. The second Administrative Order No. 2 (AO2) was also issued in 1997 and it required that certain training activities (artillery and mortar firing) cease pending the completion of environmental investigations at the training ranges and Impact Area. In 2000, EPA issued Administrative Order No. 3 (AO3), which required the National Guard Bureau and the Massachusetts National Guard to conduct rapid response actions, feasibility studies and remedial actions to address contamination in certain areas of the training ranges and Impact Area. It required the NGB to undertake a feasibility study to address unexploded ordnance (UXO) and munitions, which have been disposed of or fired at the training ranges and Impact Area. It also required the NGB, upon approval from EPA, to implement remedial measures relating to UXO and munitions. Administrative Order No. 4 (AO4) issued in 2001 under the Resource Conservation and Recovery Act (RCRA) required that munitions found subsurface or in burial pits be properly stored and disposed of in a Contained Detonation

Chamber (CDC), or by other means which prevent the release of explosives, metals and other contaminants into the environment.

The invocation of the Safe Drinking Water Act and the subsequent issue of a series of administrative orders progressively pushed the military to stop damaging practices and to investigate and remediate potential sources of environmental pollution. The orders provide a factual representation of ground conditions through sampling and testing done by the EPA. Appropriate reference to statutes is then added and the details of the action to be taken under the order are specified. The EPA also mentions the submissions (related to work completion) that the party must provide and the subsequent approval that must be obtained. In addition these orders also identify the designated coordinator from both the military and the EPA who would be responsible for overseeing the activities. These administrative orders from the EPA demonstrate that various aspects of the rehabilitation process including the functioning of related mechanisms is effectively monitored and enforced by the EPA.

Financial Framework: The National Guard Bureau is responsible for overseeing the activities that led to the pollution. It provides the funding to begin cleanup with several interim actions designed to remove and treat soil that is potentially contributing to groundwater contamination. It is also starting groundwater treatment to reduce levels of contamination and its migration off base. These actions are being undertaken while ongoing investigations continue to define the extent of contamination and provide information that will help in the evaluation of final cleanup solutions for each area of concern.

Case Study 2: Maryland Sand and Gravel (Consent Order, with polluter paying)

History: This 150-acre site is the location of a former sand and gravel quarry owned by the Maryland Sand, Gravel & Stone Co. From 1969 to 1974, the site was used for the disposal of industrial waste, including waste processing water, sludge, and hazardous waste drums. After a chemical waste fire at the site in 1974, about 200,000 gallons of liquid waste were taken to an off-site landfill, and the remaining drums and sludge were buried in on-site excavation pits. The hazardous waste disposal at the Maryland Sand Site resulted in high levels of several contaminants -- including benzene, chlorobenzene, 1,4-dioxane, 1,1,1-trichloroethane and vinyl chloride in the site soil and ground water.

Legal Framework: Since 1984, when the site was added to EPA's Superfund list of the nation's most contaminated sites, EPA has been involved in extensive cleanup efforts at the Maryland Sand Site. Under the Superfund law, landowners, waste generators and waste transporters that are responsible for the contamination of a Superfund site must either clean up the site, or reimburse the government or other parties for cleanup costs. In 1988, forty potentially responsible parties entered into a consent decree with the U.S., agreeing to conduct the first phase of the EPA-approved cleanup plan which involved the removal of about 1,200 buried drums and construction of a pump and treat cleanup system for shallow contaminated ground water. A 1992 consent decree amendment required the parties to complete the second phase of the cleanup, addressing monitoring and treatment of deeper groundwater. The consent decree, filed on behalf of EPA, by the United States Department of Justice, requires the settling defendants to complete the cleanup.

Financial Framework: The EPA-supervised cleanup effort began in 1984, and will take several more years to complete. The total cleanup costs may exceed \$50 million. The consent decree announced involves the third and final phase of the cleanup, which will cost an estimated \$23.5 million. The final phase of the cleanup includes excavating and treating contaminated soil, backfilling treated soil, and expanding the groundwater pump and treat system. This phase also includes adding substances, such as molasses or oxygen, to the groundwater in order to facilitate

the breakdown of hazardous substances by microbes. As part of the EPA-approved cleanup plan, the settling defendants will address 1,4-dioxane contamination of groundwater and soil, which may cost an additional \$7 million. Past cleanup activities at the site have cost \$20.7 million.

5.6. Relevance to India

Polluter Pay's principle - USA for long has implemented “polluter’s pay” principle in an elaborate manner as per its legal framework with different types of liabilities and settlements with clearly defined. CERCLA clearly define the liabilities of polluters in terms of paying for a cleanup action through settlements with polluters though either (a) General agreement- where the polluters take the responsibility of remediation of a dump site at their own cost and sign an agreement with the EPA delineating the agreed scope of work- or (b) cash out- where remediation is carried out by EPA and polluters pay or (c) cost recovery-where remediation is carried out by EPA at their own cost and recovered from the polluters. This provides a key input as the Indian legal framework has provisions for “penalties” for non-compliance but does not mandate liability or responsibility of a polluter in case of an intervention such as clean up or remediation is required because of the polluter’s activities.

Retrospective liability - The legislation also defines “retroactive” liability before Superfund came in 1980. A polluter may also be held responsible for polluting activities for the grey era i.e. before enactment of superfund in 1980. India has several legacy contamination issues where illegal dumps have been created years back and the country till date has no legal framework to address liability issues and hence can draw from the USA framework.

Joint liability - The CERCLA defines “joint liability” so that any one (of many) potentially responsible party may be held liable for the entire cleanup of a site when the harm caused by multiple parties cannot be separated. As, traceability of polluters is a big issue in the Indian scenario, guidance on a liability clause for scenario where it is not possible to identify a single party may be of assistance while designing the legal framework. As per CERCLA one party is held responsible until the liable party points out other responsible parties.

Transporters of waste - In the USA, liability involves polluters as well as local governments and land owners and transporters of hazardous waste. Superfund’s legal framework puts liability on the current owner of a contaminated land, or the transporter of hazardous waste to a property, the owner of a land during contamination to recover remediation costs. In India, there are many instances where hazardous wastes are being transported by private parties for land development purpose in/surrounding their property. Applicability of this provision in the Indian legal framework can address these issues.

SARA explicitly grants EPA the authority to enter private property for site investigation and clean up purposes. The current Indian legal framework does not explicitly grant this authority to anybody (e.g. MoEF/CPCB/SPCB) to address an immediate remediation requirement and hence can draw from the SARA framework.

Financial mechanism - The financial mechanism of superfund is a well structured on that is designed based on cost recovery or cash out agreements with potentially responsible parties and a trust fund of \$8.5 billion to be used in case orphan sites where no potentially responsible parties are identified or if they fail to pay for the remediation work. In India many a time responsible parties cite “lack of fund” as a reason for “non-action”. To address such a situation India may look at a similar financial mechanism with proper allocation of liability and a structured trust fund for use in case emergency.

Institutional framework - The institutional framework of the country has elaborate enforcement of authority as per institutional structure. The lead agency responsible for the implementation of the Superfund Program is the Environmental Protection Agency with clear delineation of its roles and responsibilities and enforcement authorities allocated specific to each of its departments and state agencies. Enforcement authorities under CERCLA empower EPA to enter into a land for investigation/remediation, issue notices to responsible parties for remediation and cost recovery. In India enforcement authority of legal framework is restricted only to monitoring of environmental compliance requirements in terms of air and water emissions. There is no central allocation of enforcement authority for major interventions such as site investigation and remediation. The institutional framework of USA hence can be drawn upon to allocate responsibilities among various central and state agencies.

However, the legal framework does not have specific provisions to stop continuous activities of illegal dumping to stop further contamination. Though CERCLA has provisions to put liability on transporters of hazardous waste to a property and has provisions to restrict entry to an identified contaminated site but it does not have any specific enforcement authority to stop transportation of hazardous wastes (may be to the neighbourhood) once a site is identified and remediation is yet take place and to stop future occurrence of such activities. In India there have been instances of inter/intra district transportation of hazardous waste for illegal dump for land development. Provisions to stop such activities even before remediation takes place and liability is determined are necessary to stop further contamination.

6. Canada

6.1. Overview

Industrial activities in Canada over the last century have left an environmental legacy that includes toxic waste sites, abandoned mines and contaminated military installations, leaking fuel storage depots that pose hazards to human health and the environment. In 1989, recognizing the need to take action, the Canadian Council of Ministers of the Environment (CCME) and the Government of Canada negotiated a joint five-year National Contaminated Sites Remediation Program (NCSRP) with all the provinces and territories. This program contributed to remediating orphaned high-risk contaminated sites (sites for which a responsible party could not be found, or where the property owner was unable or unwilling to finance remediation).

During this period a total of 45 contaminated sites across Canada were addressed under the National Contaminated Sites Remediation Program. In addition, 55 site developments and demonstrations of remediation technology projects were undertaken. Also, keeping in mind the availability of resources (fund, skilled manpower) it was necessary to first prioritize the sites according to its environment and health impacts to assess the need for immediate remediation. Hence Under this program, a method for classifying contaminated sites according to their current or potential adverse impacts on human health and the environment was also developed.

In 1990, to address contaminated sites on federal Crown land, Environment Canada committed to assisting the federal departments, agencies and consolidated Crown corporations responsible for contaminated sites with identifying, assessing, and remediating high-risk contaminated sites within their jurisdictions. As an outcome of this effort, 325 federal sites were investigated and remediation was initiated at 14 sites requiring immediate attention.

The creation of the Contaminated Sites Management Working Group (CSMWG) in 1995 was a major step towards addressing federal contaminated sites. This interdepartmental group, made up of representatives from custodian departments, was instrumental in developing an interdepartmental strategy to deal with contaminated sites. Even with these efforts, both the Auditor General and the Commissioner of the Environment and Sustainable Development remained critical of federal contaminated sites management. The primary concern was the absence of an adequate regulatory framework and a clearly defined action plan to address federal sites.

The 2002 Report of the Commissioner of the Environment and Sustainable Development concluded that the federal government had failed to address federal contaminated sites adequately. The concerns were mainly with lack of information on the number of federal contaminated sites in Canada; the failure to produce an action plan to deal with high-risk sites in a timely manner; and the need for stable, long-term funding to manage the problem. Recognizing the need for a coordinated approach to address these concerns, the government established the Federal Contaminated Sites Action Plan program in 2005 following a commitment of 3.5 billion in Budget 2004. The Federal Contaminated Sites Action Plan (FCSAP) is a 15-year program aimed to reduce environmental and human health risks from known federal contaminated sites and associated federal financial liabilities. In Phase I (2005-2011), the federal departments, agencies and consolidated Crown corporations responsible for contaminated sites (also referred to as custodians) made significant progress in assessing and remediating sites. Custodians conducted remediation activities at 1,400 sites, and completed remediation at 650 sites. Assessment activities were conducted on over 9,400 sites and completed on 6,400. FCSAP Phase II (2011-2016) allows this work to continue, with a focus on remediating the highest priority sites.

Federal contaminated sites are classified and prioritized based on the Canadian Council of Ministers of the Environment (CCME) National Classification System for Contaminated Sites (NCSCS) and the Aquatic Site Classification System (ASCS) developed under the Federal Contaminated Action Plan (FCSAP). The NCSCS and the ASCS provides scientific and technical assistance to prioritize their contaminated sites as high (with a score of 70 – 100), medium (with a score of 50 – 69.9), or low risk (with a score of 37 – 49.9), according to their current or potential adverse impacts to human health and/or the environment.

As per statistics available of 2006, around 6 million tonnes of hazardous and liquid industrial waste are produced in Canada each year - this has decreased from an estimated 8 million tonnes produced in 1986. It is still, however, an alarming figure. Hazardous waste generation in the country is concentrated mainly in two provinces Ontario and Quebec. Although there are no accurate figures about how much hazardous waste is produced in Ontario, estimates suggest that around 2.8 million tonnes of Canada's hazardous waste was produced in this one province in 2004.

Since January 1, 2002, the Ontario Ministry of the Environment (MOE) has required that hazardous waste producers register their wastes (type and quantity) on a yearly basis and pay a fee according to how much they have generated. This was the first major change to the producer registration and tracking systems since the Ministry first began tracking hazardous wastes in 1985. Companies who fall under these reporting requirements are hazardous waste producers who produce their hazardous waste in Ontario and dispose of their waste off the site production (Estimates suggest that approximately 60% of Ontario HW producers dispose of their waste off-site.), hazardous waste producers who produce their hazardous waste in Ontario and dispose of their waste on-site and on land (instead of sewer systems, waterways, et). Resulting from new regulations passed in 2005, this reporting requirement comes into effect on January 1, 2007 and hazardous waste producers from outside of Ontario who dispose of their waste in or move it through the province.

Within the Canadian federal government, the Canadian Environmental Protection Act (CEPA) of 1999 is the primary element of the legislative framework for protecting the Canadian environment and human health. A key aspect of CEPA 1999 is the prevention and management of risks posed by toxic and other harmful substances. CEPA 1999 also manages environmental and human health impacts of products of biotechnology, marine pollution, and disposal at sea, vehicle, engine and equipment emissions, fuels, control of movement of hazardous waste and hazardous recyclable material and of prescribed non-hazardous waste for final disposal, environmental emergencies and other sources of pollution. The Minister of the Environment and the Minister of Health jointly administer the task of assessing and managing the risks associated with toxic substances.

Where CEPA 1999 deals with environment protection in general, chronologically, the first specific effort to deal with hazardous waste contaminated site came with contaminated land rehabilitation policy in 1988. The policy got revised as Soil Protection and Contaminated Sites Rehabilitation Policy in 1998. The country is currently in the process of revising its 1998 Soil Protection and Contaminated Sites Rehabilitation Policy and making necessary amendments to the legal framework in line with the revised policy structure.

The Federal Contaminated Sites Inventory lists over 21,000 federal sites. This number includes confirmed contaminated sites, suspected contaminated sites, and about 9,000 "closed" sites where remediation was either completed or not required. In addition to addressing contaminated sites, the FCSAP program helps support skills development, training and employment of Canadians, including Aboriginal communities and others who live in northern and rural areas. It is also encouraging Canada's environmental industry to develop innovative and sustainable remediation technologies and approaches.

The Sydney tar ponds case provided in section 6.5 has also been used to demonstrate how the practices in Canada are very strong in the area of multiple stakeholder involvement in remediation.

6.2. Legal and Policy Framework

The Environment Quality Act (Division IV, Sections 31.42 to 31.52) acts as the backbone of the legal framework of the Soil Protection and Contaminated Sites Rehabilitation Policy. The Act grants the Ministry of Environment and Forest (MEF) a number of powers that allow it to require and force characterization studies to be carried out on contaminated sites or the carrying out of rehabilitation work.

Section IV.2.1 of the EQA establishes new rules aimed at protecting the lands and their rehabilitation in case of contamination. It gives the minister powers to make orders including an order requiring the characterization of sites and their rehabilitation. It recognizes as a form of rehabilitation possible the retention of contaminants in ground be taken provided that certain mitigation measures specific to protect the environment and land users. The law provides that disclosure measures are required to inform third parties related to restrictions on the future land use. It also specifies the need to hold a public information session in these circumstances.

Specifically, it sets certain requirements for those responsible for the excavation of contaminated soil, and sets the conditions for operating a transfer station and temporary storage of contaminated soil elsewhere on the site of origin. The regulation also aims to contribute to sanitation and safe reuse of land, given that contaminated soils accepted in a transfer must be sent in a treatment for decontamination and soil stored in places of temporary storage should be harnessed. The target audience includes companies operating a transfer of contaminated soils, companies that want to establish or change a transfer of contaminated soils, companies that have to have contaminated soil and companies specializing in excavation of soils.

Regulations on the Protection and rehabilitation of land, adopted by the Council of Ministers on 26 February 2003, aims to provide increased protection and land rehabilitation in case of contamination, making several provisions applicable to the new section IV.2.1 of the Act on Environmental Quality (sections 31.42 to 31.69). It lays down limit values for a range of contaminants, determines the categories of business activities.

The objectives of the new Soil Protection and Contaminated Sites Rehabilitation Policy and its associated implementation tools are to continue the work that began in 1988 with the introduction of the Contaminated Sites Rehabilitation Policy and to better respond to present-day problems and concerns. The new policy will have the following structure:

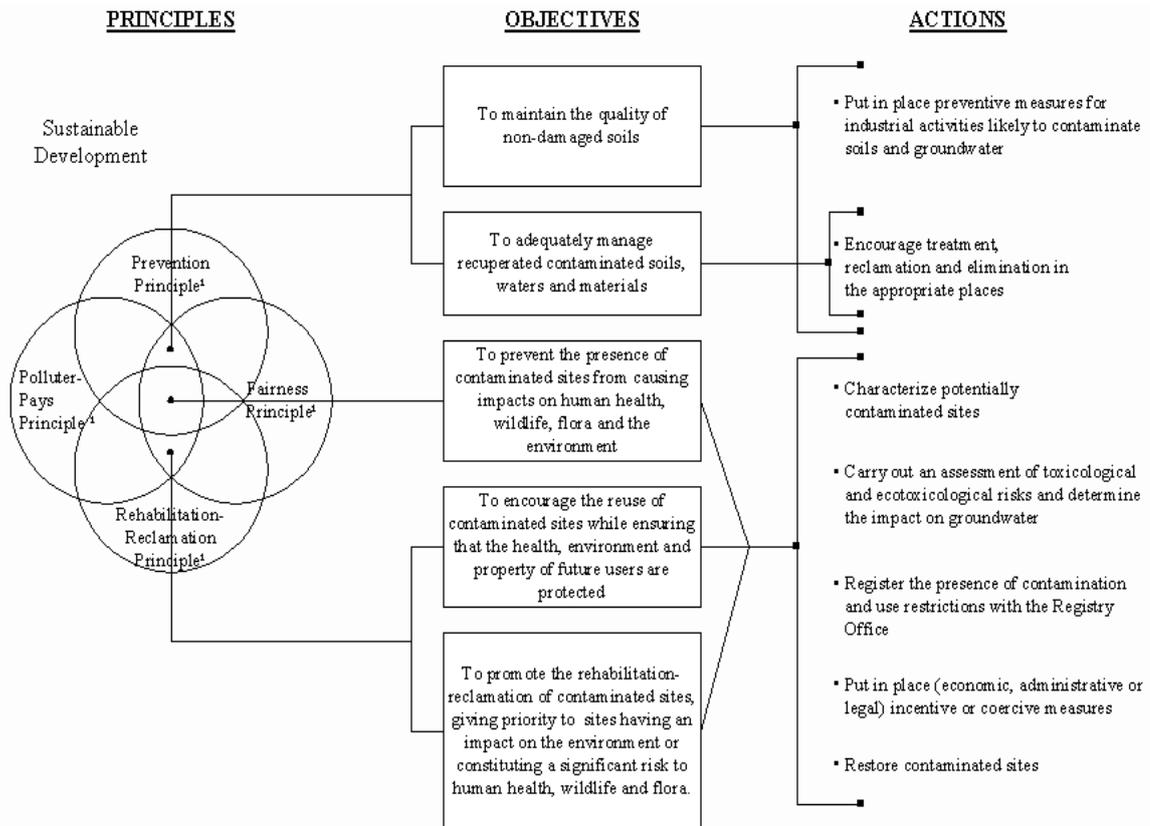


Figure 4: Soil Protection and Contaminated Sites Rehabilitation Policy Structure

The Soil Protection and Contaminated Sites Rehabilitation Policy is an instrument designed to contribute to the sustainable development. The concept of sustainable development stipulates that present use of resources and the environment must not limit their potential for use by future generations. The policy draws on the following four principles:

The Prevention Principle-Contaminating the soil means making it lose one or more of its functions to a perceptible extent. Contamination of this resource constitutes a social and environmental disadvantage as well as a significant economic restraint. Impacts on human health, damage to the environment, loss of use of sites and groundwater, and investor uncertainty are all direct consequences of the presence of contamination in the soil. The rehabilitation of a site is an expensive process that does not always lead to the restoration of all uses. Thus, hundreds of sites today have been negatively affected to various degrees and cannot be freely used by future generations. The prevention principle² aims to prevent such situations from being repeated in the

future. Its objective is to preserve the integrity of the soil in order to safeguard its ecological functions and guarantee full use of this resource now and in the future.

The Rehabilitation-Reclamation Principle-It is the responsibility of present-day society to repair as much as possible of the damage resulting from past errors rather than passing it on to future generations. Even if it has no impact or does not constitute a significant danger in its present state, a contaminated site remains a site at risk. Poorly planned modifications (change in use, drainage or excavation work carried out on the site, etc.) can result in this risk becoming significant. Sites burdened by modes of production and consumption not focused on sustainable development cannot simply be abandoned and forgotten. Rehabilitation must not only correct the situation by decreasing the impact but must also aim at upgrading, that is, returning a maximum of uses to the site and reintegrating it into the cycle of sustainable development. In the same way, excavated contaminated soils and contaminated materials collected during the rehabilitation of a contaminated site must be managed so as to reclaim them and return them to use. If it cannot immediately rehabilitate all contaminated sites, the present generation has a duty, as a responsible society, to promote the general concept of rehabilitation, elaborate a strategy to make the concept reality and apply this strategy immediately to priority cases.

The Polluter-Pays Principle-Each person is responsible for the consequences of any action that affects a common asset. With respect to contaminated sites, this concept is expressed by the polluter-pays principle, which establishes that the polluter is liable for the contamination he has caused and the impact it may have, as well as the costs of characterizing and restoring the sites he has damaged, and he may not transfer this responsibility to other members of society or to future generations. The application of the polluter-pays principle, which means that environmental costs must be borne internally, allows society to hold the polluter responsible and to ensure that soils and sites regain their functions. If this principle is not applied, society risks being saddled with hundreds of seriously damaged sites scattered throughout the province, which, in order to protect the public and the environment, it will have to take charge of, that is, monitor changes and use and, where required, make them safe or restore them.

The Fairness Principle-The fairness principle presupposes that the rehabilitation of a contaminated site is first and foremost the responsibility of those who are profiting or have profited from the failure to protect it. From another point of view, it means that an individual or a business that in good faith applies MEF policies and directives to prevent the contamination of its site or to rehabilitate it must not be placed at a disadvantage with respect to those who fail to do so. This means that the action required from all owners in the same situation facing the same problems must be similar and apply equally to all at the same time, so that no one gains any advantage over his competitors by ignoring his responsibilities or making do with half-measures.

The amended act to be adopted under the new policy structure has the following features:

- A regulation must be adopted establishing the concentration level in excess of which a site is considered contaminated (as provided in Section 31.52 a) of the Environment Quality Act (EQA).

Section 31.52 a states that “A person who, as owner or lessee or in any other capacity, has the custody of land in which contaminants resulting from an industrial or commercial activity of a category designated by regulation of the Government are found in a concentration exceeding the regulatory limit values is required, on being informed of the presence of the contaminants at the limits of the land or of a serious risk of off-site contamination which could compromise a use of water, to give immediate notice thereof in writing to the owner of

the neighbouring land concerned. A copy of the notice must also be transmitted to the Minister.”

- A regulation be adopted determining the industrial or commercial activities the exercise of which may cause soil and groundwater contamination (as provided in Section 31.52 c) of the EQA).
- Owners of sites contaminated in excess of the use-based generic criteria corresponding to the zoning of their site register a Contamination Notice with the Registry Office (the Contamination Notice required to permit registration with the Registry Office must be prepared) as per Section 31.58 of EQA. Section 31.58 states that *“Where a characterization study performed pursuant to this Act reveals the presence in land of contaminants in a concentration exceeding the regulatory limit values, the person or municipality who had the study performed shall apply for registration in the land register of a notice of contamination on being informed of the presence of such contaminants. The notice of contamination must contain, in addition to a description of the land,*
 - *The name and address of the applicant for registration of the notice and of the owner of the land*
 - *The name of the municipality in which the land is situated and the land use authorized by the zoning by-laws; and*
 - *A summary of the characterization study, certified by an expert referred to in section 31.65, stating among other things the nature of the contaminants present in the land*

In addition, the person or municipality must transmit to the Minister and to the owner of the land a duplicate of the notice bearing a registration certificate or a copy of the notice certified by the Land Registrar. On receipt of the document, the Minister shall transmit a copy to the municipality in which the land is situated ; if the land is situated in a territory referred to in section 133 or 168 that is not constituted as a municipality, the document is transmitted to the body designated by the Minister.”

- Owners of sites contaminated under specific criteria or on which confinement, control and monitoring (CCM) measures or restrictive measures are in place arrive at a Restrictive Use Covenant with the MEF and register it with the Registry Office (the Restrictive Use Covenant required to permit registration with the Registry Office must be prepared).
- Owners of contaminated sites who become aware of contamination in soils or groundwater at the edges of their sites are obliged to report it to the owners of neighbouring sites.
- A professional certification program be implemented. These professional certification programs are to be provided to the labour to guarantee quality or work for the cleanup of hazardous waste sites.
- A fee structure system be implemented:
 - to establish measures providing for the use of economic instruments, including tradeable permits, emission, effluent and waste-disposal fees or charges, advance elimination fees or charges, and fees or charges related to the use, management or purification of water, for the purpose of protecting the environment and achieving environmental quality objectives for all or any part of the territory, and establish any rule necessary or relevant to the functioning of the measures pertaining in particular to the determination of the persons or municipalities required to pay such fees or charges,

the conditions applicable to their collection and the interest and penalties applicable in case of non-payment.

- To determine the fees payable by the holder of an authorization, approval, certificate, permit, attestation or permission to cover the costs of control and monitoring measures, particularly the costs of inspecting facilities and examining information or documents provided to the Minister, the conditions of payment and the interest payable in case of non-payment, and exempt from payment of all or part of the fees, on the conditions the Minister determines, a holder who has set up an environmental management system that meets a recognized Québec, Canadian, or international standard.
- A regulation made under subparagraph e.1 of the first paragraph prescribing fees or charges related to the use, management or purification of water must provide that those fees or charges are to be credited to the Green Fund for the purpose of ensuring water governance, including protecting and developing water resources and ensuring that there is an adequate quality and quantity of water in a sustainable development perspective.
- A regulation made under subparagraph e.1 of the first paragraph prescribing waste-disposal or elimination fees or charges may provide that all or part of those fees or charges are to be paid to the Société québécoise de récupération et de recyclage for the purpose of the carrying out of its functions in the field of residual materials recovery and reclamation.
- Assessment of fees-The fees determined under subparagraph of the first paragraph are based on the nature of the holder's activities, the characteristics of the facility, the nature, quantity and location of waste or stored, buried, processed or treated materials, and on the number of offences under a provision of this Act or a regulation made under it of which the holder has been convicted in a final judgment during the period determined by the Government, and the nature and seriousness of those offences. For the purposes of this subparagraph, a person or municipality that was carrying on an activity referred to in this Act when the provisions of this Act or a regulation made under it for the purpose of requiring an authorization, approval, certificate, permit, attestation or permission were made applicable to that activity is considered to be a holder.

Liability and its exemptions under EQA are provided under Section 31.43 and 31.51.

The section 31.43 states that *“Where it appears to the Minister that contaminants are present in the land in a concentration exceeding the limit values prescribed by a regulation made under section 31.69, or that the contaminants, even though they are not determined in the regulation, are likely to adversely affect the life, health, safety, welfare or comfort of human beings, other living species or the environment in general, or to be detrimental to property, the Minister may order any person or municipality that,*

– even before the coming into force of this section, had emitted, deposited, released or discharged all or part of the contaminants or had allowed the contaminants to be emitted, deposited, released or discharged ; or

– after the coming into force of this section, has or has had custody of the land as owner or lessee or in any other capacity,

to submit for the Minister's approval within the time specified a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule”

The exemptions to the liability state that:

“Such an order may not be made against a person or municipality that has or has had custody of the land as owner or lessee or in any other capacity, where

(1) it is established that the person or municipality was unaware of and had no reason to suspect the presence of contaminants in the land, having regard to the circumstances, practices and duty of care ;

(2) it is established that, once becoming aware of the presence of contaminants in the land, the person or municipality acted in conformity with the law, as to the custody of the land, in particular as regards the duty of care and diligence ; or

(3) it is established that the presence of contaminants in the land results from outside migration from a source attributable to a third person.”

Section 31.51 states that *“A person who permanently ceases an industrial or commercial activity of a category designated by regulation of the Government is required to perform a characterization study of the land on which the activity was carried on within six months of the cessation or within such additional time, not exceeding 18 months, as the Minister may grant, subject to the conditions fixed by the Minister, with a view to the resumption of activity. Upon completion, the study must be transmitted to the Minister and to the owner of the land.”*

“If the characterization study reveals the presence of contaminants in a concentration exceeding the regulatory limit values, the person who carried on the activity concerned is required to transmit for the Minister's approval, as soon as possible after being informed of the presence of the contaminants, a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule and, where applicable, a plan for the dismantling of the installations on the land”

31.51.1.

“The owner or operator of a tank that is part of a petroleum equipment installation within the meaning of the Building Act (chapter B-1.1) must, in the cases, under the conditions and within the time limits prescribed by regulation, notify the Minister and perform or commission a characterization study of all or part of the land where the tank is located. If the characterization study reveals the presence of contaminants in a concentration exceeding the regulatory limit values, the owner or operator must present to the Minister, for approval, a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule”

Provisions of access to land under EQA are provided under Section 31.63 which states that *“The person who, as owner or lessee or in any other capacity, has the custody of the land shall give free access to the land at any reasonable time to any person required under this division to perform a characterization study or a toxicological and ecotoxicological risk assessment and groundwater impact assessment or to implement a rehabilitation plan, subject, however, to that person restoring the premises to their former state and compensating the owner or custodian of the land, as the case may be, for any damage.”*

Provisions of change in land use under EQA are provided under Section 31.53, 31.54 and 31.55.

Section 31.33 states that *“Any person intending to change the use of land where an industrial or commercial activity of a category designated by regulation of the Government has been carried on is required to first perform a site characterization study unless such a study is already available and a certificate of an expert referred to in section 31.65 states that the study meets the requirements of the guide prepared by the Minister under section 31.66 and is still current.”*

Section 31.54 states that *“Any change in the use of land referred to in section 31.53 is subject to the Minister's approval of a rehabilitation plan if contaminants are present in the land in a concentration exceeding the regulatory limit values.”*

Section 31.55 states that *“The rehabilitation plan referred to in section 31.54 may provide that contaminants in a concentration exceeding the regulatory limit values are to be left in the land, on the condition, however, that a toxicological and ecotoxicological risk assessment and groundwater impact assessment be submitted with the plan.”*

Amendments to regulations to bring in financial mechanism in case of bankruptcy have been suggested under the new policy:

- Over the past few years, the number of contaminated industrial properties abandoned by bankrupt owners has increased in Canada. The work required to secure and decontaminate these sites has often had to be carried out by the municipalities involved and the government and at their expense. To end this state of affairs, the MEF under the new policy plans to develop and put in place mechanisms making it possible to guarantee that the amounts required securing and decontaminating the sites and equipment are available, even if the company goes bankrupt.
- The Ministère des Ressources Naturelles has already broken new ground in this area by bringing in amendments to the Mining Act in 1995 that make it possible to ensure restoration of sites affected by mining activities by requiring the deposit of financial guarantees before the industry begins its activity. For its part, the MEF already requires financial guarantees under the Hazardous Materials Regulation and plans to put in place post-closure environmental management funds for final waste disposal.
- The development of a specific insurance product, although presenting certain difficulties, constitutes another path to be explored, as does the implementation of a preferred claim in case of bankruptcy.
- The MEF will continue discussions with experts in the field on these various mechanisms. When appropriate, the most promising mechanisms will be presented to environmental stakeholders for discussion.
- The mechanisms adopted must apply to both new industrial establishments and industries already in operation.

Canadian Soil Quality Standards: Canadian Council of Minister's of the Environment (CCME)'s Soil Quality Guidelines Task Group (SQGTG) is responsible for the development of Canadian Soil Quality Guidelines for the protection of environmental and human health, guidance on other soil quality and contaminated site-related activities; developing and maintaining the Canada-wide Standard for Petroleum Hydrocarbons in Soil and the requirements under it. The Soil Quality Standards, 1997 provide threshold level of pollutants such as Arsenic, Benzene, Copper, and Lead and others for determination of contamination of soil. As per the legal framework, Each

Canadian province and territory is responsible for the development of their own remediation criteria and guidelines for contaminated site management, as well as the procedures for site-specific risk assessment implementation as per the 1997 guidelines.

A list of actions on contaminated land as per legal framework is presented in table below:

Table 17 Sequence of activities on contaminated land as per legal framework

Activity	Details
Identifying a contaminated land	EQA Section 31.52 a: Any person who has the custody of the land in which contaminants resulting from an industrial or commercial activity of a category designated by regulation of the Government are found in a concentration exceeding the regulatory limit values or on being informed of the presence of such contaminants in the land can identify and inform a land as contaminated.
Determining the industrial or commercial activities the exercise of which may cause soil and groundwater contamination	EQA Section 31.52 c identifies the industrial or commercial activities that are responsible for soil/groundwater contamination.
Notice to inform the Minister /owner of the contaminated land	EQA Section 31.52 a- “A person who, as owner or lessee or in any other capacity, has the custody of land in which contaminants resulting from an industrial or commercial activity of a category designated by regulation of the Government is found in concentration exceeding the regulatory values... to give immediate notice thereof in writing to the owner of the neighbouring land concerned. A copy of the notice must also be transmitted to the Minister.”
Access to contaminated land	EQA under Section 31.63 states that the person who, as owner or lessee or in any other capacity, has the custody of the contaminated land shall give free access to the land at any reasonable time to any person required under this Act to perform a characterization study
<u>Non-Orphan site</u> Performing a characterization study for a non-orphan site <u>Orphan site</u> <u>Performing a characterization study for an orphan site</u>	Section 31.58 of EQA addresses the requirement For a non-orphan site, once the notice is submitted, characterization study is to be performed by the owner /lessee/ custodian of the land and the land gets registered by the Minister as a contaminated land. For an orphan site, once the notice is submitted, characterization study is to be performed by the concerned municipality and the land gets registered by the Minister as a contaminated land.
A person who permanently ceases an industrial or commercial activity of a category designated by regulation of the Government is required to perform a characterization study of the land	Section 31.51 of EQA addresses the requirement
Any person intending to change the	Section 31.33 of EQA addresses the requirement

Activity	Details
use of land where an industrial or commercial activity of a category designated by regulation of the Government has been carried on is required to first perform a site characterization study	
<p><u>Non- Orphan Site</u> Developing the rehabilitation plan for a non-orphan site</p> <p><u>Orphan Site</u> Developing the rehabilitation plan for an orphan site</p>	<p>For a non-orphan site, Section 31.43 of EQA states that where it appears to the Minister that contaminants are present in the land in a concentration exceeding the limit values prescribed by regulation, the Minister may order any person to submit for the Minister's approval within the time specified a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule.</p> <p>For an Orphan site, Section 31.43 of EQA states that where it appears to the Minister that contaminants are present in the land in a concentration exceeding the limit values prescribed by regulation, the Minister may order the concerned municipality to submit for the Minister's approval within the time specified a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule.</p>
<p><u>Non-orphan site</u> Liability to submit rehabilitation plan for a non-orphan site</p> <p><u>Orphan site</u> Liability to submit rehabilitation plan for an orphan site</p>	<p>For non-orphan sites, Section 31.43 of EQA states that the Minister may order any person that even before the coming into force of this section, had emitted, deposited, released or discharged all or part of the contaminants or had allowed the contaminants to be emitted, deposited, released or discharged ; or after the coming into force of this section, has or has had custody of the land as owner or lessee or in any other capacity to submit for the Minister's approval within the time specified a rehabilitation plan.</p> <p>For orphan sites, Section 31.43 of EQA states that the Minister may order municipality to submit for the Minister's approval within the time specified a rehabilitation plan.</p>
Liability to submit rehabilitation plan when one permanently ceases an industrial or commercial activity of a category designated by regulation of the Government	Section 31.51 states that if the characterization study reveals the presence of contaminants in a concentration exceeding the regulatory limit values, the person who carried on the activity concerned is required to transmit for the Minister's approval a rehabilitation plan setting out the measures that will be implemented to protect human beings, the other living species and the environment in general, including property, together with an implementation schedule and, where applicable, a plan for the dismantling of the installations on the land.
Liability to submit rehabilitation	Section 31.54 of EQA addresses the requirement

Activity	Details
plan when a person intends to change the use of land where an industrial or commercial activity of a category designated by regulation of the Government has been carried on.	
<u>Non-Orphan site</u> Liability to finance rehabilitation of non-orphaned sites <u>Orphan site</u> Liability to finance rehabilitation of orphaned sites	Custodian of contaminated land, cost sharing (80/20) between custodian and FCSAP Funds from FCSAP is used for rehabilitation of federal orphaned sites

6.3. Institutional Framework

The principle agency responsible for implementing Canada's environmental regulations is Environment Canada or MEF. Their mandate is to coordinate environmental policies and programs for the federal government; conserve and protect Canada's water resources; preserve and enhance the quality of the natural environment, including water, air, soil, flora and fauna; conserve Canada's renewable resources; forecast daily weather conditions and warnings, and provide detailed meteorological information to all of Canada and enforce rules relating to boundary waters. Environmental Canada is headed by the Minister of the Environment Canadian and is assisted by the Environmental Assessment Agency President and the Parks Canada CEO. Departmental offices include Strategic Policy, Environmental Stewardship, Meteorological Service of Canada, Assistant Deputy Minister, Science & Technology, Finance, International Affairs, Human Resources and Corporate Services. The Director General of Environmental Protection Operations is located within the Environmental Stewardship Department and is assisted by six regional Director Generals.

Public Works and Government Services Canada - The Public Works and Government Services Canada (PWGSC) fulfils three roles within the Federal Contaminated Sites Action Plan – as a custodian implementing projects to assess and to manage contamination on its real property inventory, as an optional service provider assisting in the implementation of other federal custodians projects through the provision of technical, project management and procurement expertise and as Expert Support assisting in the development of project management tools, liaising with industry, and sharing information on innovative technologies.

Health Canada- Under the Federal Contaminated Sites Action Plan, Health Canada is an Expert Support Department which means that it provides guidance, training and advice on human health risk assessment and public involvement to other federal departments. As an expert support department, Health Canada's Contaminated Sites Division is responsible for reviewing human health risk assessment and related reports from contractors, custodial departments and provincial regulatory authorities; collaborating with Health Canada's Environmental Health Assessment Services, an authority on integration of health issues in environmental assessments conducted under the Canadian Environmental Assessment Act; and providing custodial departments with expert advice, guidance, training and tools on best practices and innovative methods for human health risk assessment and incorporating stakeholders into contaminated site management.

Department of Fisheries and oceans: Fisheries and Oceans, Canada is also an Expert Support Department who devote considerable effort as an expert Federal Authority to many Environmental Assessments conducted by other federal departments and agencies that involve fish and fish habitat issues. With respect to implementation of the Federal Contaminated Sites Action Plan (FCSAP),

DFO provided expert support and advice to the FCSAP Secretariat and the Contaminated Sites Management Working Group. DFO also provided expert support advice to departments with custody of federal contaminated sites.

Remediation Specific Skill Set determination: Some provinces and territories have set requirements for people who are qualified to work on contaminated sites. The mapping carried out in this regard shows the stage wise requirement of skill set for a remediation project:

Table 18 Mapping of skill sets to activity phases

Type of Project	Environmental	Non-environmental
Site assessment	Engineers Technologists/technicians Hydro-geologists and other scientists	Operators of drilling rigs, labourers
Maintenance	Engineers Technologists/technicians Hydro-geologists and other scientists	Operators (excavation and other equipment), truck drivers, labourers, site managers
Remediation	Engineers Hydro-geologists and other scientists	Operators (excavation and other equipment), truck drivers, labourers

The tasks allocated amongst the professionals are as follows:

Table 19 Mapping of tasks to professionals

Environmental Practitioners	Tasks
Engineers	Project planning and management; Site Specific Risk Assessment Technical analysis; Site surveys; Data search and compilation; and Supervision and monitoring
Technicians	Site surveys; Sample collection; and Logistical planning
Administrative personnel	Graphics and maps and Word processing

For example, site assessments in Ontario was carried out by a qualified person (QP) who was a certified professional, such as an engineer, geoscientist, chemist, agrologist, or technologist. Likewise, among the 79 qualified site assessment experts in Quebec in 2004, 63% were engineers and 19% were geologists. The remaining 18% were biologists, chemists, geographers, hydrogeologists, microbiologists, and industrial technicians or technologists.⁹

6.4. Financial mechanisms

The arrangements of funds in the country have evolved with the change in knowledge on the number of contaminated sites, extent of contamination, resources requirements etc. The timeline below shows the chronological evolution:

- 1989: The Canadian Council of Ministers of the Environment (CCME) and the Government of Canada negotiate a joint \$250-million, five-year National Contaminated Sites Remediation Program.
- 1990: Environment Canada commits \$25 million over five years to assist custodians with identifying, assessing, and remediating high-risk contaminated sites within their jurisdictions.
- 1995: Contaminated Sites Management Working Group (CSMWG) is created.
- 1999: The Working Group releases A Federal Approach to Contaminated Sites.

⁹ Canadian labour requirements for remediation and reclamation of contaminated site 2006-2009
Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task – 2 Overview of International Practices

- 2002: The Treasury Board Secretariat launches the Federal Contaminated Sites Inventory (FCSI).
- 2003: The Government of Canada announces funding of \$175 million over two years to accelerate action on the highest risk federal contaminated sites.
- 2004: Federal budget commits \$3.5 billion under the Federal Contaminated Sites Action Plan.
- 2005: The government launches the Federal Contaminated Sites Action Plan program.
- 2006: The Treasury Board introduces its Policy on the Management of Real Property that integrates all policies related to the management of federal real property including contaminated sites.
- 2009-2011: Under Canada's Economic Action Plan (CEAP), the Federal Contaminated Sites Action Plan receives \$245.5 million. The funding includes \$80.5 million in new funding and \$165 million from existing funding (Budget 2004).
- 2011: Budget 2011 includes an additional \$68 million over two years for funding site assessments and program management.

Under Canada's Economic Action Plan, thousands of sites across Canada have been evaluated and remediation action is underway or completed on more than 200 sites. Building on work to date, Budget 2011 provides \$68 million over the next two years to renew support for the Action Plan, which will contribute to an improved environment as well as economic development and employment opportunities. Departments will undertake remediation work that is expected to reduce the federal liability by close to \$550 million, focusing on the highest priority sites such as the Giant and Faro Mines in Northern Canada.

The Federal Contaminated Sites Action Plan (FCSAP) expenditures during Phase I of the program, from 2005 to 2011 were \$1.3 billion including \$1.1 billion for remediation activities. 50% of FCSAP project sites have total planned costs less than \$50,000, and 75% of projects have total planned costs less than \$250,000. Only 16% of the projects exceed \$1 million. The breakup of remediation costs are as follows:

Table 20 Breakdown of remediation costs

Type of Project	Logistical Costs	Site Direct Costs
<i>Territories</i>		
Assessment	50	50
Care and maintenance	70	30
Remediation	80	20
<i>Provinces</i>		
Assessment	33	67
Remediation	70	30

Logistical costs include expenses for mobilization, demobilization, camp, contractor personnel, health and safety, fuel, flights, communication costs, and other functions necessary to carry out the project. Site contractor expenses, including drilling, excavation, and transportation, are also included within logistical costs. Site direct costs include site specific environmental expertise and analytical (laboratory) services. Engineers, scientists, technicians, technologists, office personnel, and laboratory workers are included in this category. Tasks undertaken involve project planning and management, site specific risk assessment, technical analysis, site surveys, data search and

compilation, supervision and monitoring, sample collection, graphic design and mapping, and laboratory work. Project expenditures include site assessments, remediation activities, and care and maintenance work to prevent catastrophic failures on higher-risk sites while developing remediation plans.

Through the Federal Contaminated Sites Action Plan, the Government of Canada is investing \$366 million this year (2012-2013), including \$333 million for remediation activities on federal contaminated sites. This funding continues to support the program, now into its second phase (2011-2016). Funding is provided to custodian departments under the FCSAP program for remediation of site if a site meets the "Treasury Board" definition of a contaminated site, has been contaminated through activities that occurred prior to April 1, 1998 and is on lands owned or leased by the federal government (or it is non-federal lands, the federal government must have accepted full responsibility). In addition, a financial liability associated with the site must be reported in the Federal Contaminated Sites Inventory.

Under the Federal Contaminated Sites Action Plan (FCSAP), about \$1.5 billion have been spent addressing federal contaminated sites. The estimated financial liability for dealing with federal contaminated sites exceeded the amount of dedicated funding remaining under the FCSAP program by about \$500 million. As reported in the Public Accounts of Canada, the financial liability to remediate or otherwise risk manage about 2,200 contaminated sites was estimated at \$4.3 billion as of 31 March 2011.

In recognition of the "polluter pays" principle underlying the program, the FCSAP operates on a cost-shared basis with custodians. To assist custodians in classifying their contaminated sites, assessment funding is available through the FCSAP at an 80/20 (FCSAP/custodian) cost-share, up to a program maximum of \$25 million per year. For remediation / risk management projects with total estimated project costs of \$10 million or less, the cost-share is also 80/20 (FCSAP/custodian). Once estimated project costs for remediation / risk management projects exceed \$10 million, the custodian's share is reduced to 10% on the amount exceeding \$10 million. Certain exceptionally large projects with total costs in excess of \$90 million may be eligible for full funding of project costs. In order to give custodians the flexibility to better manage their contaminated sites programs, the FCSAP allows custodians to internally reallocate FCSAP funds in-year among projects. In so doing, the FCSAP is providing custodians with the flexibility to respond to unforeseen circumstances within a given fiscal year, while continuing to make progress and meet the requirements of the program. In addition to the FCSAP program, there are three other major initiatives that address contaminated sites or facilities for which the federal government has accepted some or all financial responsibility. These are Port Hope Area Initiative, Nuclear Legacy Liabilities Program and Shared-Responsibility Contaminated Sites. The total environmental liabilities reported are upto \$7.7 Billion. The total cost to the government will likely increase over time as more sites are assessed and as action plans, along with cost estimates, are developed and refined.

Cost sharing principles - Under the cost-sharing arrangements of the FCSAP program, it funded about \$1.3 billion or about 90 percent of the spending, including \$245 million from Canada's Economic Action Plan during the 2009-10 and 2010-11 fiscal years. Custodians funded the remaining amount.

Environmental Damages Fund - The Environmental Damages Fund is administered by Environment Canada, and was created in 1995 to provide the courts and companies with an option to direct monetary penalties and settlements to investments in the restoration of natural resources and the environment, and wildlife conservation projects in the same geographic area where the damage originally occurred. The Environmental Damages Fund (EDF) follows the Polluter Pays Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task - 2 Overview of International Practices

Principle to help ensure that those who cause environmental damage or harm to wildlife take responsibility for their actions.

Please refer to Appendix 2 for further details.

6.5. Case studies exemplifying the legal, institutional and financial mechanisms

Sydney Tar Ponds Agency (Federal/Province Partnership)

History: The project is situated in a 68 hectare former industrial property bounded by residential and former industrial lands. It contains several watercourses and a tidal estuary that received industrial discharges from upstream industrial activities. The Tar Ponds cover 31 hectares and contain more than 700,000 tonnes (550,000 m³) of sediments contaminated with PAHs and metals. About five percent of the sediments also contain polychlorinated biphenyls (PCBs) in amounts greater than 50 parts per million.

Legal Framework: The governments of Canada and Nova Scotia jointly proposed to remediate the Sydney Tar Ponds and Coke Ovens sites through the creation of the Sydney Tar Ponds Agency (a Special Operating Agency of the government of Nova Scotia) that manage and implement the project. The project is governed by the Canadian Environmental Assessment Act and the Nova Scotia Environment Act. Public Works and Government Services Canada was assigned the lead for the project on behalf of the government of Canada. The remediation plan underwent an environmental assessment as required by the Canadian Environmental Assessment Act and the Nova Scotia Environment Act. Environment Canada and the Sydney Tar Ponds Agency developed a cleanup plan

Financial Framework: A \$400 million cost-share agreement signed by both the Government of Canada and the Province of Nova Scotia.

This case demonstrates the high level of stakeholder involvement in rehabilitation activities through various features. With pollution being a localized problem with a nationwide impact, the federal and provincial government partnership is a key element of success. Further involvement of the Sydney Tar Ponds Agency (specified below) in project planning activities led to the creation of the project management framework to ensure stakeholder participation and accountability. The project management framework built upon the Memorandum of Agreement between the federal and province governments and identified the proposed structure of the project team, and their roles and responsibilities with clear distinction between federal, provincial and joint responsibilities. It defined project management committees with representation from NS Department of Transportation and Public Works, Enterprise Cape Breton, Environment Canada, Health Canada and Privy Council Office. The framework also included the creation of a Community Liaison Committee to liaison between the community and governments with respect to identification and management of community stakeholder interests.

Skill set deployment in Ontario Remediation Project: The following table shows the skill set deployment in Ontario Remediation Project in different phases of the study. In Ontario, the regulatory requirements for Qualified Persons (QPs) according to Ontario regulation 153/04 under the Environmental Protection Act are under review.

Table 21 Regulatory requirements in Ontario for Qualified Professionals (QP)

Designation	Site Assessment Phase I and related recording of site condition	Site Assessment Phase II and related recording of site condition without risk assessment	Site Assessment Phase II and related recording of site condition with risk assessment
Professional Engineer Engineering	√	√	√
Professional Geoscientist	√	√	√
Chartered Chemist	√	√	
Professional Agrologist	√	√	
Applied Science Technologist	√		
Certified Engineering	√		
Architectural Technologist	√		

6.6. Relevance to India

The Canadian legal framework has clear delineation of liability to carry out land characterization before abandoning an industrial property. Section 31.51 of EQA has clearly mandated that any person who permanently ceases an industrial or commercial activity is required to perform a characterization study of the land on which the activity was carried on within six months or if additional then by 18 months. There are many cases of legacy contamination in India in abandoned industrial land. A regulatory provision similar to Section 31.51 of EQA may be instrumental to resolve these issues in future.

There is also clear delineation of liability to carry out land characterization before any land use change in the country. Section 31.53 of EQA specifies that any person intending to change the use of land where an industrial or commercial activity has been carried on is required to first perform a site characterization study unless such a study is already available and a certificate of an expert referred to in section 31.65 states that the study meets the requirements of the guide prepared by the Minister under section 31.66 and is still current.

Clarity on enforcement before enforcement of a certain regulatory provision - Section 31.43 clearly states that the Ministry may order for remediation for contamination even if the contamination has taken place before any enforcement with regard to contaminated land was in effect.

Authority for Land Entry - Section 31.63 explicitly grants any authorized person under this Act to enter private property for site investigation and clean up purposes. The current Indian legal framework does not explicitly grant this authority to anybody (e.g. MoEF/CPCB/SPCB) to address an immediate remediation requirement.

However, the allocation of liability in the Canadian framework is not clear. Though EQA has provisions to put liability on “any person” or municipality to carry out remediation, it does not mention the type of obligated entities such as polluter/owner/transporter of hazardous waste etc. In India to address different types of responsible entities it would be useful to have legal framework specifying the type of responsible parties obligated under law.

7. Australia

7.1. Overview

As per the latest available statistics of 2006-07, hazardous waste generated in Australia doubled between 2002 and 2006 to around 1.19 million tonnes per annum owing to rapid industrial growth. In 2007, Australia generated 1.12 million tonnes of hazardous wastes. An average of 30 000 tonnes of hazardous waste is exported from Australia annually, in accordance with the requirements of the Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal. The hazardous waste generation scenario in the country foretells the need for a comprehensive legal-institutional and policy framework to deal with hazardous waste management and rehabilitation of polluted sites in the country.

In Australia, different provinces have different legislations that govern the contaminated land management. In this section, we would review the key legislations of the province of New South Wales to analyse the legal, policy, institutional and financial mechanisms involved. The practice followed in New South Wales focuses on a deep level of interaction among stakeholders. We found that the mandate is jointly addressed by institutions such as the Environment Protection Authority (EPA), the Department of Planning and Infrastructure and planning consent authorities (usually local councils) working together on each of the steps of the rehabilitation process. In addition, accredited ‘site auditors’ participate as independent verification agencies to ensure that rehabilitation goals and subsequent land use requirements are appropriately set.

7.2. Legal and Policy Framework

7.2.1. Brief introduction of the key legislations and framework

In New South Wales, there is a two-tier structure for legal framework of contaminated sites:

- the Environment Protection Authority (EPA), which uses its powers under the Contaminated Land Management Act 1997 (CLM act) to deal with site contamination that is significant enough to warrant regulation under the Act given the site’s current or approved use
- local councils who deal with other contamination under the planning and development framework, including State Environmental Planning Policy No. 55 - Remediation of Land and the Managing Land Contamination - Planning Guidelines, on sites which, though contaminated, do not pose an unacceptable risk under their current or approved use. In these cases, the planning and development process determines what remediation is needed to make the land suitable for a different use

The main act for contaminated sites in Australia is the New South Wales (NSW) “Contaminated Land Management Act” of 1997 by the Office of Environment and Heritage of the Government of New South Wales. The CLM act was amended in 2008 with the “Contaminated Land Management Regulation”. The CLM act enables the government to respond to contamination that it has reason to believe is significant enough to warrant regulation. As per the act the government can order a person to undertake a preliminary investigation of land that the EPA suspects to be contaminated, declare land to be significantly contaminated land, order a person to take management action in

relation to significantly contaminated land and approve a voluntary proposal to manage significantly contaminated land

7.2.2. Relevant clauses within the legislations

Responsibility of contamination is enforced through Part 1 Section 6 of the CLM act which states that:

“For the purposes of this Act, a person is responsible for contamination of land (whether or not the contamination is significant contamination) if any one or more of the following is true:

- *the person caused the contamination of the land (whether or not any other person also caused the contamination of the land),*
- *the contamination occurred because an act or activity of the person resulted in the conversion of a substance that did not cause contamination of the land into a substance that did cause contamination of the land,*
- *the person is the owner or occupier of the land and the person knew or ought reasonably to have known that contamination of the land would occur and the person failed to take reasonable steps to prevent the contamination,*
- *the person carried on activities on the land that generate or consume:*
 - *the same substances as those that caused the contamination, or*
 - *substances that may be converted, by reacting with each other or by the action of natural processes on the land, into substances that are the same as those that caused the contamination,*

unless it is established that the contamination was not caused by the person.

For the purposes of this Act, a person is also responsible for significant contamination of land if either or both of the following is true:

- *the significant contamination occurred because an act or activity of the person resulted in a change in some pre-existing contamination of the land so that the contamination of the land became significant contamination,*
- *the significant contamination occurred because an act or activity of the person resulted in a change in the approved use of the land and the consequent increase in the risk of harm caused the EPA to identify the land as significantly contaminated land (even if the contamination itself did not change).”*

The EPA’s authority to provide preliminary investigation orders for land are provided under Part 3 Division 1 Section 10 “Preliminary investigation of land” of the act which states that:

“The EPA may, by order in writing served on a person, direct the person to conduct a preliminary investigation of land specified in the order (the specified land) within the time specified in the order to:

- *investigate whether the land is contaminated with the substances specified in the order (the specified substances) being the substances that the EPA reasonably suspects contaminate the specified land, and*
- *investigate the nature and extent of any such contamination, and*
- *provide to the EPA such information with respect to the investigation as it may require.”*

“A preliminary investigation order may be served on any one or more of the following persons:

- *a person who the EPA reasonably suspects may have been responsible for contamination of the land with the specified substance,*
- *an owner of the specified land,*
- *a notional owner of the specified land,*
- *a person who carried on activities on the specified land, but only if the activities are of the sort that:*
 - *generate or consume the same substance as a specified substance, or*
 - *generate or consume substances that may be converted by reacting with each other or by the action of natural processes on the land into the same substance as any of the specified substances,*
- *a public authority.”*

EPA’s authority to declare a land as significantly contaminated is through Part 3, Division 2 Section 11 of the CLM act Declaring land to be significantly contaminated land” which states that:

“If the EPA has reason to believe that land is contaminated and that the contamination is significant enough to warrant regulation under this Division, the EPA may declare the land to be significantly contaminated land.”

Once the land is declared as contaminated, the EPA must identify one or more appropriate persons as the subject of the order. The liability hierarchy for this is set out under Part 3, Division 2, Section 13 “Choice of appropriate person to be made subject to management order”, which states that:

“The EPA is to choose the appropriate persons from among the following persons:

- *2(a) a person who is responsible for significant contamination of the land (whether or not there may be other persons who are also responsible),*
- *2(b) an owner of the land (whether or not the person is responsible for contamination of the land),*
- *2(c) a notional owner of the land (whether or not the person is responsible for contamination of the land).*

In determining the appropriate persons, the EPA is, as far as practicable, to specify a person referred to in subsection (2) (a) over a person referred to in subsection (2) (b) or (c) and to specify a person referred to in subsection (2) (b) over a person referred to in subsection (2) (c).”

The above suggests that the liability hierarchy for management orders are – 1) the person/s responsible for the contamination, 2) owner/s, 3) notional owner/s.

The EPA may also direct a public authority to carry out management action in relation to contaminated land. The public authority may recover costs from the person responsible for the contamination in some circumstances.

The land related issues are dealt with in this act under Part 3, Division 5 “Entry on land” under section 32 and 33 as follows: Further land issues in terms of powers to enter land are described as under Section 81 and 82 in Division 3. This is explained later in this sub-section.

32 Refusal of entry on land

An order under this Part does not confer any power to enter land, remain on land or do anything on land, without the permission of the occupier of the land.

However, if the occupier withholds or withdraws that permission, the EPA may revoke or suspend the order and instead make an order to which the occupier is subject as if the occupier were the appropriate person.

If the occupier carries out the requirements of an order, the occupier may recover costs in accordance with Division 6 as if the occupier was the appropriate person.

33 Liability for losses

A person who (with the permission of the occupier) enters any land, or does anything else on land, as required by an order under this Part, is liable (except as prescribed by the regulations) to the occupier of the land for any loss suffered by the occupier as a result of the entry or other actions (including any loss suffered by the occupier because of the interruption of the occupier's business on that land by that entry or those actions).

A person (other than the owner of land) who (with the permission of the occupier) enters the land, or does anything else on the land, as required by an order under this Part, is liable (except as prescribed by the regulations) to the owner of the land for any loss suffered by the owner as a result of that entry or those actions or for any injury to the land caused by that person.

In addition to any liability that a person who enters land as referred to in this section may have, the person has a duty to meet the reasonable costs and expenses of the owner and the occupier of the land in providing access to that land as referred to in this section.

A person has a duty to:

- *take reasonable steps to minimise the loss and injury referred to in this section caused by the person's actions, and*
- *take reasonable steps towards restitution in respect of that loss or injury (except as prescribed by the regulations), and*
- *compensate the party that suffered the loss or injury for which the person is liable to the extent that restitution is not practicable (except as prescribed by the regulations).*

According to Part 3, Division 7, Section 46 – “EPA may issue clean-up and prevention notices” in relation to significantly contaminated land.

According to Part 5, Section 60 of the ACT, “Duty to report contamination” - The Act requires land owners and persons who carry on contaminating activities to notify the EPA of the contamination of land in certain circumstances. If they fail to do so a penalty will be imposed.

The Act allows the EPA to accredit people as site auditors under Part 4 Section 49. Site auditors must issue a Site Audit Statement indicating the land uses that any site is suitable for under part 4 Section 53B.

The EPA is required to keep a record of current and former sites regulated by it under part 5 Section 58.

The act under Division 3 – “Powers of entry and search of land” confers certain powers to enter the contaminated land as follows.

“Section 81 Powers to enter land

An authorised officer may enter:

- *any land on which the authorised officer reasonably suspects that any activity that may cause contamination is being carried on—at any time during which the activity is being carried on there, and*
- *any land at or from which the authorised officer reasonably suspects contamination has been, is being or is likely to be caused—at any time, and*
- *any significantly contaminated land—at any time, and*
- *any other premises—at any reasonable time.*

Section 82 Entry into residential premises only with permission or warrant

This Division does not empower an authorised officer to enter any part of premises used only for residential purposes without the permission of the occupier or the authority of a search warrant under this Division.”

Environmental Offset Arrangement - If the Minister considers that it would not be practicable to remediate the contamination within a reasonable time, the Minister may enter into an offset arrangement with a person responsible for the contamination if it is in the public interest to do so. Under the arrangement the person is to provide assistance (other than monetary assistance) to communities affected by the contamination. Examples of assistance include community services or establishment and operation of environmental projects.

According to section 111a, the Minister for the Environment (the Minister) can enter into offset arrangements with a person responsible for 'significant contamination'. The person can implement the offset as a means of mitigating the impact of contamination on the community affected by the contamination. Importantly, offsets are not an alternative to the remediation and management of significant contamination required under the CLM act. Offsets are developed on a case-by-case basis depending on the particular situation. This framework ensures that the providers of offsets and the recipients of the benefits of offsets have certainty about the circumstances under which offset programs can be considered.

Apart from the CLM other key policies / regulations in the state are:

- State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55), which complements the CLM act. SEPP 55 provides state-wide planning controls for remediation of land. It facilitates and controls the remediation of land and the provision of information to planning and environmental authorities, and the public.
- Managing Contaminated Land: Planning Guidelines (DUAP & EPA 1998) assist planning authorities to ensure that land is cleaned up to allow its safe use.
- The Protection of the Environment Operations Act 1997 controls the operation of polluting activities to ensure that the environment is protected.
- The use of agricultural chemicals is controlled under the Pesticides Act 1999.
- The Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 focuses on a preventative approach to minimise the risk of soil and groundwater contamination.

7.2.3. Summary of relevant legislations

To summarise the “polluters pay” principle as indicated in the legal framework, it may be highlighted that liability of payment of cost recovery for a remediation work under CLM act extends from a polluter to an owner (current/or notional) and it also addresses specific liability issues in Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task – 2 Overview of International Practices

case of bankruptcy of the responsible party. Sections 33,34,35,36 and 37 of the CLM act describe various cost recovery scenarios in case of single or multiple responsible parties.

The CLM act has clear delineation of enforcement authorities that includes empowering EPA to enter into a private land to carry out investigation or remediation, addresses scenarios in case denial of entry by the occupier. In case of damaged caused to the owner/occupier due to activities on the land after entry (with occupier's permission), then the liability to pay for the damage is on the person who enters the land. The legal framework enables EPA to issue site investigation orders, declare a land as contaminated, enter into a private land for investigation or cleans up, issue notices for clean up, choose the "appropriate" person(s) liable for contamination and cost recovery.

The following table presents the flow of key activities in the remediation, based on the legal framework.

Table 22 Sequence of remediation activities under the CLM framework

Activity	Details
Responsibility of contamination	For non-orphan sites, any person who the EPA reasonably suspects to be responsible for contamination, the owner of the land, or a person who carried out activities on the land that generate contaminants or generate substances that may convert into contaminants after reaction with the land. For orphan sites the notional owner of the land is responsible.
Preliminary investigation orders	The EPA may direct the responsible person to conduct a preliminary investigation of land in order to assess whether the land is contaminated, investigate the nature and extent of any such contamination, and provide to the EPA such information with respect to the investigation as it may require.
Declaration of significantly contaminated land	If the EPA has reason to believe that land is contaminated and that the contamination is significant enough to warrant regulation under this Division, the EPA may declare the land to be significantly contaminated land
Sending management orders and choice of appropriate person to whom the order must be sent	Once the land is declared as contaminated, the EPA must identify one or more appropriate persons as the subject of the order. Liability hierarchy for management orders is: For non- orphan sites 1) the person/s responsible for the contamination, 2) owner/s, For orphan sites – the notional owner/s.
Approved voluntary management proposals	There is also a possibility that one or more persons furnish the EPA with a proposal for the management of significantly contaminated land (a voluntary management proposal). The EPA upon its satisfaction with the proposal may approve a voluntary management proposal unconditionally or subject to conditions by notice in writing.
Ongoing maintenance orders	For land that has been the subject of a management order or an approved voluntary management proposal, the EPA may, direct the person to carry out any ongoing management of the land, provide reports to the EPA or any other specified person at specified periods, to inform the EPA of any change in the ownership or occupancy of the land, to not carry out specified activities on the land and to not permit other persons to carry out any such activities on the land, and to carry out any other requirement in relation to the ongoing monitoring and

Activity	Details
	maintenance of the land that is prescribed by the regulations.
Land issues – Entry on land	The CLM act does not confer any power to enter land, remain on land or do anything on land, without the permission of the occupier of the land. If the occupier withholds or withdraws that permission, the EPA may revoke or suspend the order and instead make an order to which the occupier is subject as if the occupier were the appropriate person.
Costs	The EPA may require a person to pay (at the prescribed rate or amount, or if no such rate or amount is prescribed, at a reasonable rate or amount) all or any costs incurred by the EPA in connection with preparing and serving an order or voluntary management proposal, monitoring action under such an order or proposal, seeking the compliance of the person with any such order or approved voluntary management proposal,
Site audit statement	Upon completion of the remediation, a site auditor must review the site and present a report which contains a critical review of the information collected in relation to the site audit clearly setting out the reasons for the findings. This statement must then be notified to the EPA.
Powers of entry and search of land	An authorised officer may enter any land on which the officer reasonably suspects that any activity that may cause contamination is being carried on or is likely to be caused at any time.
Offsets	The Minister may, if he or she considers it to be in the public interest, enter into offset arrangements with a person responsible for the contamination of land under which the person provides assistance (other than direct monetary assistance) to communities affected by the contamination. Assistance may, amongst other things, include the provision of community facilities or community services or the establishment and operation of environmental or resource projects.

7.3. Institutional Framework

In Australia provincials EPAs have jurisdictions over remediation within each province. The EPA has a statutory duty to examine and respond to information that it receives of actual or possible contamination of land, and to address any contamination which it considers to be significant enough to require regulation under the Act. The EPA is only responsible for regulating significantly contaminated sites, although it has a general duty to examine and respond to any information that it receives of actual or possible contamination of land. In cases where the contamination does not reach the threshold of "significant", the responsibility for regulating the site falls to the relevant local council. Site auditors accredited by the provincial EPAs approve remediation criteria and certify land use after the remediation. In NSW, the management of contaminated land is shared by the Environment Protection Authority (EPA), the Department of Planning and Infrastructure and planning consent authorities (usually local councils). Under the CLM act, the EPA regulates contaminated sites where the contamination is significant enough to warrant regulation. Contaminated sites that are not regulated by the EPA are managed by local councils through land-use planning processes. The EPA also administers the NSW site auditor scheme under Part 4 of the CLM act, makes or approves guidelines for use in the assessment and remediation of contaminated sites, and administers the public record of regulated sites under the CLM act.

The site auditor scheme provides a pool of accredited 'site auditors' who can be engaged to review investigation, remediation and validation work conducted by contaminated land consultants.

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Accredited site auditors can be engaged to independently review reports on assessment, remediation and validation actions to ensure that the methodology used by consultants and their interpretation of data are consistent with current EPA regulations and guidelines.

The EPA may also be involved with the remediation of contaminated sites by performing technology reviews and assessing proposed technologies for treating certain chemical wastes (such as scheduled chemical wastes) in order to establish their effectiveness in meeting desired outcomes, assessing licence applications for remediation proposals (where required) as part of the integrated development assessment process, issuing and enforcing licences (where required) that regulate waste treatment, storage and/or disposal facilities or by issuing clean-up and prevention notices

As described above, NSW has a two-tier structure, where local councils oversee sites that do not pose an unacceptable risk under their current or approved use while the EPA looks at the contaminated sites. The key nodal agency in NSW for contaminated land management is the Environment Protection Agency or the EPA. The NSW Minister for Climate Change and the Environment is responsible for the administration of the Contaminated Land Management Act 1997. The Act is administered by the EPA, an independent statutory authority within the NSW Department of Environment, Climate Change and Water (DECCW). The Office of Environment and Heritage (OEH) was created in April 2011 as a part of the NSW Department of Premier and Cabinet. The Environment Protection Authority (EPA) is a constituent of OEH and retains a range of powers as a statutory entity for the CLM act. In regulatory matters, certain OEH officers act as delegates of the EPA and some are 'authorised' officers for the purposes of the CLM act. The detailed roles and responsibilities of the EPA for the step-wise contaminated land identification and remediation process is as follows.

Significantly contaminated land - If the EPA has reason to believe that land is contaminated and that the contamination is significant enough to warrant regulation, the agency may declare the land to be 'significantly contaminated land'. Section 12 of the CLM act defines matters to be considered by the EPA in assessing a site to determine whether or not to declare the land to be significantly contaminated.

Notification policy - The EPA notifies those responsible for significant contamination, owners, occupiers and local authorities once it has declared significantly contaminated land. The declaration is a means of informing affected parties and the broader public about the contamination. The declaration is published in the NSW Government Gazette and online via the contaminated land management public record as well as via direct consultation with identified interested parties.

Preliminary investigation orders- The EPA may require certain persons to carry out a preliminary investigation of land if it reasonably suspects the land is contaminated. Preliminary investigation orders are intended to provide a 'snapshot' for the EPA to determine whether the land is contaminated and, if so, whether it is significant enough to warrant regulation. If the findings of the preliminary investigation lead the EPA to believe that the land contamination is significant enough to warrant regulation, it may declare the land to be significantly contaminated land.

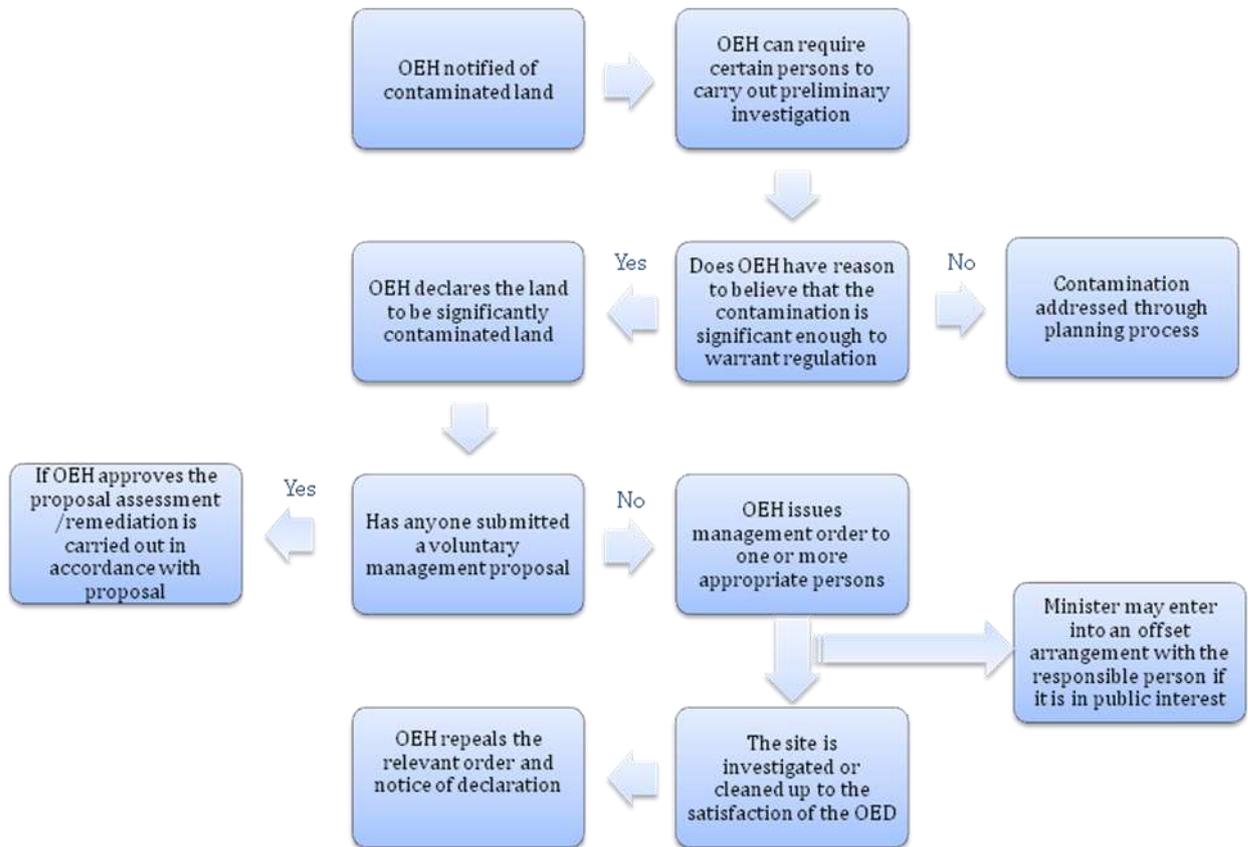
Management orders - The EPA may order certain persons to manage the significantly contaminated land in the following hierarchy (as far as practicable): those responsible for the contamination, the landowner and the notional owner. A management order can include actions to investigate and/or remediate the land.

Voluntary management proposals - The EPA may approve a voluntary management proposal for the management of significantly contaminated land (with or without conditions). Anyone can put forward a voluntary management proposal.

Offset programs - The Minister for the Environment can allow those responsible for significantly contaminated land to implement offsets to mitigate the impact of contamination. Importantly, offsets are not an alternative to the remediation of significantly contaminated land.

The flowchart below represents the activities in the remediation process in Australia.

Figure 3: Remediation process in Australia



Role of planning authorities

While the EPA under OEH is the key nodal agency for the CLM, Planning authorities play an important role in management of contamination with regard to the planning and development control process under the Environmental Planning and Assessment Act 1979 (EP&A Act).

The key roles and responsibilities of various agencies are as follows:

- planning authorities consider contamination issues when they are making re-zoning and development decisions
- local councils provide information about land contamination on planning certificates that they issue under section 149 of the EP&A Act

7.4. Financial mechanisms

7.4.1. Description of the financial mechanism

A Contaminated Land Management Program was established in 2001 to facilitate remediation of significantly contaminated land under the CLM act. Till 2009, the program had contributed around

\$9.4 million for the investigation and remediation of 19 significantly contaminated sites. There is a concept of ‘Appropriate Person’ in the Australian regulations namely Contaminated Sites Environment Protection Policy (EPP), 2009, developed to address the contaminated site remediation issues and this concept is consistent with the ‘Polluters pay’ principle. The reason behind this is to rank the responsibility or liability of the contaminated sites. The Appropriate Person(s) are of the following types:

- Who was responsible for contamination of the land; or; if not practicable:
- A lessee of the land (whether or not the person had any responsibility for such contamination); or, if not practicable:
- A notional lessee of the land (whether or not the person had any responsibility for such contamination).

If an appropriate person cannot be identified, or the person(s) does not have adequate resources, in these cases the person presently in control of the site, irrespective of whether that person is the owner or the current occupier, would be liable. In these cases the Government in the case of Territory land and the Commonwealth Government in the case of National land shall take the necessary action to remediate the land. Therefore, the main principle of financing the remediation of the contaminated site is ‘Polluters pay’ with some responsibility on the person who controls the land presently and on government where the polluters are not located. For orphan sites in Australia, the responsibility is of Commonwealth, State or local governments.

The remediation can be done by the Environment Protection Agency. The costs of such assessment or remediation can be recovered from an appropriate person who is the actual polluter or in case of his insolvency from the next responsible person in the priority list. There is also a provision that if a person, who is not responsible or only partially responsible for the contamination, incurs the costs of remediation can recover the whole or a portion of those costs through the courts from the responsible party. If a company failed to comply with an order given earlier to assess or remediate, or only partially completed the order, or was wound up to avoid compliance the EPA may apply to the Supreme Court for an order that a person who was a director of a wound-up body corporate be made personally liable for the costs of assessment or remediation. If a company disposed of the land to avoid having to comply with an assessment or remediation the EPA may also apply to the Supreme Court for an order that a person who was a director of a body corporate be made personally liable for the costs of assessment or remediation.

7.4.2. Clauses under CLM Act that define financial mechanisms

The recovery of costs for remediation is as per the CLM act under Part 3, Division 6, “Costs” Section 34, 35:

Section 34 Recovery of EPA’s costs

The EPA may require a person to pay at the prescribed rate or amount, or if no such rate or amount is prescribed, at a reasonable rate or amount all or any costs incurred by the EPA in connection with preparing and serving an order or a voluntary management proposal or monitoring action or seeking the compliance of the person with any such order or approved voluntary management proposal or any other matter prescribed by the regulations.

Section 35 Recovery of public authority’s costs in carrying out order

A public authority may, require a person to pay all or any costs reasonably incurred by the public authority in connection with the public authority’s carrying out, the requirements of an order made in respect of the person.

A public authority may require an owner of land to pay all or any costs reasonably incurred by the public authority in connection with the public authority's carrying out of the requirements of an order made in respect of the land (whether or not the order was made in respect of the owner).

A public authority may enter into an arrangement with the owner of land for the payment of any cost under bullet point above, including an arrangement for the periodic, partial or deferred payment of such a cost, or for the compromise of any debt to which the arrangement relates.

Section 36 Recovery of other costs

If a Person subject to order carries out the requirements of a management order or a preliminary investigation order in relation to the land, is not responsible for the significant contamination, then the person's costs in carrying out those requirements may be recovered as a portion from each person who is responsible for the significant contamination.

If the person who carries out the requirements of a management order is responsible for the contamination then a portion of the person's costs in carrying out those requirements may be recovered from each other person who is responsible for the significant contamination.

If an owner (or notional owner) of land pays any costs specified in a notice with respect to a management order, and the owner (or notional owner) is not responsible for the significant contamination concerned, then they may recover a portion of the amount paid from each person who is responsible for the significant contamination.

In all of the above statements in the section the word "portion" must reflect the proportion of responsibility of each person for the significant contamination and the reasonable cost of any steps taken by each person in respect of managing the significant contamination.

Section 37 Public authority's priority if owner insolvent

If a public authority carries out the requirements of an order in respect of land disclaimed (by a liquidator or trustee in bankruptcy) as onerous property in the course of proceedings for winding up or bankruptcy, the public authority may recover the cost of carrying out the order together with a reasonable commercial rate of interest and all associated administrative or other costs and expenses so incurred in priority to any holder of a security over the land.

Section 38 Limit on liability of representative or trustee

The financial liability under this Division of a legal personal representative in respect of an estate that is significantly contaminated land is limited to such value of the assets of the estate as the representative or trustee may lawfully realise to meet a liability under this Division.

A person is not, in such a capacity, personally liable for any costs under this Act that relate to an order under this Part that relates to the land and is not required to carry out such an order to a greater extent than may be paid for by the person's lawfully realising the assets of the estate or the property to meet those costs or that payment.

Section 39 Registration of cost notices

A public authority that issues a notice to an owner of land to pay all or any costs reasonably incurred by the public authority, may apply to the Registrar-General for registration of the notice in relation to any land that is owned by the person and was the subject of the management order to which the notice relates.

The Registrar-General, on application under this section and lodgement of a copy of the notice, must register the notice in relation to the land in such manner as the Registrar-General thinks fit.

Section 40 Charge on land subject to cost notice

Creation of charge - on the registration of a notice under the section above, a charge is created on the land in relation to which the notice is registered to secure the payment to the public authority specified in the notice.

Such a charge ceases to have effect in relation to the land when the first of the following occurs:

- *Payment by the person to the public authority of the amount concerned,*
- *Completion of the sale or other disposition of the land with the consent of the public authority,*
- *Completion of the sale of the land to a purchaser, in good faith for value, who, at the time of the sale, has no notice of the charge.*

Charge is not subject to existing charges and encumbrances - Such a charge has priority over every charge or encumbrance to which the land was subject immediately before the notice was registered and, in the case of land under the provisions of the Real Property Act 1900, has priority over every mortgage, lease or other interest recorded in the Register kept under that Act.

Charge not affected by change of ownership - Such a charge is not affected by any change of ownership of the land, except as provided under bullet point 2 of this section.

Section 41 Removal of charge

When a charge under this Division ceases to have effect, the relevant public authority must apply to the Registrar-General for the cancellation or removal of the relevant notice registered under section 39.

The regulations may make provision for or with respect to the removal of a charge under this Division.

Section 42 Repayment of appropriations out of Consolidated Fund

This section applies if the costs of a public authority in carrying out the requirements of an order under this Part are partly or fully met out of money appropriated by Parliament specifically for the management of contaminated land.

If a public authority recovers, under this Division, part or all of the cost of carrying out the requirements of the order, the authority must repay, into the Consolidated Fund or such other fund as may be directed by the Treasurer, a portion of the amount recovered.

The portion referred to above must reflect the proportion that the money provided by Parliament bore to the total costs incurred by the authority in carrying out the requirements of the order.

7.5. Relevance to India

The Australian legal framework puts the shared financial liability of a remediation work on the polluter, owner/ notional owner or lessee/notional lessee of a contaminated land. CLM act sections 33,34,35,36 clearly define financial liability in all possible practical scenarios. As per section 36 of the act, a private owner owning a private and significantly contaminated land or a notional owner/lessee of land is liable to pay for remediation whether or not they are responsible for contamination. Parties who are not responsible may recover the cost from the responsible parties if they are identified. In case of multiple responsible parties, liability of cost recovery depends on the proportion of responsibility of each person for the significant contamination and the reasonable cost of any steps taken by each person in respect of managing the significant contamination. Indian legal framework has provisions for “penalties” for non-compliance but does not mandate liability or

responsibility of a polluter in case of an intervention such as clean up or remediation is required because of the polluter's activities and hence may draw from the above. In addition, there are instances in India of multiple parties involved in a contaminated land. In that case, liability may be jointly shared amongst the responsible parties following a similar structure as section 36 of the CLM act. Again, there are instances of private owner owning a contaminated land and may not be responsible for contamination directly. In such cases provisions of section 36 of CLM act may be useful to review.

Provisions of liability in case of responsible parties bankruptcy - CLM section 37 clearly states that in case the responsible party is unable to pay for remediation due to insolvency, then the security holder of the land is liable to pay for such remediation.

Authority for Land Entry - CLM act explicitly grants EPA the authority to enter a private property for site investigation and clean up purposes and has elaborations of EPA's authorities in case of objection to land entry by the owner/occupier. The current Indian legal framework does not explicitly grant this authority to anybody (e.g. MoEF/CPCB/SPCB) to address an immediate remediation requirement and hence may draw insights from this. The Australian legal framework does not explicitly talk about financial mechanisms in case of an orphan site. Though CLM act defines several liability options for cost recovery and allocates consolidated fund for remediation work to be carried out, it does not specify, in case of an orphan site where an owner/responsible party is not identified, who would be liable to pay for a remediation work. Cases of orphan site are rampant in India. Hence liability, fund allocation and cost recovery mechanisms in such cases should be explicit in Indian legal framework.

The Australian legal framework also does not clarify liabilities in case of legacy contamination. The act does not clearly mention or does not have adequate and specific provisions for putting liability on responsible parties for legacy contamination created in the pre-CLM era when there was no law. Also, there are no specific provisions to stop continuous activities of illegal dumping to stop further contamination in the country. CLM act has no provisions or specific enforcement authority to stop transportation of hazardous wastes (may be to the neighbourhood) for illegal dumps once a site is identified and remediation is yet to take place and to stop future occurrence of such activities. In India there have been instances of inter/intra district transportation of hazardous waste for illegal dump for land development. Provisions to stop such activities even before remediation takes place and liability is determined are necessary to stop further contamination.

8. EU

8.1. Overview

There are over 250,000 contaminated sites that are estimated to be located in the EU. By 2006 most of the EU member countries have undertaken and reported the inventories of contaminated land sites however the progress on remediation and management varies widely between different countries depending on national legislative frameworks.

8.2. Directives for countries

Soil Framework Directive

For the European Union the key regulation for contaminated sites is the "Thematic strategy for Soil Protection". The Thematic Strategy for Soil Protection consists of a Communication from the Commission to the other European Institutions which establishes a ten-year work program for the European Commission. The strategy includes a proposal for a "Soil framework directive". The directive is yet to be adopted. The key grounds on the basis of which the directive was proposed was Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task - 2 Overview of International Practices

that soil is essentially a non-renewable resource and a very dynamic system which performs many functions and delivers services vital to human activities and ecosystems survival. The proposal for a framework directive (COM(2006) 232) sets out common principles for protecting soils across the EU. Within this common framework, the EU Member countries will be in a position to decide how best to protect soil and how use it in a sustainable way on their own territory. The aim of the directive is to avoid the further degradation of soil quality and to preserve soil's functions, and to restore soil quality to a level of functionality consistent at least with current and intended use, also in consideration of cost implications. These objectives are founded on four principles:

- Legislative framework to protect soil from erosion, decline of organic matter, salinisation, compaction, landslides, and soil contamination;
- Incorporation of soil protection in Member States' and EU measures;
- Closing the gap in knowledge through research at the EU and national levels;
- Raising public awareness of the necessity of soil protection

The key features of the directive are that member countries are required to inventorise and remediate the contaminated sites, implement measures to prevent soil pollution; undertake investigation and risk assessment of identified sites and develop a national remediation strategy.

Key articles of the directive are as follows:

- It sets out a requirement for central and local Government to consider the impacts that new policies will have on soils whilst they are being developed (Article 3);
- The directive sets a duty on all land-users to prevent or minimise harm to soils (Article 4);
- A requirement to limit or mitigate the effects of soil sealing (the covering of the soil surface with an impermeable material such as concrete) (Article 5);
- A requirement to reduce the risks relating to soil erosion, organic matter decline, compaction, salinisation and landslides, by identifying risk areas, and deciding on a programme of measures to address these risks (Articles 6- 8);
- A requirement to prevent soil contamination, compile an inventory of contaminated sites and remediate those sites listed on the inventory (Articles 9-14); and
- A requirement to raise awareness of soils issues, report to the Commission, and exchange information (Articles 15-17).
- The provisions of this Directive relate to environmental protection, and consequently the legal base chosen is Article 175(1) of the EC Treaty.

Proportionality Principle - The directive also considers the proportionality principle wherein to ensure proportionality, significant scope is left to the Member States to identify the most appropriate specific measures at the most appropriate geographical and administrative level. This ensures that the regional and local specificities as regards soil variability, land uses, local climatic conditions and socio-economic aspects can be taken into account.

Prevention Principle - In compliance with the prevention principle as laid down in Article 174 of the EC Treaty, this Directive also calls for contribution to the prevention and reduction of the introduction of dangerous substances into soil to avoid soil contamination and to preserve soil functions.

Polluter Pays Principle - The directive also states that taking into account the polluter pays principle, Member States should ensure that action is taken to remediate the contaminated sites identified within their national territory.

Environmental Liability Directive, 2004

Another key directive in the EU is the Environmental Liability Directive (ELD) 2004 with regard to the prevention and remedying of environmental damage. The ELD establishes a framework based on the polluter pays principle, according to which the polluter pays when environmental damage occurs.

Definition - The directive defines environmental damage as direct or indirect damage to the aquatic environment covered by Community water management legislation; direct or indirect damage to species and natural habitats protected at Community level by the 1979 "Birds" Directive or by the 1992 "Habitats" Directive; direct or indirect contamination of the land which creates a significant risk to human health.

Liability under the ELD - The Directive distinguishes between two types of activities - occupational activities specifically mentioned in the Directive and other occupational activities.

The directive has a different liability scheme that applies to certain dangerous or potentially dangerous occupational activities as listed in Annex III of the Directive. These are mainly agricultural or industrial activities requiring a licence under the Directive on integrated pollution prevention and control, activities which discharge heavy metals into water or the air, installations producing dangerous chemical substances, waste management activities (including landfills and incinerators) and activities concerning genetically modified organisms and micro-organisms. The liability for these activities under the ELD is that, the operator may be held responsible even if he is not at fault.

A different liability scheme applies to all other occupational activities (those not listed in Annex III to the Directive), but only where there is damage, or imminent threat of damage, to species or natural habitats protected by Community legislation. In this case, the operator will be held liable only if he is at fault or negligent.

Prevention of damage - Under the ELD wherever there is an imminent threat of environmental damage, the competent authority designated by each Member State may require the operator (the potential polluter) to take the necessary preventive measures; or take the necessary preventive measures and then recover the costs incurred.

Remediation of Damage - Where environmental damage has occurred, the competent authority may require the operator concerned to take the necessary restorative measures (determined on the basis of the rules and principles set out in Annex II to the Directive); or take the necessary restorative measures and then recover the costs incurred. Where several instances of environmental damage have occurred, the competent authority may determine the order of priority according to which they must be remedied. In Annex II to the Directive provides information on the method that has to be taken into account in order to remedy environmental damage.

Costs of preventing and remedying damage - If the competent authority has carried out preventive and remedial actions itself, the authority may recover the costs it has borne from the operator responsible for the damage or imminent threat of damage. The same principle applies to environmental assessments carried out to determine the extent of damage and the action to be taken to repair it. If several operators are jointly responsible for damage, they must bear the costs of repair either jointly and severally or on a proportional basis. The Directive does not oblige

operators to take out a financial security, such as insurance, to cover their potential insolvency. Member States are required to encourage operators to make use of such mechanisms.

Cooperation between Member States- Where damage or a threat of damage may affect more than one Member State, the Member States concerned must cooperate on the preventive or remedial action to be taken. The policy measures for member countries of the EU with regard to contaminated sites, are based on the principles of EU directives. These are however implemented and enforced nationally.

8.3. Financing mechanism

The EU's key financial intervention for environmental and conservation projects is through its LIFE programme, which disburses funds both in the EU and outside, in potential member countries and other neighbouring countries. LIFE is the EU's financial instrument supporting environmental and nature conservation projects throughout the EU, as well as in some neighbouring countries. Since 1992, LIFE has co-financed some 3506 projects, contributing approximately €2.5 billion to the protection of the environment.

As per Article 5 of the Regulation (EC) No 614/2007 of the European Parliament and of the Council of 23 May 2007 concerning the Financial Instrument for the Environment (LIFE+), there are two types of community funding; (a) grant agreements and (b) public procurement contracts. Community grants may be provided in specific forms, such as framework partnership agreements, participation in financial mechanisms and funds, or co-funding of operating or action grants.

For action grants, the maximum rate of co-financing shall be 50 % of eligible costs. In exceptional cases, the maximum co-financing rate for LIFE+ Nature and Biodiversity may be up to 75 % of eligible costs in the case of projects concerning priority habitats or species. In the case of public procurement contracts, Community funds may cover the costs of purchase of services and goods. These costs may include expenditure on information and communication, preparation, implementation, monitoring, checking and evaluation of projects, policies, programmes and legislation.

A large proportion of funds for remediation activities in the EU come from the private sector. The proportion ranges from around 100% private sector funding in Czech Republic and Spain to as low as 7% in France.

Further details of the LIFE+ fund are given below:

Overall Fund size - The overall size of the fund for the implementation of LIFE+ shall be set at EUR 2.14 Billion for the period from 1 January 2007 to 31 December 2013

Activities not funded - Civil servants' salary costs may be funded only to the extent that they relate to the cost of project implementation activities that the relevant public authority would not have carried out had the project concerned not been undertaken. The staff in question must be specifically seconded to a project and they must represent an additional cost with respect to existing permanent staff.

Programming and project selection - At least 78 % of the budgetary resources for LIFE+ shall be used for action grants for projects.

National allocations - The Commission shall ensure a proportionate distribution of projects by establishing indicative annual national allocations for the periods 2007-2010 and 2011-2013, based on the following criteria:

(a) population: the total population of each Member State. A weighting of 50 % shall be applied to this criterion; and the population density of each Member State, up to a limit of twice the EU's average population density. A weighting of 5 % shall be applied to this criterion;

(b) nature and biodiversity: the total area of sites of Community importance for each Member State, expressed as a proportion of the total area of sites of Community importance. A weighting of 25 % shall be applied to this criterion; and the proportion of a Member State's territory covered by sites of Community importance in relation to the proportion of Community territory covered by sites of Community importance. A weighting of 20 % shall be applied to this criterion.

The total amount of such allocations shall not exceed 3 % of the total budgetary resources dedicated to action grants for projects.

However, the Commission shall ensure that no Member State's allocation is less than an appropriate minimum allocation of between EUR 1 and 3 million per year, taking into account population density, environmental expenditure, environmental need and absorption capacity.

Beneficiaries - Public and/or private bodies, actors and institutions may receive financing through LIFE+.

9. Germany

9.1. Overview

Germany consists of 16 Federal States or (Länder). As per the latest available statistics, all the federal states of Germany have listed down the following sites as the potentially contaminated sites¹⁰:

- Potentially contaminated abandoned waste sites - 90 517
- Potentially contaminated abandoned industrial sites -112 368
- Potentially contaminated abandoned former armament production sites -202 885
- Potentially contaminated abandoned military sites -3 240

Prior to 1998, each of the states had developed their own management and strategy for issues relating to contaminated sites, including individual registration systems, evaluation systems, prioritisation procedures and risk assessment methodologies. In 1998, the introduction a new Federal Soil Conservation Act created a legal framework to address the problems at existing contaminated sites and to prevent future soil contamination. The act replaced the multiplicity of legal requirements and standards for soil remediation in different parts of Germany with national uniform criteria for risk assessment and clean-up.

9.2. Legal and Policy Framework

9.2.1. Brief introduction of the key legislations and framework

The key legal instruments in Germany for contaminated lands are the “Federal Soil Protection Act” of 1998 along with the key extension to this act “Federal Soil Protection and Contaminated Sites Ordinance” of 1999. These two instruments provide a nationwide legal basis for soil conservation and the evaluation and rehabilitation of contaminated sites.

¹⁰ Management of contaminated sites in Western Europe, 2000

Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task – 2 Overview of International Practices

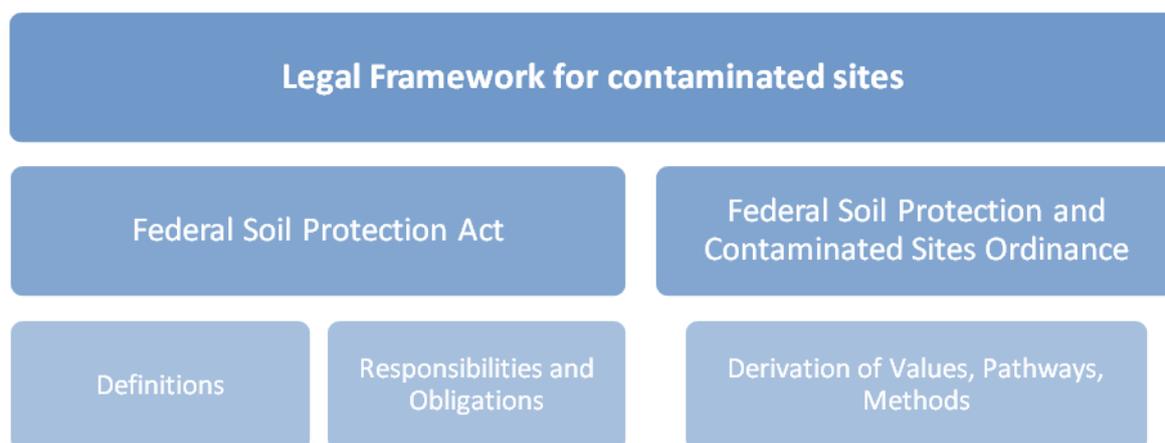


Figure 4: Legal Framework in Germany

The provisions of these instruments also indicate the application of the prevention and the precautionary approach. The Soil Protection Act covers issues including prevention of harmful soil changes, rehabilitation of the soil of contaminated sites and of waters contaminated by such sites and precautions against negative soil impacts. The Federal Soil Protection and Contaminated Sites Ordinance govern the key elements of contaminated site management. The ordinance specifies requirements of site investigation, sampling strategy and laboratory approach, evaluation and remediation. The ordinance as well as the act applies the “polluter pays” principle, where the person causing the contamination is held responsible. Besides the polluter, the owner or occupier is responsible as well. For orphan sites the Federal States are liable for risk assessment and clean-up.

One key aspect of the German Soil Protection Act is that it has supplementary effect where other, sectoral legislations do not cover impacts on soil i.e. the act precludes precedential sectoral laws, such as fertilizer and plant protection law, from being supplemented by the Federal Soil Protection Act.

Where laws on other topics contain general prescriptions such as ‘protection of public interests’ or ‘prevention of other risks’, however, the provisions of the soil protection law affect the interpretation and implementation of these generic principles.

Federal states are responsible for enforcement of the act and the ordinance. The Federal States are responsible for identification, risk assessment and cleanup of contaminated sites.

Another key legislation in the state is the Environmental Damage Prevention and Remediation Act, 2007 which serves to implement the Directive of the European Parliament and of the Council on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damages.

Sources: <http://www.bmu.de/> and <http://www.eugris.info>

9.2.2. Relevant clauses within the legislations

Article 3 of the Soil Protection Act identifies the **scope of application** of the act as below:

“This Act applies to harmful soil changes and contaminated sites, as far as

- *provisions of the Closed Substance Cycle and Waste Management Act regarding application of waste for use as secondary raw-material fertilizer or farm fertilizer*
- *provisions of the Closed Substance Cycle and Waste Management Act*
- *provisions regarding the transport of hazardous materials,*

- *provisions of fertilizer and plant-protection law,*
- *provisions of the Genetic Engineering Act*
- *provisions of Chapter Two of the Federal Forest Act and of the forest management*
- *provisions of the Land Consolidation Act regarding the relevant consolidated land, also in conjunction with the Agricultural Adjustment Act,*
- *provisions for construction, modification, maintenance and operation of transport routes, or provisions that govern transport,*
- *provisions of construction-planning law and of the building regulations,*
- *provisions of the Federal Mining Act*
- *provisions of the Federal Emission Control Act*

into account, do not regulate impacts on the soil.”

Article 4 describes the **obligation of the polluter (to prevent hazards) along with identification of responsible persons.** The responsible persons identified are polluter or owner or occupier.

Article 4 Obligations to Prevent Hazards

- *“Any person who is by his action affecting the soil shall act in such a manner that harmful soil changes do not occur.*
- *The property owner and the occupant of a real property shall be obligated to take measures to prevent harmful soil changes originating from their property.*
- *The party who caused a harmful soil change or a contaminated site, and his universal successor, as well as the relevant property owner and the occupant of the relevant real property, shall be obligated to remediate the soil and contaminated sites, and any water pollution caused by harmful soil changes or contaminated sites, in such a manner that no hazards, considerable disadvantages or considerable nuisances for individuals or the general public occur in the long term. In cases of burdens from pollutants, in addition to decontamination measures also securing measures are to be taken into consideration, that permanently prevent spread of pollutants. Where such measures are not possible or cannot be reasonably required, other protection and restriction measures shall be carried out. Persons who, for reasons of commercial law or company law, are required to answer for a legal entity that owns a real property that is encumbered with harmful soil changes to the soil or site contamination, and persons who give up ownership of such properties, is also obliged to carry out remediation.*
- *As part of fulfilment of obligations relative to the soil and to contaminated sites, pursuant to paragraphs (1) through (3), the permissible use of the piece of land under planning law, and the resulting protection requirements, shall be taken into account, as far as this is compatible with the protection of the soil functions mentioned in Article 2 (2) Nos. 1 and 2. If relevant determinations under planning law are lacking, the nature of the relevant area, taking into account its expected development, shall determine the requirements for protection. The requirements to be fulfilled in connection with rehabilitation of bodies of water shall be determined by law pertaining to water.*
- *If harmful soil changes or contaminated sites have occurred after first of March 1999, pollutants shall be eliminated, where this is a reasonable requirement with respect to the*

previous soil pollution. This shall not apply to a party who, at the time the pollution was caused, expected that such impacts to the soil would not occur because he had fulfilled the applicable legal requirements, and whose good faith is worthy of protection, taking the circumstances of the relevant individual case into account.

- *The former owner of a real property is obligated to carry out remediation if he has transferred his property after first of March 1999., and if he was aware of, or should have been aware of, the relevant harmful soil change or site contamination. This shall not apply to a party who, when purchasing the real property, confided that such harmful soil changes or contaminated sites would not be present, and whose confidence is worthy of protection, taking the circumstances of the relevant individual case into account.”*

Article 5 sets out the federal government / state government’s authority to obligate property owners, to maintain or restore the functional capacity of the soil of a sealed land.

Article 7 **reiterates the precautionary principle.**

“Article 7: Obligation to take Precautions - *The property owner, the occupant over a site and the party who carries out, or has carried out by others, actions on a site that can lead to changes in soil characteristics are obligated to take precautions against the occurrence of harmful soil changes that could be caused by their uses of the site or in its area of influence. Precautionary measures shall be required if there is concern that harmful soil change could occur as a result of the spatial, long-term or complex impacts of a use on the soil's functions. In order to fulfil the obligations to take precautions, soil impacts shall be avoided or reduced where this is a reasonable requirement also with respect to the purpose of the use of the site.”*

Article 8 provides the **federal government the authority to define trigger values, action values and precautionary values** for soil pollutants

“Article 8 Values and Requirements - *The Federal Government shall be authorised, after hearing the parties concerned (Article 20), to issue statutory ordinances, which include:*

- *values which, if exceeded, shall mean that investigation with respect to the individual case in question is required, taking the relevant soil use into account, to determine whether a harmful soil change or site contamination exists (trigger values),*
- *values for impacts or pollution which, if exceeded, shall normally signal the presence of a harmful soil change or site contamination, taking the relevant soil use into account, and to mean that measures are required (action values),*
- *soil values which, if exceeded, shall normally mean there is reason that concern for a harmful soil change exists, taking geogenic or wide-spread, settlement-related pollutant concentrations into account (precautionary values),*

Article 9 of the act provides the state governments the authority to undertake Risk Assessment and Orders for Investigations in sites where the trigger values are exceeded.

“Article 9 Risk Assessment and Orders for Investigations

- *If the competent authority has a clue about the presence of a harmful soil change or a contaminated site, it should take appropriate measures to determine the facts of the relevant matter. If the trigger values defined in a statutory ordinance pursuant to Article 8 (1) second sentence No. 1 are exceeded, the competent authority should take the measures necessary to determine whether a harmful soil change or contaminated site exists. Such investigation and assessment shall include, in particular, consideration of the*

type and concentration of the pollutants concerned; of the possibility of their spreading into the surrounding environment; of the possibility of their being ingested or absorbed by people, animals and plants; and the use of the piece of land pursuant to Article 4 (4). The property owner and the occupant of the real property, if the latter is known, shall upon application be informed in writing, regarding the relevant findings and the results of the assessment.

- *If, as a result of specific indications, there is sufficient suspicion that a harmful soil change or contaminated site exists, the competent authority may order the persons mentioned in Article 4 (3), (5) and (6) to carry out the studies necessary to assess the relevant hazards.”*
- The responsibility hierarchy of remediation will be polluter, Ground owner, occupier and then the Public authorities.

The Federal Soil Protection and Contaminated Sites Ordinance is an extension of the Soil Protection Act that makes use of several powers conferred under the Federal Soil Protection Act. The Ordinance covers the investigation (Article 3) and evaluation (Article 4) of suspect sites, contaminated sites and soil degradation. It lays down requirements for sampling, analysis and quality assurance. (Annex 1). It lays down requirements for hazard prevention by means of decontamination, containment, protection and restriction measures (Article 5) and supplementary requirements on remediation investigations and remediation plans for certain sites (Article 6). It contains requirements for the prevention of soil degradation (Article 8). Finally, it specifies trigger values, action values, precautionary values and permissible additional pollution loads (Annex 2).

The following table presents a brief flow of activities in the remediation process in Germany.

Table 23 Sequence of remediation activities in Germany

Activity	Details
Soil definition	The Soil protection action under Article 2, defines soil as the upper layer of the earth's crust, as far as this layer fulfils the various soil functions mentioned in paragraph (2) of the Act., The definition includes the liquid components (soil solution) and gaseous components (soil air), except groundwater and beds of bodies of water.
Scope of Application of the Act	The Soil Protection Act has a supplementary effect where other, sectoral legislations do not cover impacts on soil i.e. the act precludes precedential sectoral laws, such as fertilizer and plant protection law, from being supplemented by the Federal Soil Protection Act
Identification of responsibility for contamination and obligation to prevent hazards	The responsible persons for remediation are identified as polluter or owner or occupier. The Act states that the party who caused a harmful soil change or a contaminated site, and his universal successor, as well as the relevant property owner and the occupant of the relevant real property, shall be obligated to remediate the soil and contaminated sites, and any water pollution caused by harmful soil changes or contaminated sites, in such a manner that no hazards, considerable disadvantages or considerable nuisances for individuals or the general public occur in the long term.
Entry into sealed land	The soil protection act under Article 5 sets out the federal government / state government's authority to obligate property owners, to maintain or restore the functional capacity of the soil of a sealed land.
Precautionary Principle	The property owner, the occupant over a site and the party who carries

Activity	Details
	<p>out, or has carried out by others, actions on a site that can lead to changes in soil characteristics are obligated to take precautions against the occurrence of harmful soil changes that could be caused by their uses of the site or in its area of influence. Precautionary measures shall be required if there is concern that harmful soil change could occur as a result of the spatial, long-term or complex impacts of a use on the soil's functions. In order to fulfil the obligations to take precautions, soil impacts shall be avoided or reduced where this is a reasonable requirement also with respect to the purpose of the use of the site</p>
<p>Authority to determine trigger / action values for soil pollution</p>	<p>The federal government has the authority to define trigger values, action values and precautionary values for soil pollutants.</p> <p>If trigger values are exceeded, investigation is required, taking the relevant soil use into account, to determine whether a harmful soil change or site contamination exists.</p> <p>If action values are exceeded, it signals the presence of a harmful soil change or site contamination, and that measures may be required taking the relevant soil use into account</p> <p>If precautionary values are exceeded, it means that there is reason that concern for a harmful soil change exists, taking geogenic or wide-spread, settlement-related pollutant concentrations into account</p>
<p>Authority to conduct risk assessment and administer orders for investigation</p>	<p>If the competent authority has a clue about the presence of a harmful soil change or a contaminated site, it should take appropriate measures to determine the facts of the relevant matter. If the trigger values are exceeded, the competent authority needs to take the measures necessary to determine whether a harmful soil change or contaminated site exists. Such investigation and assessment shall include, the type and concentration of the pollutants concerned; of the possibility of their spreading into the surrounding environment; of the possibility of their being ingested or absorbed by people, animals and plants; and the land use of the piece of land pursuant.</p> <p>If, as a result of specific indications, there is sufficient suspicion that a harmful soil change or contaminated site exists, the competent authority may order the persons to carry out the studies necessary to assess the relevant hazards.</p>
<p><u>Non-Orphan sites</u> Responsibility of remediation</p>	<p>The responsibility hierarchy of remediation of non-orphan sites will be polluter, Ground owner, occupier and then the Public authorities.</p>
<p><u>Orphan sites</u> Responsibility of remediation</p>	<p>While for orphan sites the public authorities would be responsible for remediation.</p>
<p><u>Non –orphan sites</u> Investigation and Planning for Remediation</p>	<p>For non-orphan sites, the competent authority may require the responsible person to submit a rehabilitation plan containing a summary of the risk assessment and of the remediation investigations, information regarding the use up to now and future use of the pieces of land that are to be remediated, a description of the remediation objective and of the relevant necessary decontamination, securing,</p>

Activity	Details
<u>Orphan sites</u> Remediation planning for orphan sites	protection, restriction and self-monitoring measures, as well as the schedule for execution of these measures. Alternately, the competent authority may require the rehabilitation investigations and the remediation plan to be carried out by an expert. Upon approval of the plan by the competent authority it may be declared as binding. For an orphan site the competent authority may itself prepare or supplement the remediation plan if the plan where it is not possible to call on the responsible party to do so.
Remediation Planning by Authorities	The competent authority may itself prepare or supplement the remediation plan if the plan has not been prepared within the deadline or has been prepared in a technically unsatisfactory manner, or where it is not possible to call on the responsible party to do so.
Supervision by Authorities, Self-Monitoring	Contaminated sites and sites suspected of being contaminated shall be subject to monitoring by the competent authority. The competent authority may require obligated parties to carry out self-monitoring measures, especially soil and water investigations and installation and operation of measuring stations. The results of such parties' self-monitoring measures shall be recorded and kept on file for five years.

9.2.3. Summary of Relevant legislations

The legal framework of Germany focuses more on technicalities of identification of a contaminated site and determining the seriousness of contamination/remediation need based on the trigger values for contamination and the entire remediation work plan. The Soil Protection Act also explicitly addresses obligations of a polluter or owner of a contaminated site to carry out remediation and delegates authorities to the state governments to enact the provisions of the Act and puts liability of remediation of an orphan site on the state government. Though it also authorizes the state governments to issue orders for site investigation in case contamination beyond trigger values, it does not explicitly mention the land entry authorities in case of urgent site remediation/investigation need to be carried out in a private land.

9.3. Institutional Framework

Until 2004, the Federal Environment Agency under the division of “The Federal Environment Agency” was the key central agency for soil protection in Germany. From 1998 to 2003 the Scientific Advisory Council on Soil Protection acted as an independent advisory committee for the Federal Ministry for Environment, Nature Conservation and Nuclear Safety. Council members included experts in agriculture and forestry, geology, human toxicology, ecotoxicology, pedology, contaminated sites, water management, and soil biology. In 2004 the FEA established a Soil Protection Commission to improve protection of soil, including early detection of new contamination and pollution prevention. The Commission was to support the Federal Environmental Agency in raising public awareness of soil issues and create the groundwork for strengthened soil protection policies. The Commission’s objectives are to improve precautionary protection of soils against impact of substances and other inputs; develop quality standards for the restoration of damaged soils which in turn enable specific ecological soil functions to be realized; void the continued increasing use of soil for human settlement and transport purposes; early

detection of new sources of contamination and threat to soils and to propose preventative measures.

Actual implementation of remediation related measures are under the state's control. State authorities have the authority to allocate liability to all current and former site owners and operators, and require them to investigate and remediate sites to address actual or potential environmental damage.

Responsible Bodies - In accordance with the German Constitution, Art. 30, 83 the Federal States are responsible for registration, inventory, risk assessment and remediation of contaminated sites. Germany has a distinct federal structure. The general management approaches can be based on state-specific standards as well as on countrywide uniform regulations.

Environmental Ministries in the Federal States - The Environmental Ministries in the Federal States are responsible for regulations and allocation of money. The Environmental Agencies in the Federal States are responsible for execution and supervision, compiling of registers, development of guidelines etc.

The Federal Environment Authorities - Competent Federal State authorities are responsible for the official registration, investigation and the risk assessment of all abandoned sites, which are suspected to be contaminated.

Federal Ministry of Defence - According to the general responsibilities for military bases the Federal Ministry of Defence, the Federal Ministry for Urban and Regional Planning and Construction and the Federal Ministry of Finance are dealing with the management of military bases owned by the Federal Ministries. The German Federal States have the freedom to regulate the registration and identification of contaminated sites. The Federal Soil Protection Act does not cover these aspects. The general implementation structure for all the states is similar and can be characterised as:

- Step I: Identification and registration
- Step II: Investigation and risk assessment
- Step III: Remediation and/or monitoring

9.4. Financial mechanisms

9.4.1. Financial mechanism as defined under the Central Soil Protection act

Article 24, 25 and 26 of the Act detail the costs, compensation and fines with regard to remediation of contaminated sites. These enforce the costs based on precautionary and polluter pays principle.

Article 24: Costs

The costs of measures ordered pursuant to risk assessment, investigation and remediation, shall be borne by the parties obligated to carry out such measures. If, in the investigations do not confirm the suspicion of the site being contaminated, or if the property owner or occupant, fulfil obligations regarding investigation or management, then the parties required to carry out the investigation shall be reimbursed for relevant costs if they are not responsible for the circumstances upon which the suspicion was founded.

In the cases where competent state authorities prepare remediation plans (where the plan has not been prepared satisfactorily by the obligated party), the party of whom the preparation of a rehabilitation plan could have been required shall bear the costs.

In cases involving several obligated parties, such parties shall have claims to compensation among themselves. Where no other arrangements are agreed, the obligation to provide such compensation, and the extent of the compensation to be provided, shall depend on the extent to which the hazard or damage was caused primarily by one party or the other; Article 426 (1) second sentence of the Civil Code shall apply *mutatis mutandis*.

Article 426 (1) second sentence of the Civil Code states that “If the contribution attributable to a joint and several debtor cannot be obtained from him, the shortfall is to be borne by the other obligors obliged to adjust advancements.”

Article 25 Value Compensation

In case the market value of a site increases due to measures taken for remediation / prevention of hazards and the owner has not fully borne all the relevant costs, the owner has to pay the agency responsible for financing the remediation measures, an amount that is equivalent to the amount of value increase owing to the relevant measure (as determined by the state authority). The amount of such value compensation shall be capped at the total amount of the public funds used.

The increase of the market value of a site resulting from rehabilitation measures shall consist of the difference between the value the piece of land would have had if the measures had not been carried out (initial value) and the market value of the piece of land following execution of the exploration and remediation measures (final value).

The compensation payment shall become due when the securing or remediation has been completed and the amount of the payment has been determined by the competent state authority.

In individual cases, a partial or complete exception can be made from the requirement for compensation payment, if this is in the public interest or is needed to prevent unjust hardship.

The compensation payment amount shall encumber the site as a public encumbrance. The Federal Ministry of Justice shall be authorised to determine, by means of a statutory ordinance the manner and means by which attention is to be called, in the land register, to the presence of such public encumbrances.

Article 26 Provisions Regarding Fines

Anyone who intentionally or negligently contravenes various articles of the act may be penalised with a fine

9.4.2. Funds and financing in the federal states

The overall budget for R&D related to contaminated land is approximately 10 to 15 million euro a year. This R&D is related to more than 300.000 suspected contaminated sites. Since 1976 BMBF funded 500 projects with a total budget of 300 million euro. R&D funders for soil contamination in Germany are:

- Federal ministry of Education and Research (BMBF)
- Federal ministry for the Environment (BMU)
- Federal ministry of Transport, Building and Housing (BMVBW)
- Federal ministry Defense (BMVg)

- Environmental ministries of the States (Länder)
- German Federal Foundation for the Environment (DBU)

The federal state environment authorities have the right to recover the investigation costs from the liable persons. The Federal States apply the polluter-pays-principle, wherever the polluter can be identified. If the polluter is insolvent or funding of the clean-up would make him go bankrupt, special support may be available in some Federal States.

Special liability regulations in the federal states - 1990 Environment Act: Liability Exemption for Environmental Damage- The Liability Exemption regulates liability of real-estate owners concerning environmental damage due to former activities on land properties. The law was enforced in the interim period between the breakdown of the German Democratic Republic (GDR) and the adhesion to the Federal Republic of Germany and maintained after the unification in order to support economic prosperity. The crucial date is 1 July 1990. Real estate owners can hence file an application for liability exemption in case the contamination was caused before this date. If the application meets the requirements, the public authorities cover site investigations and necessary clean-up costs.

Orphan sites - The Federal states in general are liable for the clean-up of orphan sites. In the new Federal States a lot of sites are handled like orphan sites due to the Liability Exemption regulation.

Public funding - Some Federal States had established special funds or tax systems mainly in order to finance orphan sites, insolvent polluters or sites which belong to public authorities. In 1998 it was realised that the existing tax systems were not in line with the constitution and were hence abandoned.

Funding mechanisms of a few states are provided below:

Baden Württemberg

- In 1987 the Federal Government and the local authorities have established a joint fund in order to support investigations and remedial action at public sites and at orphan sites.
- Between 1988 and 1996 total expenditures were about 300 Million Euro.
- Up to 1998 a waste tax was used as a contaminated sites funding tool.

Bavaria

- The Society for the Clean-Up of Contaminated Sites in Bavaria was founded in 1989 in order to support clean-ups at orphan sites.
- The annual budget of the society is around 3 Million Euro. The fund is dedicated to industrial orphan sites.
- The State Ministry for State Development and Environmental Affairs has set up a 50 Million Euro fund for contaminated sites, which is financed through revenues from the state's privatisation programme. Low-interest loans have been available from mid- 1997 to private companies which cannot fully cover remediation costs.

Berlin

- For the years 1995 and 1996 annual budgets for public funding were previewed with 35 Million Euro for the years 1995 and 1996.
- Public funding is available for public sites, orphan sites and most sites of the former GDR.

9.4.3. Concluding overview of financial mechanisms in Germany

Financing principles - According to the Federal Soil Protection Act the polluters are held responsible for the contamination and therefore will pay for the remediation. Other than that occupiers or owners of the sites are also held responsible. As per the act, however, if the type of owner is such that they were neither the polluter nor were aware of the contamination while buying it, then such owners have limited liability to bear the costs for remediation measures only up to the maximum market value of the site. In case of orphan sites the Federal States are liable for risk assessment and clean-up.

Funding Mechanism & Source - Wherever the polluter can be identified the polluters pay for the site remediation, sometimes with the special support of federal states if the polluter is insolvent or funding of the clean-up would make him go bankrupt. This is as per Polluters Pay principle.

There is also a provision of liability exemption concerning environmental damage due to former activities on land properties. If the contamination was caused before the date 1st July 1990, then Real estate owners can file an application for liability exemption.

Public funding for Orphan sites - special funds or tax systems has been established in some of the Federal States to finance the cleanup of the orphan sites. There are state government institutions which release the fund to local authorities to perform the cleanup programmes. The funding in different states is on an average of 40%-50% of the total remediation cost. This fund is also used for insolvent polluters or sites which belong to public authorities.

9.5. Case studies exemplifying the legal, institutional and financial mechanisms

One of the most important case studies of soil remediation in Germany is that of the Bitterfeld region in the State of Saxony-Anhalt in eastern Germany. It is to be noted that this case study was prior to the Central Soil Protection Act and hence used the state legislative frameworks for remediation. The financing mechanism used and the institutions created for the remediation offer good examples of institutional and financial mechanism and hence have been presented below.

The financial mechanism in this particular study looks at a possible use of public funds for remediation when the parties responsible for the contamination of Brownfields can no longer be called upon to bear financial responsibility for their remediation.

Context

The Bitterfeld region was used for lignite mining in the 18th century through to the 19th century. Right at the end of the 19th century there was also a heavy concentration of chemical industries in the area. At the time nearly 5000 different chemical products were being manufactured in the region. After the unification of Germany the chemical production fell by almost 70% and several installations were closed and former owners of the nationally owned enterprises no longer existed. By this time, 100 years of chemical production had led to significant levels of soil contamination as well as ground water pollution.

Legal context

Since the owners of the chemical industries no longer existed, the most conceivable solution for the government would have been to close down the area and only implement safeguard measures to avoid spreading of contamination. A political decision was taken by the state to retain the region as a centre for chemical production and avoid de-industrialisation of the area.

Under the then East German Environment Framework Act concerning remediation, the option for exemption from liability for residual pollution was enforced by the state government and all fiscal responsibilities for the remediation process were transferred to governmental authorities. The provision of exemption from liability for remediation was provided by the state, with the aim of encouraging private investors to purchase and continue operating previously state-owned sites and facilities.

In December 1992, the German Federal Government and the state of former East Germany entered into an administrative agreement on the remediation of contaminated sites. This agreement covered not only the Bitterfeld project but also another 20 large-scale projects.

Financial mechanism

Under the 1992 agreement, for the 21 large scale projects the Federal Government and the state would share the remediation cost in a 60:40 ratio. For some special projects such as the Bitterfeld case study, the Federal Government would take on a greater financial share of 75% while 25% of the costs were left to the Länder or state. The entire financial liability due to the exemption of liability was taken up by the German Federal and state governments through public funds.

Institutional Mechanism

In the year 2000, a Regional Agency for Site Decontamination (Landesanstalt für Altlastenfreistellung, also abbreviated as LAF) was created, for overseeing and management of financing and for the remediation. The LAF had the overall responsibilities including Exemption from liability for residual pollution, the development of remediation planning, the determination of remediation measures to be implemented, oversight of the implementation of remediation measures, refinancing as well as comprehensive financial planning.

Creation of a special Fund

A special fund, independent of the state's budget, was created to fund the remediation of all the contaminated sites in the State of Saxony-Anhalt (including the Bitterfeld site). This was done to ensure long-term financial requirements for remediation.

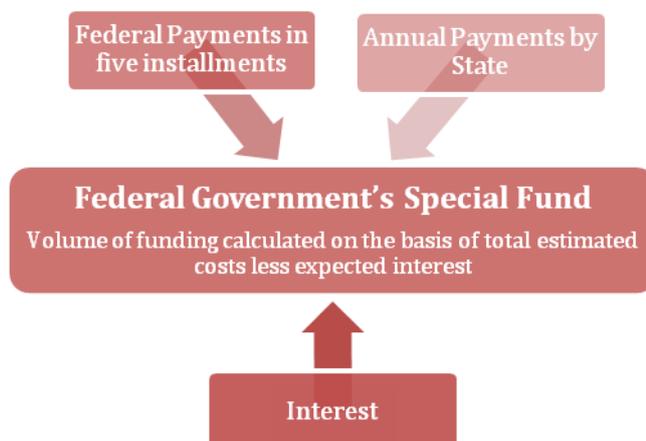


Figure 5: Fund structure

It was also envisaged that some measures would require finances far in the future (such as ground water remediation) in this case, money from the fund may not be required immediately and hence the funds for the longer term measures were to be invested in the capital market.

General interest income was therefore included in the calculation of the volume of special funds i.e. a discounted amount - reduced by the amount of future interest income generated - has been invested for future use.

The estimation of total costs for the fund is based on the estimates of the costs for each individual project.

This financial mechanism is of course applicable only to scenarios where the polluter cannot be called upon to bear the financial responsibility (here the reason was political i.e. the authority responsible for the state-owned economy, the German Democratic Republic, no longer existed after the unification). In such a scenario, if the prospective buyers had been called upon to bear remediation costs, the area may not have had any buyers.

Key lessons learnt from the case study

It is estimated that more than 650 million Euros have been spend in the Saxony-Anhalt state for remediation of 7 large sites and over 150 small projects. The economic impact of these measures are that there are a number of new business and industrial sites at the earlier contaminated sites which are now remediated. The Bitterfeld is now a remediated industrial park, employing more than 10,000 persons which would not have been possible without the remediation by public authorities.

9.6. Relevance to India

The legal framework in Germany puts shared financial liability of a remediation work on the polluter, owner/ occupant of a contaminated land. Article 4,7,24 of soil protection act mandates obligation of polluter/owner/occupant of a contaminated land for remediation of the land and bearing cost of remediation. It also describes sharing of liability to the extent of damage caused in case of multiple obligated parties. The state government is liable to pay for remediation in case of an orphan site. Indian legal framework has provisions for “penalties” for non-compliance but does not mandate liability or responsibility of a polluter in case of an intervention such as clean up or remediation is required because of the polluter’s activities. There are instances in India of multiple parties involved in a contaminated land. In that case, liability may be jointly shared amongst the responsible parties following a similar structure as article 24 of the soil protection act.

Clear delineation of authorities - The legal framework has clear delegation of authorities to the state government to order for investigation of a contaminated land, to identify and obligate responsible parties. In India lack of clear delegation of responsibilities in the legal framework results in non-action on several critical issues related to management of contaminated lands.

Authority for Land Entry - Though the soil protection act authorizes the state governments to issue orders for site investigation in case contamination beyond trigger values, it does not explicitly mention the land entry authorities in case of urgent site remediation/investigation need to be carried out in a private land. Many remediation cases in India are in a hiatus owing to lack of regulatory enforcement on authorization of an entity to enter a private land to carry out remediation.

Lack of provisions when owner is not responsible for contamination - The act obligates owner/occupier/ any person who has carried out activities to contaminate the land. It however fails to clearly mention if an owner is not responsible for contamination if he is still liable in case responsibility of any other party is not proven. In India there are instances of private owner owning

a contaminated land and may not be responsible for contamination directly. This scenario is not explicitly clarified in Article 24.

Exemption from liability – While the retrospective liability is not very clearly indicated in the act, the country is an example of when the state takes over remediation of a certain kind of orphan sites. Under the East German Environment Framework Act concerning remediation, the option for exemption from liability for residual pollution is available, where all fiscal responsibilities for the remediation process can be transferred to governmental authorities. The provision of exemption from liability for remediation is provided by the state, with the aim of encouraging private investors to purchase and continue operating previously state-owned sites and facilities.

The legal framework does not have specific provisions to stop continuous activities of illegal dumping to stop further contamination. In India there have been instances of inter/intra district transportation of hazardous waste for illegal dump for land development. Provisions to stop such activities even before remediation takes place and liability is determined are necessary to stop further contamination.

10. Netherlands

10.1. Overview

Historically, the country's reported hazardous waste generation was to the tune of 1.5 million tonnes, with a per capita generation to the tune of 100 in the early 90s. To combat with the problem of hazardous waste generation and associated contamination, globally, Netherlands has played a pioneering role in developing legal and policy frameworks to address the issue of remediation of polluted sites.

With the discovery of some major contaminated sites in 1970s, Netherlands realised the need for a soil contamination and clean up policy. At that point of time the country had little idea of the intensity and spread of contamination and hence the primary aim was to remove all existing contamination and make the land ready for all possible future post remediation use. In course of time, the vastness of contamination came into knowledge and the amended versions of the legal and policy framework introduced remediation standards for different types of post remediation use to bring in cost effectiveness to the whole endeavour.

Also to expedite work where immediate response is required, the legal framework has clear demarcation of “urgent” and “non-urgent” remediation before drawing up a remediation plan. So far as the current status goes, in line with the country's National Environment Policy 2001, the goal of identifying and inventorying all contaminated sites by 2005 has been met and as a result a detailed mapping of inventory is available with the state and local level authorities who implements remediation across the country.

Over the past few years, out of a total of 265,000¹¹ sites requiring remediation, about 11,000 sites have been identified as needing “urgent” remediation. The country on an average remediates 1500 sites a year to meet the policy target of all “serious contamination” to be controlled by 2030. The total estimated cost for this entire endeavour is about 12 billion euro. The country has devised financial mechanisms in terms of “polluter's pay”, “liability on interested parties” and formation of Government Fund to meet the target.

The Netherlands is a good example of a country whose practices are based on a strong technical foundation. It is one of the earliest countries to define detailed soil standards and remediation

¹¹ Into Dutch Soils, Ministry of Housing, Spatial Planning and Environment
Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems
and Task – 2 Overview of International Practices

methodology. It addresses the impacts of pollution by bringing into context both conservation of resources (Prevention and sustainable land management) and land development (and redevelopment). The use of baseline soil standards, effectively strengthens the technical approach for rehabilitation and allows for easier cost budgeting and subsequently implementation of remediation action.

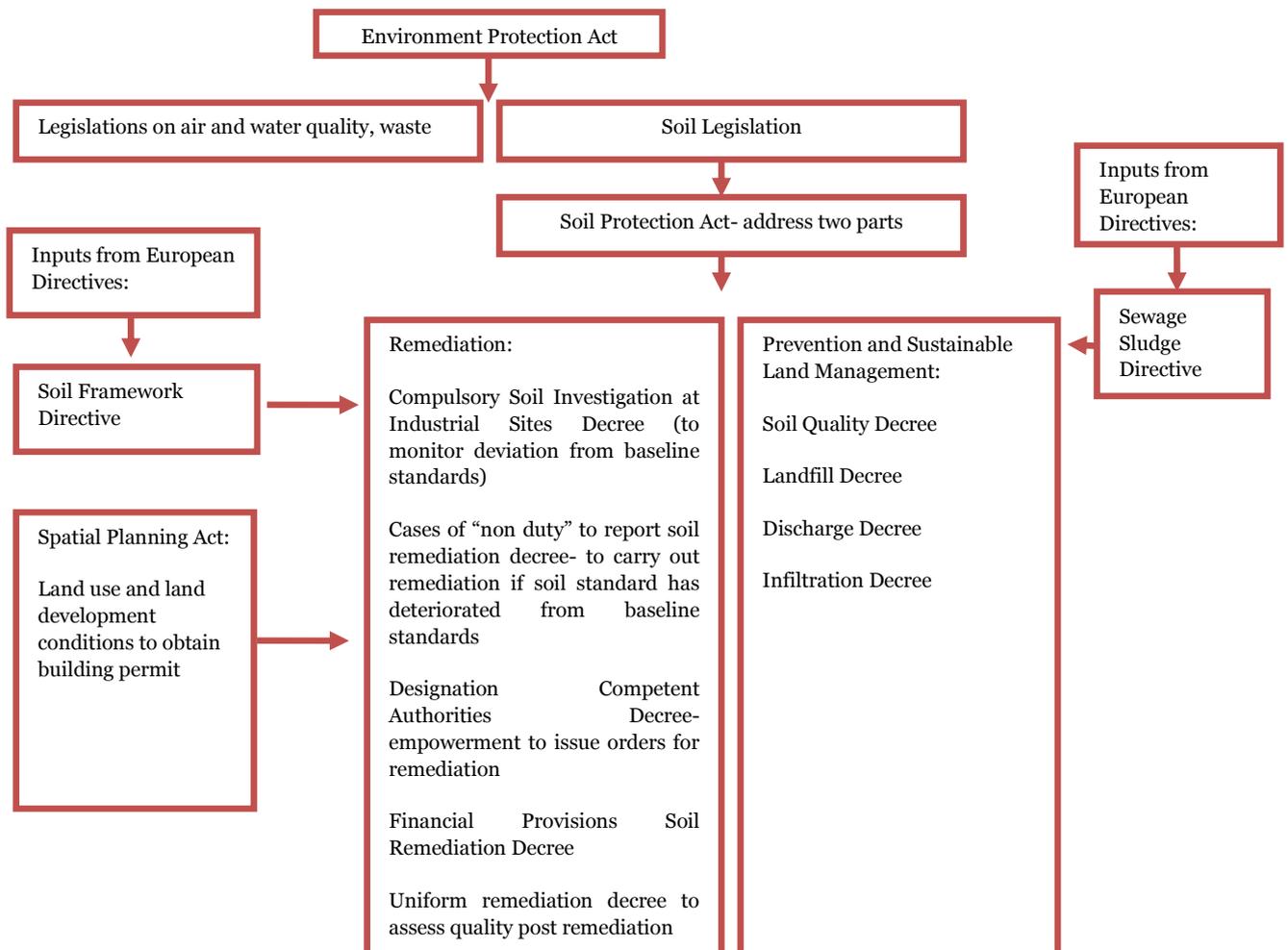
10.2. Legal and Policy Framework

The backbone of the legal and policy framework addressing soil remediation issue in Netherlands is constituted as:

- National Environment Policy 2001
- Environment Management Act, 2004
- Soil Protection Act, 2006
- Spatial Planning Act, 2006
- The Comprehensive Soil Quality Decree and Soil Quality Regulations, 2008
- The New Soil Development Policy , 2009

An overview of the legal framework is shown in the below figure:

Figure 6: Netherland’s legal framework



In Netherlands, the introduction of Interim Soil Remediation Act in 1983 brought in the concept of “multifunctional” use of remediated land and provided remediation standards assuming that a land when remediated would be fit for all possible post remediation use. The “polluter’s pay” principle was introduced in the year 1987 with the Soil Protection Act that spelt out the “duty of care principle” under which “the industry permit holder is liable to clean up the soil pollution (duty to cleanup) he has caused and is liable for the cost of restoring the soil quality to the baseline standards”. National Environmental Policy came into being in 1989 and got amended in 1997, 1999 and 2001 and provided the country with a target that “all sites with soil pollution shall be known before 2005 and all sites with “serious risks” shall be controlled before 2030”. In 1995 the Soil Protection Act included remediation standards also and therefore Interim Soil Remediation Act ceased to exist. The Soil Protection Act, 1995 introduced target values for determination of unpolluted sites and sites where remediation was necessary and abandoned the principle of “multifunctional” use of remediated land and provided standards based on cost effectiveness and to be fit for future land use.

In the year 2003 a significant move took place as per the Decree on Financial Guarantee [Bulletin of Acts, Orders and Decrees, April 15 2003] where clean-up costs were estimated at € 22500 for the soil to be restored to baseline (investigation) and soil standards at the very latest of 4 years¹².

The amendment of 2006 in Soil Protection Act introduced the following¹³:

- section 29 includes criteria for “serious” and “non serious” contamination determined based on detailed survey
- section 28 in the case of construction activities on or in seriously contaminated oil that reduce or displace the contamination, a report to the competent authority is compulsory
- section 37 includes criteria for urgent and non-urgent site remediation based on location specific current and future land use, consequences of obligation, mandates the competent authority to set a remediation deadline specific to local conditions
- section 38 describes the remediation objective to be set which is function based and cost effective

Soil Quality Standards

The first set of soil quality standards published in 1983 as part of the Interim Soil Remediation Act was the A, B and C values. Concentrations below the A value implied that there was no soil contamination. The B value was the trigger for a Main Investigation. It suggested that if concentrations above the B value were found, serious soil pollution might be present. The C value was the actual indication of such. Exceeding the C value implied that remediation was necessary. The A, B and C values were defined for a list of substances that were thought to be of relevance with respect to the occurrence of soil contamination and, to some extent, this mirrors the contaminated sites encountered at that time. Later on, these three values were replaced by a set of two values, the Target value and the Intervention value. The Target value had a similar function as the A value, while the role of the Intervention value was comparable to the C value. The Target and Intervention value were risk-based. Although there was no longer a formal intermediate (B) value, in practice such an intermediate value was still used to determine the need for a Main Investigation. For this, the average of Target and Intervention value was used. At the same time, a volume criterion was

¹² <http://www.agentschapnl.nl/en>

¹³ Soil Remediation Circular 2009, www.esdat.net

introduced. It implied that a single excess of the Intervention value is not enough to declare contamination to be serious. This requires a volume of at least 25 m³ for soil or 100 m³ for groundwater exceeding the Intervention value. The publication of the Soil Quality Decree resulted in a drastic change in soil quality standards. The perspective of the new decree is different from the past as soil re-use is now the prime objective. Soil quality values had been used to define when remediation is necessary, but the Soil Quality Decree required soil quality standards that define when the soil quality is fit for a specific function. For the lowest soil quality level, this implied the abandonment of the toxicological definition of the Target value.

Parallel to this, significant features were introduced in the Spatial Planning Act in 2006 that involved land developers also to share the liability of payment for remediation if required based on the land use plan. As per the act a municipality has to have spatial land-use plan of the entire area coming under its jurisdiction and “a building permit may not be granted for a proposed development which does not conform to the spatial plan” and “the municipal executive shall recover the development costs of the land lying within a development area by attaching, having due regard to the development plan, a condition to the building permit for a building plan that was designated in accordance with section 6.12, subsection 1 that the permit-holder is liable for a development contribution to the municipality, unless the contribution is secured in some other way or a contribution was agreed and secured prior to the submission of the building application”. A development plan shall include: “a map of the area to be developed; a description of the works and activities needed to prepare the area for construction, install the utilities and lay out the public space in the area.”

The New Soil Development Policy in the country also shows the larger vision of sharing liability with all stakeholders or interested parties rather than restricting it to the polluters, “where possible, the Parties shall see to it that remediation of urgent sites involving humans on the one hand and sites involving other risks on the other hand is performed before 31 December 2015 by stakeholders or by or at the expense of those parties to whom the judicial instruments of the Soil Protection Act apply”. Also until this new policy, the country’s legal framework focussed on “soil” specific remediation and did not consider land re-development issues covering management and treatment of sub-soils and groundwater. This focus is now being brought into the legal framework with this new policy. In the long run, Netherlands may come out of the “soil protection act” regime to a much broader perspective of “contaminated land management act” regime as witnessed in USA and Australia. To summarise the observations, the highlights of the legal framework of Netherlands are as follows:

- The legal framework is simultaneously addressing soil remediation and sustainable land management to ensure proper remediation and no further contamination once inventory of contaminated sites is available and remediation of identified sites is completed
- Instead of restricting financial liability on polluters putting liability on "interested parties" or "stakeholders" including land owners, land developers and polluters
- Building permit is provided based on land use conditions, recovering cost of land development from the builder
- Netherlands' legal framework primarily deals with setting criteria for serious and non serious contamination, urgent and not so urgent remediation and mandates remediation cost and deadline, sets remediation standards for post-remediation land use
- Implements polluter's pay principle but does not talk about traceability of polluters and joint liability

- Does not clarify on empowerment of "access to land" or "land acquisition" by the authorities remediation purposes for an orphan site where no owner is identified
- Does not clarify on remediation procedures (financing, land entry etc) to be followed for an orphan site
- Stresses upon the fact that even if polluters pay for remediation, there should be government fund allocated for urgent remediation

The table below presents a flow of activities in the remediation cycle in the Netherlands.

Table 24 Sequence of remediation activities

Actions	Details
Risk based identification and prioritization of polluted sites	Section 27,29,37,38 of Soil Protection Act address this requirement
Determining extent of remediation i.e. remediation standards based on post remediation use	Soil Quality Decree 2007 attempts to develop remediation standards based on post remediation use
Evaluation of baseline standards before industry holder permit is issued and regular investigation of soil standards once industry is set up	Soil Protection Act mandates regular monitoring of soil standards at an industrial site vis-a-vis its baseline standards
Liability to clean up a polluted industrial site	"duty of care principle" of Soil Protection Act- the industry permit holder is liable to clean up the soil pollution (duty to cleanup) he has caused and is liable for the cost of restoring the soil quality to the baseline standards
Fixing up the cleanup cost and deadline for an industrial polluter	Decree on Financial Guarantee [Bulletin of Acts, Orders and Decrees, April 15 2003] where clean-up costs were estimated at € 22500 for the soil to be restored to baseline (investigation) and soil standards at the very latest of 4 years
Liability to carry out remediation, financial liability extended from only polluters to interested parties including owners, land developers etc.	New Soil Development Policy extends liability from polluters to all interested stakeholders of the contaminated land

Transfer of property to a new owner, who would be liable for payment of remediation costs of a contaminated land, may trigger an investigation to check if the land being acquired is contaminated or to prevent land development in a seriously contaminated land before issuing permit.

To start an investigative activity or to develop a remediation plan the interested party has to submit a notification to the competent authority (provinces/municipalities etc). For less complex situations, a uniform regulation has been provided by the state government whereby the competent authority needs to be notified of the fact that remediation will follow the simplified procedure. A standard form is available for this notification. The competent authority should decide within five weeks if the simplified procedure can indeed be followed. There is no possibility to appeal against this decision. If the competent authority does not respond within five weeks, the simplified

procedure is implicitly accepted. Once the decision on complex or simple is confirmed, the activity-timeline for the processes is as follows¹⁴:

Table 25 Activity timelines for simple and complex methods

Activity	Timeline for complex method	Timeline for simple method
Draft decision making by competent authority made available for comments from people and/or organisations that have an interest in the specific site	6 weeks	No such step is required
Formal decision making by competent authority	15 weeks from receipt of notification	No such step is required
Appeal by interested party to the State Council	Within 6 weeks after receipt of decision	No such step is required
Post remediation report evaluation and acceptance /final decision on remediation result by the competent authority	8 weeks after receipt of remediation report	8 weeks after receipt of remediation report based on a standard format made available by the state government
Appeal by interested party to the State Council	Within 6 weeks after receipt of decision	Within 6 weeks after receipt of decision

10.3. Institutional Framework

Netherlands' legal framework (Designation Competent Authorities Decree) provides the institutional framework and distribution of empowerment to carry out a work of remediation. The main responsibilities to conduct the necessary clean-ups rest on the Provinces and Local Authorities, whereas the central government is responsible for the legal framework and its supervision.

The table below provides the overview of the institutional framework of empowerment in place in Netherlands¹⁵:

Table 26 Institutional empowerment in Netherlands

Empowerment	Entity	Roles and Responsibilities
Decision making	Central Government	Takes financial decisions on policies to be adopted
Policy making	Ministry of Housing, Spatial Planning and the Environment,	Designing and enforcing policies
	Ministry of Economic Affairs	Operationalizing the policies
Coordination for implementation	Soil Plus	Acts as the link between the Ministries and the competent implementing authorities at local

¹⁴ Into Dutch Soils, Ministry of Housing, Spatial Planning and Environment

¹⁵ <http://www.agentschapnl.nl/en>, www.cabernet.uk

		levels (provinces, municipalities etc)
Implementation under Soil Protection Act, Environment Management Act	Municipalities, District Water Boards and Provinces are referred as “competent authorities” under the Soil Protection Act. There are 12 provinces, 26 district water boards and 29 large municipalities recognized as competent authorities.	Implementation of duties and powers (issuing orders for compulsory soil investigation, remediation in case of non-duty etc) as delineated in these Acts. They have responsibilities of implementation of all features of the Act and are distributed amongst provinces and municipalities based upon area of jurisdiction.

The Ministry of Housing, Spatial Planning and the Environment (VROM) is responsible for defining general soil policy. The Soil Protection Act, and instruments based on the Act such as General Administrative Orders, soil quality objectives and procedures for estimating site-specific risks, is defined by the Ministry. The local authorities, provinces and municipalities are responsible for applying the Act and associated instruments, and deciding how best to deal with specific contaminated sites. The National Institute of Public Health and Environmental Protection (RIVM) provides the scientific basis for soil quality objectives and risk assessment procedures. The Technical Committee on Soil Protection (TCB) advises the Minister on the implementation of technical and scientifically based instruments in soil protection policy.

SenterNovem/ Soil+: SenterNovem is an agency of the Ministry of Economic Affairs. It pursues government policy in various policy areas such as innovation, the environment and sustainability. In this role, SenterNovem maintains contact with public authorities, social organisations, knowledge institutions and companies. These parties can go to SenterNovem for subsidies, knowledge exchange, public information and process supervision. Soil+ is a task group in the SenterNovem agency. It is an assignment of the Ministry of VROM and, in this position, acts as a link between policy formation by the central government and the actual implementation of these policies by the provinces, municipalities (competent authorities) and district water boards.

Provinces: The Netherlands is divided into 12 provinces. The provinces form an administrative layer between the central government and the municipalities. In close cooperation with the central government, the municipalities and the district water boards, the provinces perform duties in such areas as spatial planning, the environment, supervision of the district water boards and supervision of the finances of the municipalities. Some other roles of the provinces are to compile inventories using data from the local authorities; approve changes in land use according to the Spatial Planning Act and draw up an investigation and remediation programme for the contaminated sites with clean up details and priority. On an annual basis Provinces submit priority lists to the central government. This also specifies who will have to clean-up his site and when. On the basis of the priority lists, clean-up costs are calculated and the shares of the national budget are allocated in proportion to the funds required.

Municipalities/competent authority municipalities: The Netherlands has 441 municipalities. The municipality is the smallest administrative unit in the Netherlands and exists alongside the central government and the provinces. Based on the Soil Protection Act some municipalities have more duties and powers than other municipalities with regard to soil policy and management. In general, these ‘competent authority’ municipalities are the large municipalities such as Amsterdam, Rotterdam and Utrecht. This means, for example, that duties normally performed by a province are instead implemented by the competent authority municipality. They report to the provincial governments about historical investigations, site investigations, incidents, clean-ups, etc.

District water boards: There are 26 district water boards in the Netherlands. The district water boards are established and dissolved by provincial bye-law, and bear responsibility for dams and water management in the Netherlands. Other duties, such as environmental management and other water management matters, can also be assigned to a district water board.

10.4. Financial mechanisms

In Netherlands even if the “polluters pay” principle is in place, however, for urgent remediation the country is not solely dependent on sourcing payment for remediation from polluters. Over the years, a transition of liability from polluters to stakeholders has been also witnessed in the legal framework that entails that any party who is interested in owning a land or developing a land for any kind constructive activities is liable to pay for remediation of the land if its required by the mapped inventory and land use map of the land in question as available with the competent authorities. Also, it is observed that several government allocated funds are also kept for use to meet the policy target of completing remediation of identified sites by 2030. Hence the financial mechanism of Netherlands is a combination of payment from polluters, interested parties and government funds and annual budget for remediation.

Financing mechanism - Financing will be done by the polluter, which means the polluters pay principle is applied, in general. But, If the person responsible for the clean-up is insolvent, public funding can be made available, which represents an advance payment, which has to be recovered. In case of orphan sites the cost of the site cleanup is borne by government by public funding.

Soil Clean up Centre – This is a public body founded as an intermediary organisation for soil remediation requirements with an objective of having an unbiased organisation and to carry out cleanup programme at reasonable costs. It is a self-financing company and charges a fee and risk premium for treatment of soil.

Voluntary contributions - Funding also comes from some voluntary public private agreements, e.g., the BSB covenant and the SUBAT covenant. Under the BSB covenant industries agree to carry out site cleanups on its own cost and the government agreed not to intervene within a period of 25 years. Under the SUBAT covenant is a voluntary agreement of the petrol industry with a major objective to fund the remediation of out-of-service petrol stations. The remediation costs are covered by a fund which retrieves money from a fee included in the petrol price.

The box below encapsulates the financial mechanism of the country to address remediation:

Fund is sourced from:

- a) polluter’s payment
- b) land owner’s/developer’s payment
- c) government soil remediation fund (even if polluter’s payment is executed, a part of the fund is still coming from the government fund (e.g. from tax revenues) and annual budget¹⁶:
 - Annual budget of € 185 million
 - Fund for urban development
 - Fund for rural development
 - Fund for industrial sites in use

Funding for remediation of sites where contamination happened before any law came into being (pre - 1987 in Netherlands)¹⁷:-

¹⁶ Policy Development in Soil Remediation in The Netherlands, Co Molenaar, Ministry of Housing Spatial Planning and the Environment

Development of National Program for Rehabilitation of Polluted Sites - Final Report on Task - 1 Review of Current Systems and Task – 2 Overview of International Practices

- Under Soil Protection Act 1987- in pre 1987 era the companies who are employing chemical experts (who should have knowledge of national and international publications on the subject) and still continuing to contaminate are regarded as liable for the contamination they have caused and then are liable to pay for remediation.
- Buyer buying a property in the pre 1987 era might not have knowledge of the contamination and the government may fund remediation.

10.5. Case studies exemplifying the legal, institutional and financial mechanisms

Markelo Fuel Depot

Markelo in East Holland is a large depot for aviation fuel, transporting it towards air bases in the Netherlands as well civil airfields in Amsterdam and Frankfurt. Over time, with ruptures and leakages there was severe contamination of soil by hydrocarbons. Remediation was financed by the ministry of defence.

Some of the important points that help demonstrate the strong technical practices used in remediation in the Netherlands are:

- Both preliminary and supplementary investigation was carried out (around 55 drilled sampling points to ensure proper coverage of the excavation plan.)
- Identification of two levels of different soil types helped further improve the probability of success of the remediation plan
- Old and recent contamination were differentiated with a distinct remediation plans for each.
- Remediation goals were set using the well defined soil standards at ‘average value’ using the formula; average value = (target value + intervention value)/2
- Based on recorded experience suitable techniques were known and could be selected from the following
 - Excavation of surface layers
 - Ground water extraction
 - Soil vapour extraction under building
 - Air sparging/bio sparging
- A combination of methods was used on old and new contamination and on groundwater. Remediation goals were reviewed against the standards and the project was able to declare 80% remediation within 2 years. The site continues to be monitored.

Well documented standards, remediation techniques and monitoring methods helped set goals, undertake the right mix of activities and review results quantitatively.

10.6. Relevance to India

Netherlands has for long implemented “polluter’s pay” principle in an elaborate manner as per its legal framework. As a prerequisite for obtaining industry permit, The Soil Protection Act has mandated that the industry should have elaborate, written down procedures on supervision and

¹⁷ <http://www.agentschapnl.nl/en>

inspection on soil investigation for the purposes of the duty to clean up. It must always take place, either in the form of a soil pollution investigation or in the form of monitoring to reduce the risk. From investigations as per the Compulsory Soil Investigation at Industrial Sites Decree if it is found out that soil standards is below the baseline standards then as per “duty of care principle” “the industry permit holder is liable to clean up the soil pollution (duty to cleanup) he has caused and is liable for the cost of restoring the soil quality to the baseline standards. India’s hazardous waste management rules have laid down procedures on compliance monitoring of air and water quality, waste generation and characteristics but it does not have any clause on comparative analysis of land (soil, groundwater) conditions due to industry practices of storing hazardous substances, leak of chemicals, non functioning of waste recycling and treatment facilities etc, does not allocated responsibilities to the industries for clean up action to be taken for monitored values of soil parameters going beyond the baseline standards and does not allocate liability on industries for payment for clean up.

The legislations in the country also provide criteria for decision for extent of clean up required. The Soil Protection Act provides the criteria for extent of remediation required based on the location of the industrial activities; data about the stratification of the soil and the geo-hydrology and Data about the mobility, solubility and volatility of used or stored substances. No such provision is present in Indian legal framework and hence key points from these legislations can be taken into consideration.

Netherlands provides criteria for seriousness of contamination and urgency for remediation. Section 29 of the Soil Protection Act provides criteria for distinction between serious and non-serious contamination based on detail survey carried out. Section 37 of the Soil Protection Act provides criteria for distinction between serious and non-serious contamination based on post remediation use and cost effectiveness. No such provision is present in Indian legal framework and which may be introduced once the studies on inventory of contaminated sites and remediation methodology under CBIPMP are completed.

The institutional framework of the country designates competent authorities to issue orders. Designation Competent Authorities Decree provides institutional structure of empowerment to carry out duties under the Soil Protection Act. It is important to designate /empower authorities to national and state level bodies to issue orders related to urgent clean up or remediation action to be taken up by the industries to reduce time delays that occur in submitting appeals to the judiciary system and awaiting response from them for orders.

Remediation cost and deadline – The legislations provide a deadline of 4 years and a cost limit of € 22500 No such provision is present in Indian legal framework which may be introduced.

Relating building permit with land use, land remediation conditions, liabilities - Since the municipalities are equipped with land use maps, they can refer to these maps while issuing building permit to any owner or developer who is buying a land and if the land is found to be contaminated the cost of remediation/land development is recovered from the buyer as per Spatial Planning Act. No such allocation of responsibility to the buyer is there in the India framework.

Liability involves polluters as well as land owners - Netherlands’s legal framework puts liability on the owner of a contaminated land to recover remediation cost. No such provision is present in Indian legal framework which may be introduced.

However, the country’s legal framework has no clarity on traceability of polluters for an orphan site. The legal framework does not clarify the mode of cost recovery where polluter cannot be identified. The acts also do not talk about access to a private land for remediation. Though the legal framework allocates liability to owners for recovering the remediation cost of a private-owned land but it does

not explicitly discuss on access to private land by authorities to carry out remediation. Also for an orphan land, the legal framework is not clear if the competent authority has the authority to take over the land, remediate and reuse.

11. Romania

11.1. Overview

As per latest available data of 2006, hazardous waste generation in Romania is to the tune of 1.05 million tonnes as per Article 1(1) a (Annex I: Y1-Y45) of Basel Convention. In Romania the history of environment legislation dates back to 1990 when the Ministry of Environment was formed. In 1992 came the Environment Protection National Strategy that paved the way for the Environment Protection Law, 1995. From the very beginning of these legislations, be it related to remediation of polluted sites or some other cleanup activities, the country has put the liability of cost recovery on the polluter as a single or joint liability as the case may be.

The concern for remediation of historically contaminated sites came as late as 2003 when the National Waste Management Strategy (2003-2013) according to the provisions of Emergency Government Ordinance (EGO) no. 78/2000 on the regime of waste, approved with amendments and completions by Law no. 426/2001. Other than the financial mechanism in place with the polluters pay principle, an environment fund has been created from various tax revenue sources of the Government and has identified development of viable market for hazardous wastes as one of financial schemes to be adopted to meet the targeted remediation of historically polluted sites under the national strategy.

11.2. Legal and Policy Framework

Romania has umbrella acts to prevent environmental pollution and promote sustainable development but has not yet gone for any remediation specific regulatory framework. As mentioned above, chronologically, the first mention of remediation of historically contaminates sites is evidenced in the National Waste Management Strategy (2003-2013). A structured regulatory framework for remediation of contaminated sites is yet to take its shape. The environmental policy and the legislative framework of Romania are set out in the Environment Protection National Strategy, National Waste Management Strategy and the Environment Protection Law. Relevant features of these are discussed in detail in this section.

Environment Protection National Strategy (came into being in 1992 and updated in 1995 and 2002) relates to preserving and improving people's health conditions; sustainable development; preventing pollution; preserving bio- diversity; preserving cultural and historical heritage; following "the polluter pays principle" ; stimulation of activities related to bringing environment to a normal state. To address issues related to environmental compliance, the general principles of the Environment Protection Law 1995 (Law no 137/1995) reflects the guiding principles of the environment protection strategy and focuses on polluter pays principle and elimination of the polluters that are directly and severely affecting human health.

Environmental liability in Romania is based on the principle of the polluter having to pay. This is specifically recognized both in the framework law (Article 3 of Environment Protection Law) as well as in the special laws. Special laws govern the liability in case of damages caused by waste (Law 426 of 2001), pollution of underground and surface waters (Law no. 107 of 1996), dangerous chemical substances (Government Decision no. 1559 of 2004), biocides (Government Decision no. 956 of 2005), genetically modified organisms (Ministerial Order no. 173 of 2006, Ministerial Order no.

1295 of 2005), nuclear accidents (Law no. 703/2001) and are applicable the specific fields and activities.

The Emergency Government Ordinance (EGO) no.68/2007¹⁸ is on environmental liability, prevention and remedying environmental damages. By adopting EGO no. 68/2007, Romania implemented the provisions of the European Directive no.2004/35/CE related to remedying environmental damages. “Environmental damages” are guided by the “principle of precaution” in the Environment Protection Law” that mentions “the absence of certitude should not hinder the adoption of measures to prevent production of a risk with important and irreversible damages for environment”¹⁹. Other features of environmental liability in Romania are as follows:

- The liability for pollution damages is objective in nature therefore it is independent of the existence or non-existence of the polluter’s guilt. In case of a plurality of polluters, they share joint responsibility- Law no. 265 of 2006 stipulates the principle of objective liability for environmental damages as a general rule (Article 95, para. 1). “The liability for damages caused to the environment is objective, without fault. In case of damages caused by more sources of pollution the polluters will be held liable jointly”²⁰.
- When the producer / holder of waste are unknown, costs of cleaning and environmental cleanup are supported by local government authority. After identifying the holder, he has to support both the costs incurred by the local government and those relating to actions taken for identification.

The polluter’s pay principle in general is also applicable to bear consequences of the lack of respect of obligations foreseen by legislation in force regarding the introduction and usage of non-polluting technologies, limitation of pollution at parameters established in eco-standards, not respecting the procedure of authorization.

Another important feature of Romanian environmental legal framework is determining liability based on “juridical responsibility”. As a general rule, any person (physical or juridical) is responsible in case of defying environment’s legislation. This responsibility should be circumstantiated as sometimes, the action though which law is transgressed has as result environment’s effective pollution (the author being “polluting agent”); some other times, the action (lack of action) taken does not lead to environment pollution, but, is an action that can be sanctioned according to the norms of this law branch (the author is not anymore a “polluting agent” but he is responsible from juridical point of view). The introduction of the juridical responsibility regime in the environmental field announces a series of difficulties, connected especially by the fact that not all prejudice forms can be repaired by applying juridical responsibility in the environmental law. Supplementary should be fulfilled by the existence of one or more pollutants that can be identified; the prejudice should be established and quantifiable; be established a cause connection between prejudice and the identified pollutant or pollutants.

To summarize the features of environmental legal framework of Romania, the following are the observations:

- Though the legal framework is not specifically meant for remediation or clean up of polluted sites, it mandates application of "polluter's pay" principle in case of “environmental damages” created by the polluters and puts liability on "one or more polluters identified” and mandates government funding in case "no polluters identified” for cost recovery towards remediation of environmental damages

¹⁸ Getting the Deal Through- Musat & Asociatii

¹⁹ <http://www.law.muni.cz/content/cs/proceedings/>

²⁰ Directive 2004/35/CE and Romania, by Mónica Józson

- Provides elaborate legal and institutional framework for Romanian Environment Fund which may be utilized for purpose of remediation of historically polluted sites
- The strategic framework indicates developing a viable market for hazardous production waste (e.g. energy recovery from hazardous waste in cement kiln) as a means to stop new contamination
- Does not clarify on "land entry" for remediation purposes of a private owned land or orphan land

11.3. Institutional Framework

At present, upon enforcing of several EU directives, the State specialized authorities (competent authorities) responsible for the environmental protection are: (I) the Ministry of Environment and Forests – as the core central authority for environment protection; (II) the National Agency for Environment Protection; (III) the regional environmental protection agencies; (IV) the county environmental protection agencies and (V) the Environmental National Guard for control. Since the country till date does not have a remediation specific regulatory framework, the institutional framework is yet to be developed.

11.4. Financial mechanisms

In Romania National Waste Management Strategy (2003-2013) was developed according to the provisions of Emergency Government Ordinance no. 78/2000 on the regime of waste, approved with amendments and completions by Law no. 426/2001. One of the overarching objectives of the strategy is to setting up and using economic-financial systems and mechanisms for hazardous waste management and Financing the intermediary securing and final rehabilitation of orphan contaminated sites while observing all general principles, in particular the “polluter pays” and “producer responsibility” principle. The objective covers stimulating the setting up and development of a viable market for hazardous production waste (e.g., promoting heat and energy recovery from hazardous waste in cement kilns, promoting the recycling of non-ferrous materials using the existing foundries); making best use of all the funding available (environment fund, private funds, structural funds, etc.) for capital expenditures in the field of waste management) and using national and international funds (ISPA, etc.)

The Environmental Fund²¹ had been set up by Law no. 73 in 2000, as a special fund, outside the budget to meet the objectives as set out by the National Waste Management Strategy. The structure of the income of the fund is as follows:

- the amounts cashed as taxes by the environmental protection central authority and by the environmental protection territorial authorities, in exchange for issuing the environment agreements and authorizations;
- the amounts cashed as taxes for exploiting the natural resources, other than those taxed for supporting the special funds;
- the amounts cashed as taxes for polluting the atmosphere, the surface and subterranean waters, the soil and vegetation, according to the principle saying that “the polluter pays”, i.e., taxes for burning fuels with high concentrations of noxious elements; taxes for trading on internal market dangerous substances as well as materials

²¹ A SURVEY OF THE ROMANIAN ENVIRONMENTAL FUND, D.nule.iu Dan-Constantin, Lecturer PhD, University of Alba Iulia, Faculty of Science, Romania

- having a high toxicological potential on human health and environment, no matter their source;
 - taxes paid by traders for wasting the packages that could be recovered; taxes for storing wastes on lands; taxes for wasting burnt mineral oils; taxes for trading fast moving goods; taxes paid by the suppliers for not providing replacement parts in order to allow some products to function according to their life span; taxes for activities generating noise pollution;
- amounts cashed as taxes for trading on internal market or for exporting some natural resources, biological or mineral, including goods coming from wild flora or fauna, terrestrial and aquatic;
- amounts cashed on the occasion of different events organized on Environmental Fund benefit;
- state budget subsidies and local budget subsidies, payments, donations, financial support provided by public or private institutions and organizations, by individuals or international organizations and bodies, as well as governments and governmental agencies;
- sponsorships, as any other sources established by the Govern, following the proposal of the environmental protection central authority, according to the law

In 2002, subsequent amendment to the law 73/2000, the following revenue sources to the Environment Fund were identified:

- 3% of the revenues cashed by entrepreneurs collecting or turning the ferrous and non-ferrous wastes into good accounts;
- amounts cashed for pollutants emissions in atmosphere affecting the environment as listed in an annex to the decision
- the revenues originated in using new lands for storing recyclable waste, as listed in other annex of the decision;
- 3% of the packages traded by producers and importers, except for those used for drugs;
- 2% of the value of dangerous chemical materials traded by producers and importers, except for the materials used to produce drugs;
- 0.5% of the value of dangerous chemical materials traded by producers and importers in order to be used in agriculture;
- 3% of the adjudication price for timber brought from National Forest Administration and other wood owners, companies or individuals;
- 1.5 % of the amounts cashed out of trading tobacco goods;
- state budget subsidies and local budget subsidies, payments, donations, sponsorships, financial support provided by individuals or companies, both domestic or foreign;

The managing unit for the Environment Fund is the Environment Fund Administration (EFA), legal public entity, coordinated by the national environmental protection authority: Ministry for Environment and Sustainable Development. EGO 196/2005 and Law 167/2010 define the tasks of EFA.

The Endorsing Committee which analyses and endorses by vote: the operation manual including the methodology for project selection, approval and financing; the annual working plan, including eligible categories of projects to be financed; the projects to be financed by the Fund, selected from those proposed by the Managing Board; categories of financial support for the projects and, if

needed, the interest rate of the loans. The Managing Board, which, according to article (6) line (3) of Government Emergency Ordinance No. 196/2005 is responsible for:

- approving the EFA revenues and expenditures budget, as endorsed by central environment protection authority;
- endorses the operation manual drafted by the specialized units and submits it for approval to the Endorsing Committee;
- endorses the annual working plan drafted by the specialized units and submits it for approval to the Endorsing Committee;
- endorses and submits for approval to the Endorsing Committee the projects selected to be financed by the Fund;
- submits for approval categories of financial support for the projects and, if needed, the interest rate of the loans;
- approves the financial papers and annual and quarterly budgetary balance sheets and submits this documents to the environment protection central authority;
- supervises Environment Fund setting up and management;
- monitors the Environment Fund financed projects implementing process;
- Approves the Funds Annual Management Report and publicize it according to the law.

11.5. Case studies exemplifying the legal, institutional and financial mechanisms

Copsa Mica²² was one of Europe's most polluted towns in the 1990s and remains the most polluted town in Romania to this day. Two factories Carbosin that produced carbon black and Sometra, a non-ferrous metallurgical smelter were behind this pollution. Carbosin shut down in 1993 but the smelter is still operational. This issue may be addressed through Emergency Government Ordinance no. 78/2000 and completions by Law no. 426/2001 that points out development of a viable market for hazardous production waste through promotion of recycling of non-ferrous materials using the existing foundries to stop further contamination.

11.6. Relevance to India

The "polluter's pay" principle is an integral part of Romania's environment law. As described above, liability for remedy of any environmental damage, as per Romanian environmental law, is upon the polluters. The liability can be shared or joint based upon the traceability of identity of one or more polluters. It clarifies that when a polluter or polluters are not identifiable the cost of remediation should come from the Government Fund. In India, traceability of polluters for an illegal dump site is a big challenge towards recovering the cost of remediation of the site from the polluters.

The legal framework in Romania is not strengthened to include remediation specific issues such as remediation methodology and standards. Though the environmental law of the country describes liability for remediation of environmental damages but it does not provide clarity on remediation specific issues such as criteria to determine the urgency of remediation, type and extent of remediation required etc. Indian legal framework also does not address any remediation specific issues and hence such provisions would be necessary.

²² http://www.blacksmithinstitute.com/projects/regions/e_europe

The country's practices also do not talk about liability of an owner of a contaminated land if he is not by action not responsible for contamination. Though the legal framework puts juridical responsibility on agents whose action may not have directly led to contamination but the action/non-action can be sanctioned according to the norms of this law branch but the law has not clarified if an owner of a contaminated land can be made responsible through this clause. In India there are instances where a private land belongs to an owner who is not directly responsible for contamination but can be made liable for his non-action towards rehabilitation of its owned contaminated land. Hence in the legal framework a definition for "juridical responsibility" can be added. Also, it has to clarify this issue specifically for the purposes of remediation of privately owned contaminated land.

Access to a private land for remediation- Though the legal framework allocates liability to owners for recovering the remediation cost of a private-owned land but it does not explicitly discuss on access to private land by authorities to carry out remediation.

Also for an orphan land, the legal framework is not clear if the competent authority has the authority to take over the land, remediate and reuse. In India even though the "polluters pay" principle is not legally established but the practice has started sporadically in a few states to penalize polluters for illegal dumping of hazardous waste thereby polluting the land but the concept of land owner help liable has not yet penetrated. Again for numerous orphan contaminated lands in India the challenge is to have a legal structure for the competent authority to takeover, remediate and reuse the land for commercial purposes.

12. Some Asian countries

We also did a brief analysis on some of the Asian countries, namely Japan and Korea among the developed economies and China with a development profile similar to India.

Japan has a reasonably advanced regulatory framework to address soil and groundwater contamination. Japan's Soil Pollution Control Law 2002 identifies industrial categories, and chemical substances with threshold limits for soil contamination. The Japan Soil Contamination Counter-measure Law (SCCL) mandates that owner of any land that has identified chemicals present beyond its threshold needs to implement measures towards containing the contamination, rehabilitation and monitoring. Under the legal framework for any land redevelopment activity, the land developer/owner is required to notify the governor/competent authority and the area must be remediated according to regulatory stipulations before carrying out any developmental activity.

Korea is another Asian country that has a rigorous legal framework in place to address remediation of soil contamination. The backbone of the legal framework is the Soil Environment Conservation Act. The regulatory framework covers reporting soil contamination, supervision of specific facilities, soil survey, risk assessment, verification and remediation of contaminated soil. It mandates strict liability that extends to Polluter, Owner, Occupant and Operator. The institutional framework involves responsibilities at central and local levels. The Ministry of Environment is the central authority that delegates responsibilities to local environment offices.

China has an economy that is growing at an extremely fast rate very much like India. The rapid industrial development in this country presents the all too familiar side effects of pollution and environment degradation. Historically large state-run industrial complexes were set up in the various provinces of the country at the perimeter of small towns and cities. Over time towns and cities developed around these industrial complexes and the industries were shifted further into the countryside. As result vast tracts of land within the present city areas exist with considerable level of soil and ground water contamination. Unfortunately the spread of industries to the country side

has led to the pollution of rivers, ground water and other irrigation systems leading to further pollution of agricultural land.

The Chinese constitution calls for rational use of land and criminalizes pollution. Specific laws for solid waste including municipal and industrial solid waste exist. The Land Management Law places the onus of protecting land with the government at all levels. Producers of waste are required to manage the treatment, storage and disposal of wastes. Separate laws exist for solid waste, water, atmosphere and noise pollution. Article 29 of the Environmental Protection Law of the People's Republic of China, 1989 clearly mentions that an enterprise or institution that has caused severe environment pollution is required to control and eliminate the pollution within a specified period of time. The law also accords liability for compensation upon the polluter but it is only 'at fault' liability.

The Ministry of Environment Protection (MEP) which was earlier known as the State Environmental Protection Administration (SEPA) is responsible for supervising and managing environmental pollution prevention; developing and implementing management rules for the prevention of water, air, soil and solid waste pollution. While control of pollution and conservation are covered under the mission of this agency, we were unable to find any referenced to restoration or rehabilitation as a part of the agency's mission. The MEP has set up standards for quality of Water, Air, Noise, Soil, Solid Waste and Radioactivity. A country wide brownfield redevelopment programme is being envisaged to tackle the primary issue of brownfields in the country

13. Tabular summary of international practices

In this section we provide a tabular summary of findings by specific areas of consideration relevant to the management and rehabilitation of polluted sites in each of the countries studied. For clarity, areas specific to orphan sites have been captioned and highlighted in a separate colour. (In the next chapter a combined summary of Indian and international practices also demonstrates the international aspects relevant for the national programme in India)

Table 1 Summary of international practices

USA	Canada	Australia	Germany	Netherlands	Romania
Key Legislations or policies					
Comprehensive Environmental Response, Compensation & Liability Act (CERCLA), Superfund Amendments & Reauthorization Act (SARA), Brownfields & Land Revitalization Programme	Environment Quality Act (EQA) and the Soil Protection and Contaminated Sites Rehabilitation Policy	Contaminated Land Management Act of New South Wales	Federal Soil Protection Act and the Federal Soil Protection and Contaminated Sites Ordinance	Soil Protection Act, Spatial Planning Act, Comprehensive Soil Quality Decree and Soil Quality Regulations, New Soil Development Policy	Environment Protection National Strategy, National Waste Management Strategy and Environment Protection Law
Prioritization and listing of contaminated sites and the existence and use of definitions and criteria in these activities					
Sites are listed on the National Priorities List (NPL) upon completion of Hazard Ranking System (HRS) screening. HRS is a numerically based screening system that uses information from initial, limited	Federal contaminated sites are classified and prioritized based on the Canadian Council of Ministers of the Environment (CCME) National Classification System for Contaminated Sites (NCSCS) and the	As per the CLM act, it is the duty of owners or occupiers to report / notify contaminated sites. Once the sites are notified, EPA has a strategy to systematically assess, prioritize and respond to these. This list is not	There is no single prioritization list in Germany. The German Federal States have designed their own approaches to register contaminated sites. The Federal Soil Protection Act does not regulate the registration and	The Soil Protection Act includes criteria for “serious” and “non serious” contamination determined based on detailed survey and criteria for urgent and non-urgent site remediation based on location specific current	There is no specific prioritization list.

USA	Canada	Australia	Germany	Netherlands	Romania
investigations to assess the relative potential of sites to pose a threat to human health or the environment.	Aquatic Site Classification System (ASCS) developed under the Federal Contaminated Action Plan (FCSAP). The NCSCS and the ASCS provides scientific and technical assistance to prioritize their contaminated sites as high, medium or low risk, according to their current or potential adverse impacts to human health and/or the environment.	a comprehensive list of all the contaminated sites in the country and only lists the sites notified by owners or occupiers.	identification process, however the Federal Soil Protection & Contaminated Sites Ordinance provides evaluation criteria for suspect and contaminated sites.	and future land use, consequences of obligation, mandates the competent authority to set a remediation deadline specific to local conditions	
Determination of liability for pollution and remediation under various types of ownership, and occupation of land					
<i>Non Orphan Sites</i>					
The liability for remediation is on the current owner of a contaminated land, the owner or operator of the site at time of disposal of the waste causing contamination, the person who arranged for the disposal of the waste or the person who transported the waste to	Any person who as owner or lessee or in any other capacity has the custody of the land in which contamination has occurred is held liable for reporting the contamination.	The NSW CLM act defines liability for any person who the EPA reasonably suspects to be responsible for contamination, the owner of the land, the notional owner of the land, or a person who carried out activities on the land that generate contaminants or	The Federal Soil protection act describes the obligation of the polluter (to prevent hazards) along with identification of responsible persons. The responsible persons identified are polluter or owner or occupier.	“Duty of care principle” of Soil Protection Act-the industry permit holder is liable to clean up the soil pollution (duty to cleanup) he has caused and is liable for the cost of restoring the soil quality to the baseline standards	The “polluter’s pay” principle is an integral part of Romania’s environment law. As described above, liability for remedy of any environmental damage, as per Romanian environmental law, is upon the polluters. The liability can be shared

USA	Canada	Australia	Germany	Netherlands	Romania
the selected site. The USA also imposes "joint and several liability," meaning that either any one responsible party, or group of parties, can be held liable for the complete cleanup costs. For a scenario where it is not possible identify a single party the legislation in USA states that one party may be held responsible until the liable party points out other responsible parties.		generate substances that may convert into contaminants after reaction with the land. Where there are instances of a private owner, owning a contaminated land but who may not be responsible for contamination directly, the NSW legislation on liability to the owner of the land may be reviewed for its applicability.			or joint based upon the traceability of identity of one or more polluters
<i>Orphan sites</i>					
EPA cleans up orphan sites when potentially responsible parties cannot be identified or located, or when they fail to act, although there is a provision for them to recover the cost in the event that a responsible party is identified.	Under the legal framework in Canada, funds from Federal Contaminated Sites Action Plan (FCSAP) are used for federal orphaned sites.	In situations where the responsible party is unable to pay for remediation due to insolvency, the liability hierarchy points to the security holder of the land to be liable to pay for such remediation.	The soil protection act of Germany mandates that the state government is liable to pay for remediation in case of an orphan site.	Does not clarify on remediation procedures (financing, land entry etc) to be followed for an orphan site	Romanian legislation clarifies that when a polluter or polluters are not identifiable the cost of remediation should come from the Government Fund.
Quantification of liability, in terms of natural resource accounting, NPV or following other economic principles					
Liability under	Not explicitly	Not explicitly	Liability includes a) cost	For industrial polluters,	Not explicitly

USA	Canada	Australia	Germany	Netherlands	Romania
<p>superfund has the following components – a) cost of performing cleanup b) cost of health assessments c) Government cleanup cost d) damage to natural resources (like fishery)</p>	<p>mentioned in the financial framework</p>	<p>mentioned in the financial framework</p>	<p>of risk assessment b) investigation c) remediation plan and d) remediation. For several liable parties the extent of the compensation to be provided, shall depend on the extent to which the hazard or damage was caused primarily by one party or the other</p>	<p>the Decree on Financial Guarantee [Bulletin of Acts, Orders and Decrees, April 15 2003] estimated clean-up costs at € 22500 for the soil to be restored to baseline (investigation) and soil standards at the very latest of 4 years.</p>	<p>mentioned in the financial framework</p>
<p>Authority for entry into site for assessment and to take over control of the land to execute remediation activity</p>					
<p>SARA explicitly grants EPA the authority to enter private property for site investigation and clean up purposes.</p>	<p>Provisions of access to land under EQA state that an owner or lessee or any other person who has the custody of the land, shall give free access to the land at any reasonable time to any person required to perform a characterization study or risk assessment and impact assessment or to implement a rehabilitation plan, subject, to that person restoring the premises to their former state</p>	<p>CLM Act explicitly grants the EPA the authority to enter a private property for site investigation and clean up purposes and also elaborates EPA’s authorities in case of objection to land entry by the owner/occupier</p>	<p>Though the Soil Protection Act authorizes the state governments to issue orders for site investigation in case contamination beyond trigger values, it does not explicitly mention the land entry authorities in case of urgent site remediation/investigation need to be carried out in a private land.</p>	<p>Does not clarify on empowerment of "access to land" or "land acquisition" by the authorities remediation purposes for an orphan site where no owner is identified</p>	<p>Does not clarify on "land entry" for remediation purposes of a private owned land or orphan land</p>

USA	Canada	Australia	Germany	Netherlands	Romania
	and compensating the owner or custodian of the land, as the case may be, for any damage.				
Remediation standards and their use in determining feasibility in remediation and determining subsequent land use					
The US regulations allow for remediation standards based on future land-use (residential/industrial/recreational).	Canadian Soil Quality Standards, 1997 provide threshold level of pollutants such as Arsenic, Benzene, Copper, and Lead and others for determination of contamination of soil. As per the legal framework, Each Canadian province and territory is responsible for the development of their own remediation criteria and guidelines for contaminated site management, as well as the procedures for site-specific risk assessment implementation as per the 1997 guidelines	Site auditors accredited by the provincial EPAs approve remediation criteria and certify land use after the remediation. The EPA administers the NSW site auditor scheme under Part 4 of the CLM act, makes or approves guidelines for use in the assessment and remediation of contaminated sites.	The German soil protection ordinance provides with three types of values for soil contamination, trigger values which, if exceeded, shall mean that investigation is required. Action values which if exceeded mean that measures are remediation required (action values), and precautionary values which if exceeded, shall mean there is reason that concern for a harmful soil change exists.	The Netherland's act has criteria for decision for extent of clean up required, serious and non-serious contamination, urgent and non-urgent remediation based on the location of the industrial activities; data about the stratification of the soil and the geo-hydrology and data about the mobility, solubility and volatility of used or stored substances.	No Specific remediation standards.
Key agency or institutions for remediation including federal and state level authorities and responsibilities					
The lead agency responsible for the implementation of the	The principle agency responsible for implementing Canada's	In Australia provincials EPAs have jurisdictions over remediation within	The implementation of remediation including allocation of liability in	The main responsibilities to conduct the necessary	At present authorities responsible for environmental

USA	Canada	Australia	Germany	Netherlands	Romania
<p>Superfund Program is the Environmental Protection Agency. In addition, the individual states possess a department that is responsible for environmental quality protection and management. The EPA Organizational Structure consists of a series of departments at the headquarters in Washington DC, and 10 regional offices spread across the country that have a mandate for enforcement as well as setting standards and guidance documents.</p>	<p>environmental regulations is Environment Canada or MEF. The Canadian mechanism uses Environment Canada as the oversight body, with other departments such as Public Works, Health and Fisheries in advisory capacity so that a broad range of subject matter experts are available to support the process.</p>	<p>each province. In NSW, the management of contaminated land is shared by the Environment Protection Authority (EPA), the Department of Planning and Infrastructure and planning consent authorities (usually local councils).</p>	<p>Germany is within the state authorities' control which may be state-specific. Environmental ministries in the state are one of the key institutions in the framework. One of the highlights of the German institutional framework however is the creation of a Soil Protection Commission whose main objectives was raising public awareness of soil issues and creates groundwork for strengthened soil protection policies.</p>	<p>clean-ups rest on the Provinces and Local Authorities, whereas the central government is responsible for the legal framework and its supervision. Central Government takes financial decisions on policies to be adopted, Ministry of Housing, Spatial Planning and the Environment looks at designing and enforcing policies, Ministry of Economic Affairs operationalizes the policies. Municipalities, District Water Boards and Provinces have responsibility for implementation of duties and powers.</p>	<p>protection are: (I) Ministry of Environment and Forests (II) National Agency for Environment Protection; (III) regional environmental protection agencies; (IV) county environmental protection agencies and (V) Environmental National Guard for control. Specific institutional framework for remediation is yet to be developed.</p>
<p>Financial mechanisms for remediation, redevelopment of land including incentives such as Brownfield redevelopment programmes.</p>					
<p><u>Non Orphan Sites</u></p>					
<p>The financial mechanism for remediation of contaminated sites in the US is designed</p>	<p>Canada has formed a Federal Contaminated Sites Action Plan (FCSAP) which is a \$3.5 billion 15 year cost</p>	<p>The CLM act clearly defines financial liability in several possible scenarios. A private owner owning a</p>	<p>In Germany the federal state's environment authorities have the authority to recover costs from the polluter</p>	<p>Financing will be done by the polluter, which means the polluters pay principle is applied, in general. But, If the</p>	<p>The Environmental Fund of Romania had been set up by Law no. 73 in 2000, as a special fund, outside the budget</p>

USA	Canada	Australia	Germany	Netherlands	Romania
<p>based on cost recovery or cash out agreements with potentially responsible parties. Approximately 70% of clean up has been through responsible parties paying.</p>	<p>sharing program for remediation of contaminated sites. The FCSAP operates on a cost-shared basis with custodians where funding is available on specified sharing principles between the FCSAP and the custodian.</p>	<p>private and significantly contaminated land. In case of multiple responsible parties, liability of cost recovery depends on the proportion of responsibility of each person for the significant contamination and the reasonable cost of any steps taken by each person in respect of managing the significant contamination.</p>	<p>or the responsible persons.</p>	<p>person responsible for the clean-up is insolvent, public funding can be made available, which represents an advance payment, which has to be recovered.</p>	<p>to meet the objectives as set out by the National Waste Management Strategy. The sources of income of the fund are the amounts cashed as taxes by the environmental protection central authority for issuing the environment agreements and authorizations, exploiting the natural resources, polluting the atmosphere, the surface and subterranean waters, the soil and vegetation, taxes paid by traders for wasting the packages that could be recovered; taxes for storing wastes on lands; taxes for wasting burnt mineral oils; taxes for trading fast moving goods; taxes paid by the suppliers for not providing replacement parts in order to allow some products to function according to</p>

USA	Canada	Australia	Germany	Netherlands	Romania
					their life span; taxes for activities generating noise pollution etc.
<u>Orphan Sites</u>					
A trust fund of \$8.5 billion to be used in case orphan sites where no potentially responsible parties are identified or if they fail to pay for the remediation work. When the party is unable to be traced or unable to fund the clean up then the costs were recovered through industry taxes or general tax-payers revenues.	No specific mention of orphan sites.	For orphan sites, the notional owner/lessee of land is liable to pay for remediation whether or not they are responsible for contamination. Parties who are not responsible may recover the cost from the responsible parties if they are identified.	Federal states are liable for financing clean up of orphan sites. Some federal states have special funds or tax systems to finance orphan sites.	In case of orphan sites the cost of the site cleanup is borne by government by public funding.	No clear financial mechanism described for orphan sites.
Institutional authority and responsibilities for monitoring of sites post the rehabilitation activity					
In Superfund and Brownfield programs, EPA works with communities and partners (such as land developers) for safe and productive use without adversely affecting the remedy.	Section IV.2.1 of the EQA aims to contribute to sanitation and safe reuse of land, given that contaminated soils accepted in a transfer must be sent in a treatment for decontamination and soil stored in places of	Not explicitly mentioned in the institutional framework	Contaminated sites and sites suspected of being contaminated shall be subject to monitoring by the competent authority. The competent authority may require obligated parties to carry out self-monitoring measures,	Post remediation evaluation and final decision on remediation result is taken by the competent authority (municipalities, district water boards). The framework does not explicitly talk about arrangements for post	Not explicitly mentioned in the institutional framework

Tabular summary of international practices

USA	Canada	Australia	Germany	Netherlands	Romania
	<p>temporary storage should be harnessed. The target audience includes companies operating a transfer of contaminated soils, companies that want to establish or change a transfer of contaminated soils, companies that have to have contaminated soil and companies specializing in excavation of soils.</p>		<p>especially soil and water investigations and installation and operation of measuring stations. The results of such parties' self-monitoring measures shall be recorded and kept on file for five years.</p>	<p>remediation monitoring.</p>	

CHAPTER 3 Analysis and Conclusion

This chapter provides a summary of findings in against the rehabilitation framework and compares the Indian and international practices that are or can be utilized in the NPRPS going forward. Specific aspects of international practices that may be used in India are also mentioned.

14. Gap analysis on step-wise rehabilitation framework

In the table on subsequent page puts forward a detailed analysis of policy/ regulations, institutional and financing requirements for each of 14 steps of rehabilitation framework. The key findings for each step are as below:

Step-1: Identification of probably contaminated sites

The NPRPS shall be launched along with an initial exercise to prepare an inventory of polluted sites in India. The consultants preparing this inventory are also developing the procedure for identification and confirmation of pollution at a site. Going forward, this procedure and its associated guidelines and standards may be used for identification of new polluted sites. At this time, exercise to prepare the inventory is targeted at conducting an extensive study in a short period of time. Therefore, the procedure may need to be fine tuned to suit the needs of an ongoing program.

From a regulatory perspective suitable authority to institutions has been provided (under various Acts), that they may enter sites and conduct investigations to determine the presence of contamination. However there is no mandate or responsibility directed to institutions such as the SPCB or the CPCB to actively seek out and identify polluted sites or take a particular action whenever they become aware of presence of contamination at a site. India however has several sets of stakeholders who are directly or indirectly impacted by pollution at a site. These include citizens, local government, water, agricultural, health and environment departments. Apart from these there are large government land holders such as the NHAI, Airports Authority, Ports and Harbours Authority, Railways, Defence etc. The procedure to identify hitherto unknown polluted sites must at various levels seek to involve these stake-holding parties and the large land holders. This kind of involvement is clearly seen in the programmes of the USA.

Another important point related to identification is the use of screening levels. This is a feature of the German framework and helps to set initial priorities where necessary thus bringing a level of efficiency in the identification step.

Our preliminary analysis suggests that, ongoing identification activities may not involve intensive efforts since we are launching the program with an initial inventory. However there would be need to issue directives to formalize an identification process and set responsibilities among the CPCB and the SPCBs/UTPCCs.

Step 2: Preliminary Assessment/Site Inspection-Investigations

A key gap between the Indian practices and the international programs is that in India while the authority to enter sites and take samples for analysis is adequately provided for under the statues , there is no clear definition on whether there is a mandate to do so. Unless a mandate is present, this activity is not budgeted as a part of the activities of the specific regulatory boards for the year and therefore does not receive the necessary priority in terms of execution.

Both Indian and International practices do not rely on in-house technical capabilities of enforcement institutions for assessment related activities. While very primary assessment may take place through these institutions and their laboratories, more specific assessment is tendered out. In Australia under CLM, the EPA agency may direct the occupier to undertake assessment and provide a report to the EPA. The occupier in turn reaches out to firms with technical expertise. In India the market for firms with such technical expertise is not as open and well developed as in the countries studied.

In India, currently assessment related activities for contaminated sites are being tendered out to international firms. For this step capacity building initiatives in terms of infrastructure development at SPCBs, technical expertise of the local firms must need to address the constraints of administration to ensure effectiveness.

Step 3: Notify, delineate the polluted sites, issue moratorium and fix the liability

Indian regulations provide multiple avenues for notification of polluted sites. There have been examples where this has been done in the past such as for the critically polluted industrial sites. The delegated legislation built into the Environment (Protection) Act may be utilized to create a special notification for polluted sites. As mentioned earlier in this report, the sites may be categorised and covered under a summary notification that applies to the category.

International programmes also put notifications onto the land record. There are several advantages to this, which also include the ability to make notification unambiguous, enforce restricted use covenants and to track the changes in land ownership for cost recovery purposes. In India, wherever land records are readily available, local government can be involved in the programme to update the necessary comments to notify land in the 7/12 extract. In other cases the overheads may not justify this.

International practices provide several methods for identifying liability as mentioned above. If the Hazardous Waste Rules, various municipal laws, and other environment legislation are to be taken as precedence, then the liability is usually placed on the occupier or the owner of the contaminated land. Existing mechanisms of assigning liability rely greatly on the judicial system, where the liable party, extent of liability and nature of compensation are all determined by the court or tribunal. This process does not take care of orphan sites, where the litigant may be an affected party or an NGO on behalf of the affected party. Assignment of liability under the NPRPS shall require the support of a legal cell, with necessary staff and resources to be able to pursue potentially liable parties for each case through the judicial process. While it will be possible to develop for the NPRPS a framework to determine the liable parties, it is unlikely that the assignment and confirmation of liability can be accomplished without judicial intervention. A specific procedure to approach the NGT may be required. International practices however provide options to the managing entity to issue an administrative order to the liable party or entering into a contractual agreement with the liable party to conduct remediation or to pay up the costs (to be) incurred before taking a judicial recourse. Judiciary will need a reference to method of calculation and estimation in a statute and will require that in case of NPRPS, any thresholds set by any act becomes null and void. Otherwise, they may be constrained to interpret the act over the program/administrative order. Perhaps, this will require an amendment in the Environment Protection Act.

Step 4: National Priorities List (NPL) Site Listing Process

The inventory creation study would result in collecting various parameters of importance for each polluted site. These parameters may be used with appropriate weight age to arrive at a priority

score. In addition to the scoring process, the NPRPS managing body may receive regular inputs from SPCB, state and central health departments for immediate remediation requirement due to acute health outbreaks, other state priorities. This is in line with some of the international programmes where both technical parameters and stakeholder inputs are used in determining priority.

It is envisaged that only a national priorities list would need to be maintained for India. The CPCB or another central authority under the ministry may manage the list. This most likely be integrated with the database being provided by the inventory study, and will have the ability to publish information that is to be shared with various other institutions and the public through electronic means such as website.

Step 5: Remedial Investigation/Detailed DPR

In the Indian context as well as in the international context, the preparation of the DPR for rehabilitation takes into account various other factors apart from technical and financial feasibility in the development of options. These include liaison with local community and government to determine social costs, compensation and setting of end goals using a consensus. Institutions such as the SPCB and CPCB have demonstrated the experience in coordinating the various activities related to DPR preparation. The basic engineering and technical activities, however, have almost always been outsourced to third parties, most often international consortiums.

Capability development at state level agencies is a key need for effective scoping, tendering of engineering work related to DPR preparation to third parties. As in other countries, it is expected that this will further develop the market for third parties offering DPR preparation services.

State level agencies also need special cells that would be able to assess and approve the work done by the third parties. This is necessary to be able to engage the other stakeholders involved in the rehabilitation of the site and to get a consensus on the remediation option to move forward with. Legal authority currently extends to entering a site for the purpose of inspection and taking samples. DPR preparation may require extensive engineering work at the site, including the drilling of wells, therefore control of the land may be necessary. International practices show that getting control of land for the DPR related activities is often with the prior consent of the occupier/owner. The manner in which subsequent liability is placed on the parties ensures that the consent is either available or the occupier/owner is ready to conduct the remedial investigation on their own.

For India, we would need to develop the process where the local government is approached for permission to take control of the site for remedial investigations, DPR preparation and remedial actions. Directions from the local government would then be binding on the owner/occupier. It is envisaged that the cost of the DPR preparation shall be included in the overall cost of remediation and shall be recoverable from the liable party. This is true of international practices too.

Step 6: Detailed Cost, Plan and responsibility analysis: based on the DPR output

In the absence of any specific legislation on the topic, guidelines will need to be developed that define the setting of remediation goals based on various factors such as technical feasibility, estimated costs, budget, time, social and economic factors such as ownership, occupancy and land use (previous and future planned land use), and risks to health and environment. Administrative order to authorize and initiate work according to the plan and the assignment of responsibilities is a mechanism found in the USA programme. On similar lines, administrative orders from local government in India may be required to authorize the next step of rehabilitation. This is important because in some cases the delineation prepared earlier may need to be expanded and buffer zones

introduced, that may require temporary resettlement of inhabitants or cessation of livelihood activities. Such cases would need to be authorized while adhering to the legal statutes related to resettlement and rehabilitation. From the cases studied for India, it is evident that responsibilities may lie or may be made to lie on other institutions such as the agricultural departments, water board, development board etc. Implementation of this step in the program will need to consider these responsibilities too.

Step 7: Funding requirement identification: availability/generation of the funds

International practices demonstrate that funding can come from three sources:

- 1) the polluter pays principle;
- 2) government funds that may have been raised through specific taxes; and
- 3) re-development incentives.

All these three methods find reference in the national policy of India. It is important to note that a mix of these mechanisms would be required to ensure that both orphan and non-orphan sites are addressed. Securing of funds may not necessarily mean a pre-payment by the liable party. Mechanism such as signing an agreement to pay, transfer of liability or placing on lien are useful approaches used internationally that allow for the rehabilitation process to continue using liquid funds available to the program. (Where there is a low risk that the party will default on payment eventually). Also provisions for increase in insurance limit for coverage of liability under different Public Liability Insurance Act may also be looked at.

International programmes have been built around a corpus of initial funding to launch the program and have been designed to extract maximum funding through the polluter pays principle.

Step 8: Remedial Design/Remedial Action

This step is expected to be fully covered by the parallel study on development of guidelines. From an administrative perspective, a process of approval may need to be developed for the state level institutions such as the SPCBs. This is to ensure that the design accurately corresponds to the finally selected option, and a detailed plan for the physical cleanup has been prepared with cognisance of risks and constraints. It may also be required to accredit third parties for their skill, capability and expertise related to this activity.

Step 9: Construction Completion. Complete Physical Clean-up

It is found that based on the technical nature of this activity, most international programmes only coordinate this activity while it is completed on ground by accredited third parties. This is also true of the design activity mentioned in step 8. In most cases the party undertaking the design activity also executes the physical cleanup of the site.

Specific guidelines being developed under a parallel study will be used for this activity. During the period when the physical clean up is being conducted, there will be maximum disruption at the site and multiple stakeholders will be effective. A state level institution such as the SPCB would need to coordinate this activity and manage stakeholder and community relations throughout. The responsible parties identified in step 6 would also be engaged and their contribution directed towards the rehabilitation activities as per the rehabilitation plan.

Monitoring of progress, deviations, changes in scope due to new findings and cost overruns would also need to be managed by the NPRPS at the state level.

Step 10: Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse

This step is of extreme importance in the India context, since this step is aimed at ensuring that remediation actions taken place provide for the long-term protection of human health and the environment. While international practices use multi-year monitoring processes to ensure that the site does not get re-contaminated, enforcement issues in the Indian context require the NPRPS to have different approach. The program may require more frequent and multi-institution audits for the site. The international practices of using both engineering and non-engineering (institutional controls) monitoring techniques may be adopted. These and other measures will need to form a part of the monitoring plan. Conditions for land-reuse may have changed from what was originally planned for rehabilitation. In India, it will remain the responsibility of the local government to determine the final use mode of the land and to issue the necessary directions to the parties involved. This can be expected to be done based on technical recommendation by the NPRPS (or the state agency such as SPCB entrusted with providing this information).

Step 11: Monitoring and Evaluation

As mentioned for the previous step, monitoring of rehabilitated sites will require a comprehensive approach. It will require a specific monitoring plan to be followed as per the rehabilitation guidelines prepared. Current monitoring activities that form part of the budgeted activities of the to SPCBs and the CPCB may third parties that have the necessary technical staff and laboratory facilities.

Step 12: Recover Costs

Cost recovery is an important aspect for financial sustainability of the NPRPS. Most international programmes rely on cost recovery under the polluter pays principle to keep the program ongoing. Current statutes in India clearly indicate that the costs of rehabilitation may be recovered from the responsible party and also provide for interest payment.

The Environment (Protection) Act provides for the costs to be recovered as arrears to land revenue or public demand. Various steps in the process require financing; this includes the costs of litigation too. As in international programmes, the cost recovery module shall require the attempt to recover all the costs associated with rehabilitation from the responsible party.

Step 13: State and National Priorities List Deletion

This is an important step marking successful completion of remediation cycle. In India, the remediation framework is at a nascent stage and hence this step is not introduced as yet. But in international practices this step help to maintain and manage the priority list so that it does get infinitely long over the years. This also helps to monitor successful application of a remediation programme.

This step should be considered under NPRPS to serve the same purpose.

Step 14: Site Reuse/ Redevelopment

As stated above, in India the remediation framework is at a nascent stage and hence this step is not introduced as yet. But in international practices, especially in USA both superfund and brown field programmes have well structured procedure for site redevelopment. Appropriate reuse of these sites can allow the community to regain lost land as valuable open space; add recreational amenities or commercial property; prevent sites from becoming targets for midnight dumping,

vandalism, and destructive trespassing; remove any lingering disincentives associated with vacant sites; and increase values of surrounding property and augment the tax base.

EPA in USA developed the Return to Use (RTU) Initiative. The RTU Initiative is designed to remove barriers to appropriate reuse at those Superfund sites where construction of the cleanup remedy has been completed. Barriers to appropriate reuse include: lack of understandable information about the site; stigma of being a Superfund site; liability concerns; site ownership issues; and lack of clear information regarding what uses might be appropriate for the site. As part of the RTU Initiative, EPA, for example provides the public with site reuse profiles, information sheets, and assessments; works with surrounding communities to establish processes for determining appropriate reuses; supplies information to potential purchasers; and determines technical needs to properly design and reuse the site.

Table 28: Analysis and Conclusion Matrix:

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
1. Identification of probably contaminated sites					
<p>There is no legally mandated procedure for identifying polluted sites and submitting their details for further investigation to authorities.</p> <p>There is no legally mandated institution to prepare and maintain a list. The SPCB however is required to investigate suspected cases of violation of the Hazardous Waste Rules (schedule 4), the Air Act (section 24,25,26,27), the Water Act (section 20, 21, 22, 23), Schedule II of the Hazardous Waste Rules provides a list of contaminants and the concentration at which the risk they pose is considered hazardous.</p> <p>The CEPI is a calculated pollution index used to rank sites according to level of risk present due to pollution. (CEPI is not part of legal statutes but based on the CEPI values the CPCB has been able to use its legal powers to issue a moratorium on critically polluted industrial clusters). Both these sets of criteria</p>	<p>Currently any party/media reports may bring to attention of the SPCBs a polluted site that is causing them hardship in the form of a complaint. The complaint may also be raised by or through other authorities such as health department, industrial development corporation, or local government. When this information is provided in the form of a complaint, the SPCB treats them as suspected cases of non-compliance with Hazardous Waste Rules, the Air Act, Water Act. This result of the investigation is maintained on a case by case basis and not as a list.</p> <p>The CPCB is also required by law to monitor compliance and coordinate with SPCBs.</p> <p>No legal powers are provided to any institution to declare a site as probably contaminated or declaring a site as not contaminated for stopping further investigation.</p> <p>Under Section 3.3 of EPA the ministry can issue a notification and set up authority to deal with specific issues (environmental damages, coastal rehabilitation, eco fragile, forestry issues), the authorities can have independent power.</p>	<p>Addressing these complaints is part of the existing mandate of the CPCB and financing for the same is covered under the existing budget. However both the staff and the laboratory facilities of several SPCBs face shortages and complaints while recorded, take time to get investigated.</p>	<p>In USA sites are discovered by regional EPA offices, state agencies, and citizens who file a Preliminary Assessment (PA) petition to EPA. Section 105(d) of SARA established the PA petition as a formal mechanism for citizens to report potential hazardous waste sites to EPA. Whenever a petition is received, it enters into EPA's computerized inventory of potential hazardous waste sites. EPA then performs PA and then if required further Site Inspection(SI) to determine if the site is to be included in the National Priority List (NPL). According to Part 5, Section 60 of the Australian Contaminated Land Management (CLM) act, "Duty to report contamination" - The Act requires land owners and persons who carry on contaminating activities to notify the Environment Protection Authority (EPA) of the contamination of land. If they fail to do so a penalty will be imposed.</p> <p>Section 31.52 a of the Canadian Environmental Quality Act (EQA) mandates an owner/lessee/anyone who has the custody of the land/owner of the neighbouring land on being informed of the</p>	<p>Institutional structure under CERCLA mandates citizens, state agencies and EPA regional offices to notify EPA through PA petition.</p> <p>Similarly CLM act institutionalizes notification process in Australia.</p> <p>EQA in Canada mandates owner/lessee/owner of neighbouring land to notify the Minister of Environment. Under the regulatory framework in US, EPA maintains comprehensive list of probably contaminated site before PA and SI and the NPL after PA and SI. In US, EPA is authorized by the legal framework to carry out PA, decide upon its inclusion in the NPL and to notify the site of its decision, to publish the sites for public awareness and comments.</p> <p>In Australia also, the institutional authority of declaring a land contaminated is defined</p>	<p>In international practices financing for all steps are covered through cost recovery, cash out agreements with responsible parties or funded through a dedicated fund.</p>

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
<p>require sampling at the site. A set of general criteria to be obtained through physical inspection, records review and local consultations is not available</p>	<p>Under the Hazardous Waste Rules the CPCB is the authority to: - Recommend standards for treatment, disposal of waste, leachate and specifications of materials. - Recommend procedures for characterization of hazardous waste.</p>		<p>presence of the contaminants exceeding the limits of the land or of a serious risk of off-site contamination to give immediate notice in writing to the owner of the neighbouring land concerned and copy of the notice must also be transmitted to the Minister for Environment.</p> <p>As per sections 31.33, 31. 43, 31.51 of EQA a person or municipality that has or has had custody of the land as owner or lessee or in any other capacity, A person who permanently ceases an industrial or commercial activity, Any person intending to change the use of land where an industrial or commercial activity of a category designated by regulation of the Government has been carried on is liable to clean up and submit a rehabilitation plan to the Minister of Environment.</p> <p>CERCLA Eligibility criteria for screening- The criteria cover variety of substances identified in specific sections of the Federal Water Pollution Control Act, the Solid Waste Disposal Act, the Clean Air Act, and the Toxic Substances Control Act, along with any other substance that EPA may designate.</p> <p>Article 8 of the German Soil Protection Act provides trigger values, action values and precautionary values of soil</p>	<p>under the CLM act. In Germany, the state government is authorized to conduct Risk Assessment to decide if the land requires further investigation/clean up and accordingly issue an order on immediate responsible parties. As per CERCLA, EPA (its contractors, regional offices) conducts PA and applies CERCLA eligibility criteria to screen sites.</p>	

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>contamination to determine if further investigation is required or if clean up measure is required or if it is a real concern and clean up measure is required urgently.</p> <p>Section 29 of Dutch Soil Protection Act provides criteria for "serious" and "non-serious" contamination based on detailed soil survey Section 37 includes criteria for urgent and non-urgent site remediation based on location specific current and future land use.</p>		
2. Preliminary Assessment/Site Inspection-Investigations					
<p>Under the Environment Protection Act the central government has the power to make rules (Chapter II, (3), (2)) that include the procedure to take samples and conduct an assessment of the site. Rules have been set up for hazardous waste management on these lines</p> <p>Under the EPA (section 11), the Air Act (section 24) and the Water Act (section 23), the government has the authority to enter any place for the purpose of assessment and take samples for analysis. (There are 63 officers identified under various acts that can enter a site)</p>	<p>The Environment (Protection) Act also gives the central government the authority to decide which institution (Chapter II, (3), (2), (x), (xi)) will carry out assessment of the site. Currently several SPCBs are outsourcing the assessment work to private laboratories due to shortage of manpower and lab facilities. The CBCB has also accredited private laboratories for the purpose.</p> <p>Both the SPCB and the CPCB have the authority and mandate for entering a site. The EPA authorizes the central government to accredit private laboratories to carry out the assessment.</p> <p>Karnataka SPCB and Haryana SPCB have indicated that they have used external laboratories and</p>	<p>The assessment is initially financed by the SPCBs. When more evidence is available to identify responsible parties, the SPCB issues notices to the responsible party, and demand that they undertake the cost of cleanup including the cost of assessments.</p> <p>The central government is authorized to fix the fees for assessment services as required of external laboratories by law under the EPA.</p>	<p>In USA Superfund programme, CERCLA section 105 provides authority to EPA (or its contractors) to perform PA and/or SI to determine if a site is to be included in NPL. The scope and timeline of the PA is defined in Section 420 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) that CERCLA refers. (NCP. Section 02 of EPA document No.EPA/540/G-91/013; "Guidance for Performing Preliminary Assessments Under CERCLA")</p> <p>As per Section 104(e) (1) of SARA explicitly grants EPA the authority to enter property to conduct investigations, studies, and also cleanups.</p> <p>In Australia, Part 3 Division 1</p>	<p>In US, EPA is authorized by the legal framework to carry out PA, decide upon its inclusion in the NPL.EPA may use the state/regional offices to carry out the work or may subcontract the work.</p> <p>In Australia also, the institutional authority is attributed to EPA under the CLM act.EPA is authorized under SARA to enter a land in USA.</p> <p>Any person authorized by the Minister of Environment in Canada is authorized to enter a land for investigation or clean up.</p> <p>CLM act does not delegate</p>	<p>In USA, costing of PA is covered under trust fund allotted under the superfund programme. As per CERCLA section 107 this cost can be recovered afterwards from the identified responsible party.</p>

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
<p>Under the EPA the central government shall create the procedure for assessment, and the content of the report for investigations and assessments. (Chapter II)</p> <p>The SPCB may identify that a violation of the hazardous waste rules has taken place, however there is no legal authority to allow them to declare whether the site is contaminated or not.</p>	<p>agencies to conduct assessments.</p>		<p>Section 10 “Preliminary investigation of land” of the Australian CLM Act provides EPA the authority to issue preliminary investigation orders to an owner, a notional owner, a suspect, an industry, a public authority (local govt, municipality). Section 32 of the CLM act states that any entity/person authorized by EPA can enter a land under this section only if he has permission from the land occupier. If the occupier refuses entry then EPA would issue an order on the occupier to carry out the requirements under the order and the occupier may recover this cost if found appropriate under part 3 division 6 of the Act.</p> <p>Section 31.63 of EQA in Canada explicitly grants any person authorized by the Minister of Environment under this Act to enter private property for site investigation and clean up purposes.</p>	<p>power to EPA, it depends on occupier's permission Both in USA and Australia, the institutional structure is defined in the legal framework.</p>	
<p>3. Notify, delineate the polluted sites, issue moratorium and fix the liability</p>					
<p>Notification: Under the EPA the central government may issue a notification restrict activities at a particular location. The CRZ notification is under the powers of the EPA. The central government may also restrict activity at a site for a</p>	<p>There is no need for individual notification by any institution, as the categorization of the land will occur by order of the local government responsible for maintaining land records. Pursuant to falling under one of the categories or pollution status the notification would automatically</p>	<p>The National Green Tribunal awards punishment to those failing to comply with its order or decision. An individual may be punished with a fine which may extend to INR 10 Crore and INR</p>	<p>As per Section 105(a) (8) (B) of CERCLA, EPA publishes notices to notify the public of sites EPA believes warrant further investigation. The public has the opportunity to comment on the EPA's proposed addition of sites (New Proposed NPL Sites) to the National Priorities List (NPL). The</p>	<p>As per institutional structure under CERCLA, EPA informs the public through federal register notices that are accessed through web-link.</p> <p>In Canada, the entity conducting the site</p>	<p>CERCLA section 104, 106 - financing options are: cash out, cost recovery, penalties if PRPs fail to meet agreements</p> <p>Orphaned site- Trust fund under Superfund programme from taxes paid</p>

Policy, regulations	India		Relevant International Parallel		
	Institutional	Financing	Regulatory	Institutional	Financing
<p>specified period towards pollution abatement or mitigation.</p> <p>Liability: The NEP talks about liability. Under the Hazardous Waste rules (section 16) the occupier, transporter and operator shall be liable for damages caused to the environment resulting due to improper handling and disposal of hazardous waste.</p> <p>Under the EPA the expenses incurred by an agency toward remedial measures may be recovered from the person responsible for the pollution (Section 9).</p> <p>NGT Section 15 -" The Tribunal may, by an order, provide compensation (a) relief and compensation to the victims of pollution and other environmental and restitution. damage arising under the enactments specified in the Schedule I (including accident occurring while handling any hazardous substance); (b) for restitution of property damaged; (c) for restitution of the environment for such area or areas, as the Tribunal may think fit"</p> <p>NGT Section 20. " The</p>	<p>apply.</p> <p>As of now the notifications are published in the official gazette or as in the case of CEPI as office memorandums. The CRZ notifications are in the form of a general notification to the state agencies with the criteria of what must be included in the CRZ</p>	<p>25,000/- a day for continuing default and/ or imprisonment which may extend to 3 years. The fine payable by Companies may extend to INR 25 crore and INR 1 lakh a day in case of continuing default.</p>	<p>EPA also publishes notices in the Federal Register, listing which sites are being proposed to the NPL. The document that forms the basis for the Agency's evaluation and scoring of the sites are contained in public Dockets located at the EPA Headquarters in Washington, DC, in the Regional offices and by electronic access at Regulations.gov (http://www.regulations.gov). The NPL notices do not describe releases in precise geographical terms.</p> <p>As per Canadian EQA Section 31.58, where a characterization study performed pursuant to the Act reveals the presence in land of contaminants in a concentration exceeding the regulatory limit values, the person or entity who had the study performed shall apply for registration in the land register through a notice of contamination. The notice of contamination must contain, in addition to a description of the land, the name and address of the applicant for registration of the notice and of the owner of the land, the name of the municipality in which the land is situated and the land use authorized by the zoning by-laws; and a summary of the characterization study.</p> <p>Assigning Liability: As per Section 104 of CERCLA-EPA can do short</p>	<p>assessment (municipality, individual entities) need to apply to Ministry of Environment for registration of the land as contaminated in the land register.</p>	<p>by chemical, petrochemical industries</p>

Policy, regulations	India		Relevant International Parallel		
	Institutional	Financing	Regulatory	Institutional	Financing
<p>Tribunal shall, while passing any order or decision or award, apply the principles of sustainable development, the precautionary principle and the polluter pays principle"</p> <p>The Civil Liability for Nuclear Damage Act, 2010, holds the operator of a nuclear installation liable on the basis of no fault liability.</p> <p>After the enactment of The Environment (Protection) Act, 1986, the affected party cannot prosecute the polluter directly. As per the act, the petitioner's case is against the regulator (in this case it is the SPCB or CPCB) who is responsible for maintaining the wholesomeness of the environment of the area.</p> <p>Under the Indian Forest Act, 1927, there are certain activities that are prohibited within the areas of reserved forests. Notification or registration of a land as contaminated may be carried out in line with section 2, 7/12 of forest conservation act.</p>			<p>or long-term cleanups at a site and later recover cleanup costs from potentially responsible parties (PRPs)</p> <p>As per Section 106 of CERCLA-EPA can order, or ask a court to order, PRPs to clean up the site when an imminent or substantial endangerment may exist.</p> <p>As per Section 107 of CERCLA-a person, including a local government, may be considered a PRP if the person is the current owner or operator of the contaminated property; CERCLA section 107(a) (1), Owned or operated the property at the time of the disposal of the hazardous substance; CERCLA section 107(a) (2) Arranged for the hazardous substances to be disposed of or treated, or transported for disposal or treatment; CERCLA section 107(a) (3) or Transported the hazardous substances to the property. CERCLA section 107(a) (1) Retroactive, joint and strict liability- Parties may be held liable for acts that happened before Superfund's enactment in 1980., Any one potentially responsible party (PRP) may be held liable for the entire cleanup of the site (when the harm caused by multiple parties cannot be separated). A PRP cannot simply say that it was not negligent or that it was operating according to industry</p>		

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			standards. If a PRP sent some amount of the hazardous waste found at the site, that party is liable.		
4. National Priorities List (NPL) Site Listing Process					
There is no existing procedure of listing and prioritizing of sites mandated under the Indian regulatory framework.	Prioritization has been conducted on the basis of the CEPI guidelines, which has led to the list of critically polluted industrial clusters. Apart from this the SPCBs are required to maintain a list of polluted sites within their states and report the updates on an annual basis.	No financial implication is involved specific to this step.	As per CERCLA section 105, EPA needs to apply HRS to score a site. The cut off for prioritization is HRS score 28.5 which is a RMS value of ground water, surface water, soil exposure and air pathway values from 0-100. The site with score less than 28.5 should receive a "no further remedial action planned"(NFRAP) recommendation. A NFRAP recommendation means that further action under the Federal Superfund programme is not planned. CERCLA also refers to Section 300.425(c) of the NCP by which NPL listing depends on: a) HRS score determined by EPA b) if state/territories feel it is a top priority and communicate to EPA c) Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Public Health Service has issued a health advisory that recommends removing people from the site d) if EPA feels remediation is more cost effective than removal e) if EPA feels the site poses significant threat to public health. Once a site is ranked, that is not updated.	In US authorization of prioritization of the National Level List is with EPA but they take inputs from states, territories, health depts.	No financial implication is involved specific to this step.

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>However, in USEPA, a site is deleted from the list under the following circumstances:</p> <p>Similar scoring system is there in Germany and Netherlands.</p> <p>Article 8 of the German Soil Protection Act provides trigger values, action values and precautionary values of soil contamination to determine if further investigation is required or if clean up measure is required or if it is a real concern and clean up measure is required urgently.</p> <p>Section 29 of Dutch Soil Protection Act provides criteria for "serious" and "non-serious" contamination based on detailed soil survey and Section 37 includes criteria for urgent and non-urgent site remediation based on location specific current and future land use.</p>		
5. Remedial Investigation/Detailed DPR					
<p>Currently the existing legal framework does not refer to any remedial investigation guideline that is required to be followed for DPR preparation.</p> <p>However, there are instances in the Indian legal framework that may be referred while considering the techno-economic feasibility of a remediation</p>	<p>Due to the local presence currently, all DPR work gets executed through the SPCB.</p> <p>Currently it is the SPCB that evaluates the work done by the agencies hired by them. This is done as a part of their existing procurement practices.</p>	<p>Funds for DPR are being allocated by the World Bank or the NCEF only. We found no other instances of funds being allocated for DPRs at a central level</p>	<p>EPA document-EPA/540/G-89/004 provides guidelines to conduct Feasibility Analysis and Remedial Investigation under CERCLA. The outcome of this step is Records of Decision (ROD) containing site details, characteristics, alternatives of remediation with methodology, technology and time details and the justification of the best alternative to go for approved by</p>	<p>Institutionalized through provisions of CERCLA.</p> <p>In US, EPA is authorized to enter a site with consent, authorized to issue administrative order to enter a site and seek judicial intervention if entry is not permitted.</p> <p>In Australia, the CLM Act division 6 does not authorize EPA to enter a</p>	<p>In international practices financing for all steps are covered through cost recovery, cash out agreements with responsible parties or funded through a dedicated fund.</p>

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
<p>action.</p> <p>The National Environment Policy, 2006 (NEP 2006) encourages the use of economic principles in environmental decision-making. However, in some cases, that compensation amounts and compensation awardees cannot be adequately explained or supported.</p> <p>The Supreme Court with the landmark order of 12.12.1996 expanded the definition of the forest for the purposes of the Forest (Conservation) Act, 1980 giving specific directions, which had far reaching impact in saving our forests. In this ruling the court directed that compensation be calculated on the basis of NPV (Net Present Value) of the forest as a resource.</p>			<p>EPA review board.</p> <p>Land use permission for remedial investigation under CERCLA: as per SARA section 104 e (1-5) EPA can access a private land for preliminary site investigations; removal actions; RI/FSs; and remedial actions. The Act mandates that EPA should, in the first instance, seek to obtain access through consent. Entry on consent is preferable across the full range of onsite activities. If consent is denied, EPA should use judicial process or an administrative order to gain access. The appropriate type of judicial process varies depending on the nature of the onsite activity. As per SARA where there is a "reasonable basis to believe there may be a release or threat of a release of a hazardous substance or pollutant or contaminant," courts are instructed to enforce an EPA request or order.</p> <p>In addition, a penalty not to exceed \$25,000/day may be assessed by the court for failure to comply with an EPA order or the provisions of subsection 104 (e) of SARA.</p> <p>a) Request for Consent: EPA would generally request consent for entry with basis, timeline etc.</p> <p>b) Administrative Order: If a site owner denies an EPA request/consent for access, EPA</p>	<p>land without occupier's permission. However, it authorizes EPA to revoke or suspend the order and instead make an order to which the occupier is subject as if the occupier were the appropriate person to carry out the clean up. if the occupier withholds or withdraws that permission.</p> <p>If the occupier carries out the requirements of an order, the occupier may recover costs in accordance with Division 6.</p>	

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>may issue an administrative order directing compliance with the request. § 104(e)(5)(A). Each administrative order must include a finding by the Regional Administrator that there exists a reasonable belief that there may be a release or threat of release of a hazardous substance and a description of the purpose for the entry and of the activities to be conducted and their probable duration.</p> <p>c) Court Order: The provisions in CERCLA authorizing EPA access may be enforced by court order. To obtain a court order for entry, the Region should follow the normal referral process. If only access is required, the referral package can obviously be much abbreviated. If timing is critical, EPA HQ will move expeditiously and will refer the case orally if necessary.</p> <p>Funding under CERCLA:</p> <p>a) From 1995- 2003 trust fund of size 8.5 billion dedicated for cleanup process was used- fund came as taxes on the petroleum and chemical industries, reflecting the polluter pays principle. After 2003, funding is done from Congress's general revenues. use of trust fund-30% of total spent, use of cost recovery/cash out-70% of total spent.</p> <p>b) Administrative orders/consents</p>		

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>between EPA and PRP for removal activity (short-term cleanup), investigation, and remedy design work.</p> <p>c) Administrative agreements between EPA and PRP for past cost (cost recovery) and for both past and future costs (cash out)</p> <p>d) Penalties: If PRP does not comply with the agreements, then EPA issues Unilateral Administrative Orders. If PRP fails to comply with orders then courts may assess penalties, require the PRP to pay up to three times what it cost EPA to do the cleanup (treble damages), issue a judicial order requiring cleanup.</p>		
6. Detailed Cost, Plan and responsibility analysis: based on the DPR output.					
<p>This would follow step 5 and there is no existing guideline recognized by the regulatory framework for detailed techno-economic feasibility analysis of a remediation work.</p>	<p>The CEPI index is a rational number to characterize the environmental quality at a given location following the algorithm of source; pathway and receptor have been developed. The index captures the various health dimensions of environment including air, water and land. CPCB has used this to prioritize the set of most critically polluted industrial clusters.</p>	<p>Funds for DPR are being allocated by the World Bank or the NCEF only. We found no other instances of funds being allocated for DPRs at a central level</p>	<p>In Superfund, ROD becomes the base document to finalize the remediation alternative, time and cost.</p> <p>In superfund, this is done by EPA or its contractors or by PRP as per agreement. ROD serves as the basis.</p> <p>ROD information is used in superfund as the base document.</p> <p>Land use permissions in USA:- as per SARA section 104 e (1-5) EPA can access a private land for preliminary site investigations; removal actions; RI/FSs; and remedial actions.</p>	<p>Similar institutional structure as per step 5 is followed.</p>	<p>In international practices financing for all steps are covered through cost recovery, cash out agreements with responsible parties or funded through a dedicated fund.</p>

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>The Act mandates that EPA should, in the first instance, seek to obtain access through consent. Entry on consent is preferable across the full range of onsite activities. If consent is denied, EPA should use judicial process or an administrative order to gain access. The appropriate type of judicial process varies depending on the nature of the onsite activity. As per SARA where there is a "reasonable basis to believe there may be a release or threat of a release of a hazardous substance or pollutant or contaminant," courts are instructed to enforce an EPA request or order.</p> <p>In addition, a penalty not to exceed \$25,000/day may be assessed by the court for failure to comply with an EPA order or the provisions of subsection 104 (e) of SARA.</p> <p>a) Request for Consent: EPA would generally request consent for entry with basis, timeline etc.</p> <p>b) Administrative Order: If a site owner denies an EPA request/consent for access, EPA may issue an administrative order directing compliance with the request. § 104(e)(5)(A). Each administrative order must include a finding by the Regional Administrator that there exists a reasonable belief that there may be a release or threat of release of a</p>		

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>hazardous substance and a description of the purpose for the entry and of the activities to be conducted and their probable duration.</p> <p>c) Court Order: The provisions in CERCLA authorizing EPA. access may be enforced by court order. To obtain a court order for entry, the Region should follow the normal referral process. If only access is required, the referral package can obviously be much abbreviated. If timing is critical, EPA HQ will move expeditiously and will refer the case orally if necessary.</p>		
7. Funding requirement identification: availability/generation of the funds.					
<p>The National Environment Policy, 2006 suggests the creation of a National Environment restoration Fund from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary contributions which may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.</p> <p>Demand for funds is raised through the judicial procedure on a case by case basis. Current examples of the SC, HC and NGT cases</p>	<p>The funds for the NCEF sites are currently managed by the Ministry and the World Bank funds for the pilot sites are managed by the Ministry with recommendations/applications from the West Bengal and Andhra Pradesh SPCBs where the pilot remediation projects are being undertaken.</p> <p>The state of Gujarat oversees the operation of an “Environment Fund” which is used for financing remediation activities of polluted sites. The fund corpus is used for making payment to the responsible entity once the polluted site is cleaned up. Gujarat Pollution Control Board (GPCB) commissions</p>	<p>NCEF has been funded through the collection of coal cess.</p>	<p>As mentioned above, in USA fund is sourced from i) cost recovery/cash agreements with the liable parties that go to the "special accounts" of EPA within the Superfund Trust Fund to pay for cleanup activities at the site for which it received the money (70%) and ii) trust fund (Refer: CERCLA section 122)- dedicated for remediation mostly used for orphaned sites (30%).</p> <p>In Romania, the Environmental Fund was set up by Law no. 73 in 2000, as a special fund, outside the budget to meet the objectives as set out by the National Waste Management Strategy. The law prescribes a structure and sources</p>	<p>In Romania, The managing unit for the Environment Fund is the Environment Fund Administration (EFA), legal public entity, coordinated by the national environmental protection authority: Ministry for Environment and Sustainable Development. EGO 196/2005 and Law 167/2010 define the tasks of EFA.</p>	<p>The Romanian Environment fund considers taxes paid by the environmental protection central authority, use of natural resources, chemicals etc and a managing committee controls the fund.</p> <p>US EPA trust fund is also created from taxes paid by polluting industries.</p> <p>Recoverable Costs under CERCLA:</p> <p>Planning and implementing cleanup actions</p> <p>Investigation and monitoring</p> <p>Actions to limit access to the</p>

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
are reflective of this. There is no defined account which funds may be deposited. For each case the court/tribunal decided on how the payment is to be made	an independent study prior to declaring a polluted site as cleaned. The GPCB and the APCB have confirmed situations where the threat to withdraw consent to operate has been the basis for demand of funds from the polluting party/parties identified.		<p>of the fund from taxes paid by users of natural resources and harmful chemicals. The fund is managed by a management board whose structure is also mandated by the law.</p> <p>In Canada, funding is through budget allocation. Budget 2009: Under Canada's Economic Action Plan (CEAP), the Federal Contaminated Sites Action Plan receives \$245.5 million till 2011. The funding includes \$80.5 million in new funding and \$165 million from existing funding (Budget 2004).</p> <p>Budget 2011 includes an additional \$68 million over two years for funding site assessments and program management.</p> <p>In USEPA, under CERCLA, the rehabilitation plan is determined based on Records of Decision approved by the Remedy Review Board of EPA. ROD for a sites has site characteristic, remediation alternatives, cost, timeline and justification on which alternative is chosen by EPA. This becomes the basis for rest of the steps. ROD GUIDELINES are followed in Superfund to determine site specific typology. As per CERCLA section 107, EPA orders PRPs to have an agreement with EPA on work, cost recovery/cash out. CERCLA section 122:</p>		<p>site</p> <p>Indirect costs needed to support the cleanup work</p> <p>EPA's contractor costs</p> <p>Annual allocation costs</p>

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>a) Administrative Order on Consent- between EPA and PRP where PRP carries out short term clean up, remedy design</p> <p>b) Administrative agreements between EPA and PRP for cost recovery/cash out where PRP pays the cash before or after actual remediation takes place by EPA</p> <p>For cost recovery EPA tracks the amount owed by potentially responsible parties (PRPs) in its accounting system. Generally, a PRP has a certain period of time in which to pay the amount owed. When a payment is overdue EPA works with the Department of Justice to collect the debt.</p>		
8. Remedial Design/Remedial Action.					
This would follow step 6 and there is no existing guideline recognized by the regulatory framework for carrying out remedial action.	There is no institutional structure existing for this step.	There is no financing mechanism existing for this step.	<p>The process of fund raising is through: collection of liabilities in a special account and from the trust fund dedicated for remediation work. In US, the executing agency follows ROD.</p> <p>In US, as per Model Remedial Design/Remedial Action (RD/RA) Consent Decree, remedial design/action on a site is carried out based on ROD decisions (approved by EPA) of the site.</p>	Institutional structure remains the same as mentioned in step 6.	Financing mechanism is as covered under step 7.
9. Construction Completion. Complete Physical Cleanup					
There is no existing guideline recognized by the regulatory framework for this step.	There is institutional structure existing for this step.	There is no financing mechanism existing for this step.	Under CERCLA, guidance on achieving the construction completion milestone is available	Institutional structure remains the same as mentioned in step 6.	Financing mechanism is as covered under step 7.

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>in the "Close Out Procedures for National Priorities List Sites" guidance of USEPA.</p> <p>Under CERCLA, EPA evaluates and approves a Remedial Action Report marking completion of remediation. Remediation Action completion depends of Remediation Action guidelines for different measures eg source remediation through in-situ treatment of soil, clean up level as per ROD has to be achieved. For containment of pollution, construction needs to be complete.</p>		
10. Post Construction Completion- Long term review plan, post remedial use, agreements for site reuse.					
There is no existing guideline recognized by the regulatory framework for this step.	There is institutional structure existing for this step.	There is no financing mechanism existing for this step.	<p>In US, a national strategy is developed called National Strategy to Manage Post Construction Completion Activities at Superfund Sites. This is as per sub-part A, section 300.5 of NCP. This includes:</p> <p>Long-Term Response Action (LTRA): Generally applies to the first 10 years for monitoring of ground and surface water restoration.</p> <p>Operation and Maintenance (O&M): Includes the activities required to maintain the effectiveness and integrity of the remedy.</p> <p>Five-Year Reviews: Required by statute to assure protectiveness for</p>	In US, CERCLA and NCP have defined the roles and responsibilities of EPA, PRPs, states, federal agencies to protect a rehabilitated land for long term.	Financing mechanism is as covered under step 7

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>any remedial action that leaves hazardous substances on a site above levels that allow for unlimited use and unrestricted exposures. Five-year reviews are also conducted as a matter of policy in other situations.</p> <p>Institutional Controls (IC): Using non-engineered instruments, such as administrative and/or legal controls, that typically minimize the potential for human exposure to contamination and/or protect the integrity of the remedy by limiting land or resource use.</p> <p>Remedy Optimization: Performing reviews to improve the performance and/or reduce the annual operating cost of remedies without compromising protectiveness.</p> <p>NPL Deletion: Removing sites or portions of sites from the NPL because no further response action is appropriate (not applicable to SA sites).</p> <p>Reuse: Working with the parties seeking to redevelop Superfund sites to ensure that their activities do not adversely affect the implemented remedy.</p>		
11. Monitoring and Evaluation					
State Pollution Control Boards and the CPCB are required by law to monitor industrial pollution. This	Municipal bodies are mandated to monitor the industrial units located within their jurisdiction. While not many industries may be sited	There is no financing mechanism existing for this step.	International practices cover monitoring and evaluation as part of post construction activities.	In US, CERCLA and NCP have defined the roles and responsibilities of EPA, PRPs, states, federal	Financing mechanism is as covered under step 7

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
responsibility is included in the Hazardous Waste Rules Schedule III but no specific reference to remediated sites.	within municipal limits, there are cases where specific industries are located within urban areas, and may be generating hazardous waste in these units.			agencies to protect a rehabilitated land for long term.	
12.Recover Costs					
As per the EPA if remediation has been conducted using government resources, the same may be recovered (with reasonable interest) as arrears of land revenue or of public demand. NGT refers to recover compensation for environmental damages following polluter pays principles.	There is no institutional structure existing for this step.	Financing mechanisms under EPA, NGT, and Supreme court order for forest conservation need to be referred.	Under USEPA, if PRP does not abide by the terms of the agreement with EPA for clean up, cash out or cost recovery within a stipulated timeline then EPA can order parties through Unilateral Orders to clean up. If PRPs do not comply with a UAO, courts may: 1.assess penalties, 2.require the PRP to pay up to three times what it cost EPA to do the cleanup (treble damages), 3.issue a judicial order requiring cleanup 4. recover the cost as a per of debt recovery process of the department of justice Australian CLM Act section 34:The EPA may require a person to pay all or any costs incurred by the EPA in connection with preparing and serving an order or a voluntary management proposal or monitoring action or seeking the compliance of the person with any such order or approved voluntary management proposal or any other matter prescribed by the	As described under above step 3.	As described under step 7.

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			<p>regulations.</p> <p>Australian CLM Act section 35:A public authority may require an owner of land to pay all or any costs reasonably incurred by the public authority in connection with the public authority's carrying out of the requirements of an order made in respect of the land (whether or not the order was made in respect of the owner). CLM Act Section 37 Public authority's priority if owner insolvent: If a public authority carries out the requirements of an order in respect of land disclaimed (by a liquidator or trustee in bankruptcy) as onerous property in the course of proceedings for winding up or bankruptcy, the public authority may recover the cost of carrying out the order together with a reasonable commercial rate of interest and all associated administrative or other costs and expenses so incurred in priority to any holder of a security over the land.</p> <p>Section 38 Limit on liability of representative or trustee-The financial liability under this Division of a legal personal representative in respect of an estate that is significantly contaminated land is limited to such value of the assets of the estate as the representative or trustee may lawfully realise to</p>		

India		Relevant International Parallel			
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
			meet a liability under this Division.		
13. State and National Priorities List Deletion					
No procedure exists under current framework.	Currently no institutional structure exists.	No such financial implication.	<p>In USA EPA may delete a final NPL site if it determines that no further response is required to protect human health or the environment. Under Section 300.425(e) of the National Contingency Plan (55 FR 8845, March 8, 1990), a site may be deleted where no further response is appropriate if EPA determines that one of the following criteria has been met:</p> <p>EPA, in conjunction with the State, has determined that responsible or other parties have implemented all appropriate response action required.</p> <p>EPA, in consultation with the State, has determined that all appropriate Superfund-financed responses under CERCLA have been implemented and that no further response by responsible parties is appropriate.</p> <p>A Remedial Investigation/ Feasibility Study has shown that the release poses no significant threat to public health or the environment and, therefore, remedial measures are not appropriate.</p>	EPA in USA is authorized by the legal framework for NPL deletion.	No such financial implication.
14. Site Reuse/ Redevelopment					
No legally mandated	Institutional structure involves	No financing	In USA the regulatory framework	The institutional structure	Financing mechanisms

India			Relevant International Parallel		
Policy, regulations	Institutional	Financing	Regulatory	Institutional	Financing
procedure exists. There is no legal ambiguity on the topic of land. Land acquisition or allocation remains within control of the local government and the state governments need to be involved even for site reuse after remediation.	state governments for all land related matter.	mechanism is existing specific to this step.	allows EPA to take charge of the land for remediation and to enter into partnership agreements with the responsible parties, interested parties, surrounding communities and local governments for site reuse under superfund and Brownfield programmes.	in USA involves EPA and its partners.	under superfund and Brownfield programmes include loan, grant for site reuse by interested parties such as land developers, real estate firms etc.

15. Programme Management requirements

A National Programme requires several aspects of programme management to be covered. Since the national programme is yet to be developed for India, our analysis in this section is based on international findings. We also examined pilot programmes, fast-track or simplified processes and offsets and alternatives to remediation. Thirdly in this section we analysed the need for monitoring processes in rehabilitation programmes

15.1. Programme Management Responsibilities

The key responsibilities identified across international programs are summarized in the table below:

Table 29 Summary of possible programme management responsibilities

Responsibility	Details
Risk Assessment and Prioritization	One of the most important responsibilities of the programme executives would be to be able to assess risk across sites that are part of the programme and determine the prioritization of sites for rehabilitation. In doing so the principles of 'Precautionary Approach', 'Equity', and 'Entities with "Incomparable" Values' will have to be considered. Additionally such decisions will be under the purview of the principle of 'Public Trust Doctrine'
Institutional Authority and delegation of tasks	Most of the countries studied had very clear demarcations of authority. Legal provisions ensured that institutional authority was appropriately delegated to agencies identified to perform a particular task. This included signing of memorandums or issuing notices and administrative orders. Such delegation of authority or sharing of responsibilities in a programme needs to be managed efficiently and within a clear process framework to ensure that actions that form a part of polluted site rehabilitation are effective and timely. Since private agencies are expected to participate in the NPRPS the responsibility of evaluation and accreditation of these agencies is also relevant.
Creation and maintenance of standards and methodology	In some cases we found the standard setting and maintenance to be done by a central agency, while in other instances we found this responsibility to be held at a state or province level. Regardless of ownership of this task, it is important to note that this is a necessary and ongoing responsibility that provides a supporting framework and guidelines for polluted site rehabilitation. Standards can be expected to change with time and the ability to identify the need for and implement such change must lie within the program.
Securing, maintenance and disbursement of funds	The importance of this function is evident from the fact that countries like the USA have named their program the 'Superfund'. International findings indicate that for a fund to be sustainable in the long run the effective application of the 'polluter pays' principle is necessary. It is important to note that since the programme does involve making prioritization decisions as well as decisions on remediation goals on the basis of commercial feasibility, the use of funds will need to be monitored for effectiveness and the same may

Responsibility	Details
	need to be disclosed to the public.
Coordination and conflict resolution	Apart from delegation of authority, we found that international programmes often covered the aspect of stakeholder engagement and community liaisoning. This is more effective when done at the local level where the remediation is been done. However a programme level oversight with the creation of an escalation matrix may be useful for better implementation.
Information sharing and dissemination	Most of the international programs studied provide detailed information to stakeholders on various aspects of the program as well as on specific rehabilitation cases. This information is sometimes provided in the form of a database hosted on the internet. In India, while an internet website may provide very useful, the low penetration of internet in the rural areas may require more traditional methods of information sharing and dissemination at the local levels.

15.2. Programme types and sub programmes (High Risk/Low Risk, Regular/Fast track Procedures)

Two pilot initiatives, one funded by the World Bank and the other by the NCEF currently operate in India. There is no procedure defined for rehabilitation. Most cases are done on an ad-hoc basis. If we look at the international practices we find that the US EPA provides for short and long term cleanups. It also provides Soil Screening Guidance to determine risk and whether cleanup under CERCLA is warranted or other procedures are to be followed. The Brownfield programme is also in a sense a parallel program. An offset option is provided to polluters in NSW where they may take other compensatory action where it is not practical to remediate a site in time. (Remediation is ultimately required). Netherlands provides a clear distinction between urgent and non-urgent remediation. They also have simple and complex methods for investigative activity or development of remediation plans. These are primarily to prevent delays. The programme in India would do well to have multiple sub programmes that can cater to variation that we expect to find across the country. Some of the parameters for classification used to develop sub-programme types could be:

1. Risk and Potential increase in risk
2. Cost of remediation
3. Time required for remediation
4. Current land use (and whether it is inhabited)
5. Orphan site, private or government site

An option would be to look at a core set of activities common to all and then see what specifications would need to be added to each sub programme type.

In conclusion, the study on Indian systems has brought to light some of the key potentials that may be applied to develop a long term programme for rehabilitation of polluted sites. At the same time the review has revealed certain problems of polluted site management and rehabilitation that need to be addressed in India. Learning from international practices demonstrates that most of these gaps can be addressed in one or many ways and that these practices may be adapted for use in the national programme for India. Special care needs to be taken to ensure that the

existing strengths of the Indian systems are leveraged going forward. The findings and analysis of this report lead us to the next steps for developing options and preparing the National Programme for Rehabilitation of Polluted Sites.

***Development of
National
Programme for
Rehabilitation of
Polluted Sites***

Appendix to Final Report
on Task - 1 Review of
Current Systems and Task
– 2 Overview of
International Practices

November 2012



Appendix A. - Project Background

Rapid urbanization and industrialization in India, as witnessed in the past two decades, has led to the generation of large quantities of solid and hazardous waste in several regions of the country. Areas contaminated by toxic and hazardous substances which pose a risk to human health and the environment are what we commonly refer to as contaminated sites or polluted sites. Contamination can occur as a result of poor environmental management and waste disposal practices or accidental spills in industrial or commercial activities. More importantly, in the past, sites may have been contaminated by activities not known to be hazardous at the time, often involving chemicals which have since been determined to be toxic and are now subject to much stricter controls.

Further, the land ownership and control of contaminated sites often is difficult to ascertain. The gravest problems associated with contamination relate to the dumping of unidentified and unmonitored quantities of hazardous waste, specifically illegal or uncontrolled hazardous waste outside the industrial estates, in abandoned public lands or within privately owned lands. Hence, (land) ownership and control of a site may in many instances be the central issue. The government recognizes the seriousness of the issue and is addressing the need of a structured programme for site remediation.

A.1.1. Project Objective

Within the context described above, the Government of India, through the Ministry of Environment and Forests (MoEF) is implementing a project on Capacity Building and Industrial Pollution Management (CBIPMP) with financial assistance from the World Bank. The two-fold purpose of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites; and to support the development of a National Programme for Rehabilitation of Polluted Sites (NPRPS).

The NPRPS targets remediation of “Point” sites, “Area” sites, contaminated municipal dumpsites and Brown Fields. In addition, by way of ownership, industry owned sites, orphan sites and illegal dumpsites need to be identified and remediated.

The assignment would specifically address the possible roles of the private sector in all aspects of the remediation process, including (but not limited to) technical services, remediation contracting, waste management services and land re-development.

The specific objectives of this assignment are to (1) review the policy and legal frameworks along with the institutional mechanisms, for implementation of remediation programs at national level, including liability issues; (2) institutional structures and mechanisms for addressing polluted sites (at all levels of government);(3) approaches to financing remediation efforts which would allow priority problems to be addressed through suitable financial mechanisms and (4) recommend the use of existing powers, and if appropriate, revision and expansion of these existing frameworks (as appropriate) to address priority problems in a cost effective manner.

A.1.2. Desired Outcomes

The desired outcomes of the assignment fulfilling the above mentioned objectives of the study are:

- A thorough understanding of the current systems and practices of managing polluted sites, at all levels in India, including policies, regulations, institutions and financing mechanisms
- In depth knowledge of international policy frameworks, and institutional mechanisms that may be adopted to strengthen the NPRPS
- Identifying and recommending institutional strengthening requirements at all government levels so that problems associated with contaminated site in India can be fully addressed
- Capacity building needs assessment and training programmes for all key stakeholders (representatives of MoEF, CPCB, SPCB and other relevant central and state agencies) on design and implementation of the NPRPS
- Development of NPRPS with legal, institutional and financial mechanisms that addresses the key remediation issues and priority problems in a cost effective manner that is acceptable to all key stakeholders.

A.1.3. Project Schedule and Update

Table 1: Project Tasks

Task	Deliverable	Planned Date	Completed Date
Signing of Contract		NA	26 th March 2012
Task 0 – Inception Meeting and Inception Report	Inception Meeting Inception Report	15 th April 2012	9 th May 2012
Task 1 – Review of Current Systems (THIS REPORT)	Summary report on landscape of polluted sites management in India <i>(A summary report which sets out comprehensively the “landscape” polluted sites management in India and which identifies the current roles and resources applied to dealing with the problems)</i>	10 th June 2012	1 st June 2012 (Final report incorporating all comments was submitted on 24 th July 2012) A draft document was circulated and a TEP review was conducted on the 13 th of August. This report incorporates the comments received during and post the TEP review
Task 2 – Overview of International Practices (THIS REPORT)	Report on overview of International practices <i>(Report on overview of international systems and identification of practices that can inform the development of schemes in India, including how residual liability is to be addressed)</i>	31 August 2012	A draft document was circulated and a TEP review was conducted on the 13 th of August. This report incorporates the comments received during and post the TEP review. Subsequently this was reviewed on 29 th and 30 th November and the comments have been incorporated.
Task 3 - Identify options for legal and institutional strengthening	A report summarizing the options considered, and recommendations for an effective policy and legal framework, along with institutional and financing mechanisms, for the NPRPS	10 th November 2012	In progress

Task	Deliverable	Planned Date	Completed Date
Task 4- Preparation of NPRPS	A Report on National Plan for Remediation of Polluted Sites	1 st March 2013	In planning
Task 5- Stakeholder Consultations	Report on stakeholder consultation	30 th January 2013	In planning
Task 6 – Prepare a plan for implementation of NPRPS	Final report on implementation plan for the NPRPS	31 st March 2013	In planning



Figure 1: Sequence of Tasks for NPRPS

A.1.4. Overview of Activities thus far

- An inception meeting was held on May 9, 2012 at New Delhi with the project management team at the Ministry of Environment and Forests (MoEF). The meeting was attended by PwC representatives and the key experts assigned to the project. The points of discussion were focused on the project approach and work plan.
- Incorporating feedback received from the MoEF at the inception meeting, work on an Inception Report that set out the approach for execution of Tasks 1 and 2 was underway.
- On May 17, 2012, PwC project team members consulted with the Central Pollution Control Board (CPCB) officials at New Delhi and the Kolkata Municipal Corporation. The purpose was to gather preliminary information on hazardous waste management, remediation procedures, and dump site information in India. The meetings also provided an opportunity to determine which institutions would be relevant to contact for the purpose of this assignment. Copies of important documents were also collected during these interactions.
- The points discussed at the CPCB were on overview of the current systems in place, funding constraints, regulatory capacity of the institutions, monitoring systems and resource utilization. The meeting with the Kolkata Municipal Corporation which included their Municipal Solid Waste (MSW) Management cell provided insights on their assessment of the problem and the key constraints faced by them on various fronts.
- A draft inception reporting indicating the approach and methodology towards the next immediate tasks, (Task 1 and Task 2) was shared with MoEF and World Bank on the 1st of June 2012. Subsequently a meeting was conducted on the 18th of June 2012 at the World Bank office to further discuss the same.
- The 4th Technical Expert Panel (TEP) meeting for the World Bank aided "Capacity Building for Industrial Pollution Management Project (CBIPMP)" was held on June 28, 2012 at the India Habitat Center, New Delhi. A presentation on the project plan and approach and the inception activities was made in the presence of the TEP, other World Bank, MoEF, CBCB officials and the consultant teams from the other two studies being conducted.
- A final version of the inception report incorporating review comments from the various experts was submitted on the 24th of July 2012.
- Task -1 which is a review of the current practices in India was developed through collection and analysis of information via stakeholder interviews and desktop research. This report was reviewed with the TEP on 13th August and includes changes based on the comments received from the TEP and other stakeholders present during the review
- Task -2 which is a review of international practices was developed through desktop research guided by our international expert on hazardous waste management. The

report was provided to the TEP and was reviewed by the TEP on 13th August. Comments received during the TEP review were incorporated into the report.

- This document is a combination of the studies of task 1 and task 2. It has been updated to reflect the comments received from the TEP and an additional chapter has been included to provide our analysis and conclusion drawn from the two studies.

Appendix B. - Scope of work for Task – 1 and 2

B.1.1. Contract Terms of Reference¹ for Task - 1

“*Objective: to review the current systems and practices of managing polluted sites, at all levels in India, including policies, institutions and financing mechanisms.*

The consultant will carry out a review of the existing systems for dealing with polluted sites, at national, state and local level. Where there is no specific agency or department with a specific mandate for these issues, the review will examine how problems of polluted or contaminated sites are addressed, including which agencies are given the responsibility and the financial arrangements.

The review will cover all relevant agencies at each level including those which have responsibilities for related aspects such as health, urban development and municipal affairs, and will identify if and how these agencies become involved in addressing polluted sites problems.

There is a clear practical linkage between the need to deal with polluted sites and current management of toxic materials and of hazardous wastes. The review should also cover the current systems in place for these issues, to the extent required to clarify such linkages.

The review will address, inter alia, the following points:

- Extent to which general information and specific data is available in each agency on the scope and scale of polluted areas in their jurisdiction, or on relevant aspects such as health impacts or revenue implications;
- Reviews of specific issues undertaken or being processed, including those where legal actions for compensation or remediation have taken place;
- Existence of institutional units with a clear mandate to deal with polluted sites; or, in their absence, the actual units that are given the task of dealing with the problem;
- Capacity of the institutions in terms of availability of technical staff, sampling and testing facilities and implementation and managerial skills, including use of external expertise and resources
- Current financing mechanisms (both institutions or individual industries) to remediate / address the issues associated with polluted sites

The review will also set out the roles and activities of relevant institutions and organizations outside the government, including technical institutions, private sector companies, and NGOs.

The task shall also include the review of current practices of managing liability issues such as the following.

- Access to sites for the purpose of determining the existence/ extent of contamination;
- Technical requirements for demonstrating that a particular site is the source of off-site or downstream pollution;

¹ These terms of reference have been reproduced from the contract awarded to the consultant.

- Orders to landowners (or other responsible parties) to undertake remediation;
- Approach taken to set site-specific remediation requirements;
- Ability to take action in case of either non-responsiveness of responsible party or inability to identify and contact responsible party;
- Power to enter land and carry out urgent remediation where the responsible party is unable or unwilling to do so;
- Powers to use/ take land as basis for recovery of costs where the agency has carried out urgent remediation;
- Ability to establish specific use requirements or constraints in relation to rehabilitation of contaminated sites to productive use.

Output: A summary report which sets out comprehensively the “landscape” polluted sites management in India and which identifies the current roles and resources applied to dealing with the problems.”

B.1.2. Our objective to deliver Task – 1

Our objective is to review the current systems and practices of managing polluted sites, at all levels in India, including policies, regulations, institutions, and financing mechanisms. We will identify and document laws, regulations and practices of managing polluted sites at national, state, and local levels. We will examine how problems of polluted or contaminated sites are addressed, such as in the absence of specific agencies or departments with a prescribed mandate for dealing with such issues. We will study the institutional roles and responsibilities of the agencies involved and resources applied in managing the issue of polluted sites.

For developing an understanding of current systems and practices, we have collected information on types of agencies (public, private, any other), their systems of data/information collection; issue identification procedures; institutional and financial capacities and arrangements among others. Through desktop research and stakeholder consultation, we have collected and collated two sets of information namely on identifying agencies and on identifying type of information sought from the agencies.

B.1.3. Contract Terms of Reference for Task – 2

“Objective: to review the policy framework, and institutional mechanisms, in other countries, highlighting key learning to inform the NPRPS.

The consultant will identify countries with systems in place for cleaning up polluted and contaminated sites. The consultant will prepare a summary of the key policy, legal, institutional and financial features of those systems, together with an assessment of the key strengths and weaknesses, as relevant to India.

The countries/ systems selected for this review will specifically cover examples of:

- Approaches to land contamination, which encourage companies to remediate and redevelop their own sites;

-
- Brownfield programs, which target areas of mixed use and ownership, with the aim of supporting urban redevelopment;
 - Remediation funds, which use different financing mechanisms to provide funds to clean up priority sites.

Output: An overview of international systems and identification of practices that can inform the development of schemes in India, including how residual liability is to be addressed.”

B.1.4. Our objective to deliver Task – 2

We will review the policy framework, and institutional mechanisms, in other countries, highlighting key learning to inform the NPRPS, that is to assess the feasibility within the current national economic framework for key aspects such as incentives for promoting remediation action, financing mechanisms, cost recovery options, etc. These activities are guided by a knowledgeable international expert on our team. We also identify relevant cases studies from international practices to better understand how the international mechanisms operate.

Appendix C. - Methodology

C.1. Coverage

In order to complete our review of the current systems and practices related to management of polluted sites our approach was to cover multiple relevant sources of information, which included interviews with officials at various agencies at national, state and the local level. These include:

- Institutions that have direct responsibilities of identifying and dealing with contaminated/ polluted sites; these would include regulators, urban local bodies, etc.
- Institutions that have responsibilities for related aspects such as health, urban development and town planning
- Institutions that are given the responsibility and the financial arrangements in areas where there is no specific agency or department with a prescribed mandate for addressing problems of polluted or contaminated sites

Stakeholders were categorized as set out in the table below:

Table 2: Stakeholder categories

Stakeholder Category	Justification
State and Central Pollution Control Boards (Including Pollution Control Committees for Union Territories)	Primary responsible for abatement of pollution from both a preventive and remediating perspective. Examples of these are the Central Pollution Control Board, Karnataka State Pollution Control Board, Gujarat Pollution Control Board etc.
District (Local) Administration and Urban Local Body	Jurisdiction over land use and revenue. Responsible for citizen welfare (including health and sanitation concerns). Frequently impacted due to contamination of land and waste streams (especially Municipal Solid Waste). These agencies offer a specific local perspective. Examples of these are District Collector and Town Planning Officer, the Director for Solid Waste Management, the Chief Engineer for Solid Waste Management at Bruhat Bangalore Mahanagar Palike etc.
State Health and Environment Departments	These agencies have a state-wide responsibility and are part of both policy making and policy enforcement. They are also expected to handle coordination between various other agencies within the purview of these topics of Health and Environment. Examples of these are the Environment Secretary for the government of West Bengal
Generators of hazardous waste	These organizations have business activities that produce large quantities of waste that need proper handling. We examined the processes followed by them to address their waste issues. Examples are paint, dye, pharmaceuticals, leather goods, and battery manufacturing organisations.
Operators of TSDFs	As a stakeholder, such an organisation provides a deeper insight into the economics around hazardous waste management, present infrastructure capacities, and a view of the future for waste management. The TSDFs operated on PPP basis are examples of

Stakeholder Category	Justification
	this.
Industries Department of the state government (including Industrial Development Board and SEZ)	Inputs from Industries department include information on policy and enforcement, and features such as inter-industry waste symbiosis, notification of industrial sites and promotion of group TSDFs
Industry Associations	Meeting these associations provides a view of a particular industry as a whole. Also these associations have local chapters that help us obtain a specific perspective on polluted sites in the area
Ministerial Bodies	Central Public Health & Environmental Engineering Organization (under MoUD), Town and Country Planning Organisation (under MoUD) JNNURM under MoUD, provide their perspective on polluted sites in the country
Non-governmental organisations (NGOs)	Several NGOs are working in this arena. They are responsible for bringing issues to public attention, tracking polluted sites and assisting the impacted parties for redressal and remediation.

In addition a specific set of central agencies and national level organisations that were consulted in order to review their roles, responsibility, influence and secondary impact. These are listed in table below.

Table 3: List of organizations and their relevance

Organization	Relevance
CPCB	Responsible for remediation of sites as per regulations
MoEF	Direct Project Stakeholder
MoUD (Town and Country Planning Organisation [TCPO])	Responsible for urban infrastructure and planning
MoUD (JNNURM)	To get the information on municipal solid waste sites and potential contamination of municipal sites
MoWR (Ministry of Water Resources)	Responsible for managing the ground water and therefore impacted by contamination of ground water
ASSOCHAM	Industry Associations, provide sectoral as well as regional views on site management
ICMR	For studies conducted on health impact of hazardous waste
National Green Tribunal	Handles legal cases on hazardous waste contaminated sites
Ministry of Commerce and Industries	To get an understanding of the legal framework for addressing hazardous waste issues at the level of industrial bodies
NHAI	Land related issues pertaining to contaminated sites

In order to have effective coverage of the country we analysed preliminary information on the following aspects, to establish a priority list of agencies and states and the extent of coverage within each state / UT:

- Number of Industrial Estates
- Number of units generating Hazardous Waste
- Total Generation (MTA), Recyclable generation (MTA), Landfillable waste generation (MTA), Incinerable waste generation (MTA)
- Locations identified in the COWI report
- Number of TSDF, Total capacity of TSDF (MTA)
- Balance in Landfillable waste (MTA), Balance in Incinerable waste (MTA)
- Number of common incinerators, Number of Individual Incinerator , Total capacity of Incinerator (MTA)
- Number of dumpsites reported in 2006 and then in 2012
- Quantity of waste in dumpsites reported in 2012
- Status of state or regional Hazardous Waste plan
- Number of contaminated MSW sites reported
- Instances of media reports on HW issues

Based on the analysis on the above aspects, we used a 3 tier approach for effective coverage – (i) full study where we conducted meetings with a broad segment of stakeholders in addition to desktop research, (ii) issue specific where we conducted meetings with select agencies on specific issues in addition to desktop research, (iii) desktop study based on secondary research, telephonic conversations with various stakeholders and collection of data over email. Our coverage of states / UTs is shown in the table below:

Table 4: Study coverage

Full study	Issue specific	Desktop
<ul style="list-style-type: none"> •Andhra Pradesh •Delhi •Gujarat •Karnataka •Maharashtra •Orissa •Rajasthan •West Bengal 	<ul style="list-style-type: none"> •Bihar •Chhattisgarh •Haryana •Himachal Pradesh •Jharkhand •Kerala •Madhya Pradesh •Manipur •Tamil Nadu •Uttar Pradesh 	<ul style="list-style-type: none"> •Arunachal Pradesh •Chandigarh •Daman, Diu, Dadra & Nagar Haveli •Goa •Jammu and Kashmir •Meghalaya •Mizoram •Nagaland •Pondicherry •Tripura

In addition to the various types of organisations in the state/Uts listed above select generators of hazardous waste, industrial associations, TSDF operators and NGOs were also consulted.

Interactions with stakeholders were aimed at obtaining information on possible contaminated sites namely point sites, area sites, municipal dumps and brown fields as well as linkages with problems and issues that have surfaced.

The detail of information sought from the agencies was as listed below:

- a) General information and specific data available on the scope and scale of polluted areas in respective jurisdictions, for example:
 - i. Reconfirmation on profile of hazardous waste generation at the state and local level, available TSDF capacity for each geographical or administrative unit, number of illegal dumpsites /orphan sites identified, and procedures used in their identification
 - ii. Ease or difficulty in traceability of ownership such as for orphan sites, abandoned industrial sites
 - iii. Environmental and demographic profile of the area around the site affected by the release of the waste material
 - iv. Observed impacts on health and systems for addressing associated issues
- b) Institutional framework and agencies that have a clear mandate to deal with polluted /contaminated sites; or in their absence, the informal (and/or actual) units that are given the task of dealing with such sites
- c) Institutional capacity in terms of availability of technical staff, current (managerial) skills set, sampling and testing facilities.
- d) Current practices of managing liability issues such as the following:
 - i. Access to sites for the purpose of determining the existence/ extent of contamination
 - ii. Technical requirements for demonstrating that a particular site is the source of off-site and/or downstream pollution
 - iii. Approach taken to set site-specific remediation requirements
 - iv. Ability to take action in case of either non-responsiveness of responsible party and/or inability to identify and contact responsible party
 - v. Ability to establish specific use requirements or constraints in relation to rehabilitation of contaminated sites to productive use
- e) Current financing mechanisms to remediate / address the issues associated with polluted sites
- f) Revenue implications, for example specific issues undertaken or being processed, including those where legal actions for compensation or remediation have taken place
- g) Land related queries such as :

- i. Procedures to identify ownership patterns, land use pattern (existing, future) of contaminated sites
 - ii. Details of orders to landowners (or other responsible parties) to undertake remediation
 - iii. Power to enter land and carry out urgent remediation where the responsible party is unable or unwilling to do so
 - iv. Powers to use/ take land as basis for recovery of costs where the agency has carried out urgent remediation
- h) Issues drawing public attention (such as from the media or issues highlighted by NGOs)
- i) Roles and activities of relevant institutions and organizations outside the government, including technical institutions, private sector companies, NGOs

Our interactions were driven by a detailed questionnaire / interview guide. Over 70 open ended questions were framed which are classified under the respective areas set out in the table below.

Table 5: Questionnaire / interview guide

Area	Description
Entity Information	Details about the entity including contact information, nearest industrial clusters, nature of operations and activities
Staffing	Staffing plan, Activity assignments to permanent staff, contract staff and outsourcing. Staff and skill adequacy
Information Management	Information on waste, polluted sites, issues and incidents. Sharing of information with other entities
Detection and Reporting	Detection and identification of polluted sites. Complaints, reports, surveys and tracking
Technical Assessment	Technical assessment of sites, providing or obtaining consent for business. Geophysical assessments, Third Party Assessments.
Assigning Responsibility	Identifying the responsible party for a polluted site. Addressing the responsible party, and intent to pursue
Decision to remediate	The various factors under which a decision to remediate is arrived at, these may include technical feasibility, costs, availability of funds etc.
Modes of remediation pursued	Technical / Legal / Financial aspects of remediation
Legal Rights/Powers	Existing rights of the entities. Ability to enforce, and gaps and loopholes.
Legal Obligations and Cases	Duties, obligations and other elements of restraint that hinder the effective cleanup or prevention of pollutions. Escalation of issues
Collaboration with other agencies	Inter-agency collaboration on the topic
Financing	Raising of funds, financial mechanisms for long term activities. Financing when multiple affected parties or multiple responsible

Area	Description
	parties are involved. Third party work management and funding.
Data and History	Trends on polluted sites and remediation. Secondary trends related to health, agriculture and livestock issues
Remediation Success	Success rate, successful mechanisms, unsuccessful mechanisms
Remediation Costs	Costs incurred and an estimate of future costs for remediation activities
Sizing	Sizing of waste streams. Location of processing and remediation facilities. Existing and future capacities
Operation	(Specific for facility operators)
Issues	Issues that the entity would like to see addressed in order to be more effective
Suggestion	Suggestions made by the entity towards the issue of polluted sites

In addition to this questionnaire, we also developed and used a Remediation Incident Questionnaire to assist in having a structured conversation when discussing a specific incident where remediation was conducted for a polluted site. The questionnaire has been reproduced in the table below.

Table 6: Remediation Incident Questionnaire

Area	Description
Inventory / List	<ul style="list-style-type: none"> • How did you identify that this site was polluted? • What were the criteria of defining this site as polluted? • Was this site included in any inventory or list? • What were the criteria for inclusion in said list? • Do you update your inventory on a regular basis? • What are the criteria for updating the inventory and how often is it done?
Prioritization for remediation	<ul style="list-style-type: none"> • Among other sites why has this site been prioritized for cleanup? • What are the criteria for prioritization? • Did any conditions change due to which this site moved up or down in the priority list?
Assess and confirm that remediation is required	<ul style="list-style-type: none"> • How did you determine an approach for remediation? • How did you determine what use this land would be subsequently put to? • How did you get other stakeholders to agree to the future use of the land?
Determine polluter responsibility and financial liability	<ul style="list-style-type: none"> • How did you determine who is the polluter of this site? • On what basis did you determine whom to pursue for placing liability for pollution? • How did you determine who would be financially responsible for remediation?

Area	Description
Planning the remediation	<ul style="list-style-type: none"> • Who approved further detailed investigation and remediation planning? • How was the detailed remediation planning carried out? • Who were the various agencies participating in the activities related to remediation?
Obtaining financing for remediation of site	<ul style="list-style-type: none"> • Finally, who paid for the remediation? • Was there a fund set up? • How was the cost recovery envisaged and who approved the mechanism for cost recovery? • On an ongoing basis how were expenses approved and paid out?
Getting access to the site	<ul style="list-style-type: none"> • How did you obtain authorization to enter the site? • Which organization or department granted you authorization and via what powers? • How did you obtain control over the site to execute the remediation activity?
Executing Remediation	<ul style="list-style-type: none"> • What were the remediation activities that were performed at the site? • What was the outcome of these activities? • How did you measure the success of remediation at the site? • What evidence has been provided to demonstrate that remediation work has been completed as per plan
Confirming that remediation is done	<ul style="list-style-type: none"> • How was it confirmed that that the remediation was done as per plan and standards? • What was the authority by which this confirmation was done? • What was the authority by which funds were released to the remediating agency?
Confirming Land Reuse	<ul style="list-style-type: none"> • After remediation what was the decision for the subsequent use of the land? • On what basis was the mode of reuse determined? • By what authority was this particular use finalized?
Disposal of land	<ul style="list-style-type: none"> • Was the land acquired by any party after remediation, from whom and by whom? • Was the land sold or leased by any party, by whom and to whom?
Updating Inventory and Accounts	<ul style="list-style-type: none"> • Were the inventories of polluted sites updated after the remediation? • Was there a report of accounts provided after the action of remediation and disposal of land?
Lessons learned	<ul style="list-style-type: none"> • Did this incident lead to learning regarding better management of hazardous waste? • Did this incident lead to learning regarding a better process for

Area	Description
	remediation of hazardous sites? <ul style="list-style-type: none"> • What was the learning regarding access and control of land for the purpose of remediation and for the purpose of cost recovery? • What are the changes implemented based on these learning?
Issues and suggestions	<ul style="list-style-type: none"> • What issues did you face during the remediation of this site? • What suggestions do you have towards remediation of this site?

C.2. Methodology

C.2.1. Review of Legal and Regulatory frameworks

In addition to consultation with the head of legal departments/ Law Officers of the identified agencies, we have conducted extensive desktop research to review the existing legal frameworks through which contaminated sites are identified and remediated. This includes the regulatory machinery that addresses contamination and prevention (of contamination). A review of writ petitions under various judicial courts of India has also been conducted to understand circumstances in which a remediation situation has been identified or has occurred and the mechanism employed by the Hon'ble Court to decide on the mode of remediation. Apart from laws and writ petitions we have also reviewed Municipal Bye-Laws for content related to the topic.

1. Our review of acts, laws and bye laws covers the following aspects:
 - i. Relevance and merit of including the act/law/bye-law in the review of current systems, along with an identification of whether this is pollution related, remediation related or Land Related
 - ii. The evolution of this regulation over time.
 - iii. The underlying objectives and principles of the regulation, including how both the Polluter Pays and Precautionary Principle are covered (or not)
 - iv. Explanation of the specific section or sections of the regulation that is of significance to the review of current systems and practices related to management of polluted sites.
 - v. Identification and explanation of how the regulation defines roles and responsibilities for the institutions involved in waste management and polluted site remediation, with a check to see if accumulative capacity is covered.
 - vi. Examination of the enforceability of the regulation, in terms of ease or difficulty. The current scenario in terms of success, with specific checks to determine if it assists in assigning liability?
 - vii. A review of the associated penalties and fines and their suitability in particular contexts.

Our review of writ petitions covers the following aspects:

- i. Context and Description: A description of the incident that occurred by which this issue was raised and who are the parties involved
- ii. Basis: What laws or rules or (absence thereof) were considered for this writ/petition. Was there anything exemplary worth noting? Were there examples of precedence?

- iii. Outcome and learning: What was the final outcome? Did this set precedence? Were legal or institutional changes made as a result of this? Was this a one-off situation that required a one-time solution?
- iv. Critique: A Critique of the writ petition in terms of coverage of polluter pays and precautionary principle, assigning liability, enforcement, penalties and fines.

C.2.2. Review of Financial mechanisms

2. The review of financial mechanisms used a three step method:

Step 1 – A mapping of the existing financial mechanisms in use (till date) for remediation of hazardous waste contaminated sites India

- a) We conducted a review of the existing financing arrangements for 12 priority sites as identified by Central Pollution Control Board (CPCB) under the National Clean Energy Fund (NCEF)
- b) We examined the existing financing arrangements for remediation of 4 identified contaminated sites as identified under the CBIPMP programme of MoEF
- c) We studied the existing financial mechanisms to remediate sites in privately owned lands in the states of Gujarat and Andhra Pradesh.
- d) We reviewed the existing financial assistance mechanism that exists in MoEF for creating and managing TSDF facilities.

Step 1 was intended to highlight the following:

- i. What are the types of contaminated sites that are being funded under these mechanisms
- ii. What is the process of allocation of funds and corresponding flow of funds
- iii. Which of the institutions are responsible for managing the sourcing and application of funds
- iv. What are the criteria for measuring the success of the funded projects and how is this monitored
- v. Is there any learning gained from challenges faced by various projects, which could be applied to projects being executed at other sites?

Step 2 – A Study of the financial arrangements of successful programs for managing waste and remediation of sites

- a) We reviewed some of the PPP arrangements for Hazardous Management at TSDFs in India

Step 2 was intended to highlight the following:

- i. Can the key success factors leading to private investment in these areas be applied towards hazardous waste management and site remediation
- ii. What are the various channels through which private funding have been introduced
- iii. Who are the major players involved in waste management in India
- iv. What is the nature of the PPP contracts and the terms of the concession agreements therein

Step 3 – A review of the different financial mechanisms adapted for various existing national programmes in India related to public health, environment and forests, and urban development.

These include The National Environment Policy (NEP), 2006; Jawaharlal Nehru National Urban Renewal Mission (JnNURM), National Rural Health Mission (NRHM); National River Conservation Plan (NRCP), National Afforestation Programme.

Step 3 was intended to highlight the following:

- i. The basis for determining the need for a Special Purpose Vehicle and/or joint ventures including a Mission Mode approach.
- ii. The nature of financial modelling that determines the structuring of projects.
- iii. The ‘primary and material’ underlying assumptions made while arriving at a funding mechanism
- iv. The nature of revenue arrangements for these projects, including payment structures and modes of recovering investments (specifically, for private investments).
- v. Determination of roles & responsibilities of each party involved, and compliance with existing legal and regulatory frameworks.
- vi. An understanding of bidding processes involved in these projects.

C.2.3. Review of institutional frameworks

The review of institutional frameworks was done using a six step method:

Step 1 – A mapping of the existing institutions participating in hazardous waste remediation in India developed through a desktop review of organization and administrative structures.

Step 2 – Interaction with agencies such as MoEF, CPCB, State Pollution Control Boards (SPCB), State department of environment, testing laboratories, hazardous waste site facilitators and TSDF operators. This was done to understand the expected roles of these agencies and their perspective on their own capacity and capabilities to address the problem.

Step 3 – An evaluation of the existing institutional capacities to address hazardous waste and polluted sites in areas of staffing, testing facilities and technical knowledge and skills.

Step 4 – A review of the intra/inter-ministerial and intra/inter-departmental coordination for remediation of the polluted sites. Details of Step 4 are follows:

- i. A study of the inter linkages of roles and responsibilities between ministries (such as the MoEF, MoUD, MoWR, and the Ministry of Rural development) was conducted. We reviewed the ministerial committees set up to address hazardous waste site remediation. In addition the existing environmental impact assessment (EIA) methods were also reviewed.
- ii. We examined the roles and responsibilities of the relevant departments such as the DoE at state level, municipal corporations, and district development authorities
- iii. Two institutions that were able to provide useful information on toxic chemicals and wastes, the Indian Institute of Toxicology Research (IITR) (Lucknow) and the

National Environmental Engineering Research Institute (NEERI) (Nagpur) were consulted to understand their experience in working on remediation cases.

- iv. We studied an existing example of participatory local environmental action planning (LEAP) in India as well as examined the institutional arrangements for considering such participatory options.
- v. A media search helped us to identify instances where NGOs were involved in facilitating remediation activities. We identified NGO networks and were able to meet some of them to understand the institutional gaps they aim to address within the current systems.

Step 5 – We interacted with the World Bank and GIZ to understand their views on the institutional capacity of the existing system in India. Their past work and experience in the area of hazardous waste site management in India further enhanced our view on the current system.

Step 6 – We performed a Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis for the existing institutional framework involved in hazardous waste site remediation and management.

C.2.4. Overall Systems Review

Needless to say, an independent examination of each of the elements of legal, financial and institutional mechanisms, led to us understanding the linkage between them. To be able to further improve our review we have also conducted a system level review. This allows us to more deeply examine the interplay among the different elements and develop additional linkages between hazardous waste management and polluted site remediation. Also, a systems review helped uncover in more detail, what takes place in the absence of institutional units with a clear mandate to deal with polluted sites.

C.3. Approach and methodology for overview of international practices

In order to obtain information that is relevant to this assignment, we are carrying out desktop research on countries with a focus on the following criteria:

- Defining polluted sites;
- Site identification procedures (both orphan and non-orphan);
- Programme for remediation - prioritization, cleanup plan, financing, implementation and monitoring (including post remediation performance)), cost recovery mechanisms;
- Guidelines and standards;
- Policy framework features;
- Risk assessment methodology;
- Strategy for prevention of future land/ water pollution;
- Institutional and administrative arrangements; responsibility matrix and delegation (role of Central, State, local, and other institutional bodies);
- Regulatory framework for the cleanup of polluted sites;
- Assessment of financing strategy and financial instruments adopted;

- Provisions with regards to liability and legacy issues;
- Similarities with India from a socio-economic perspective; and
- Differences with India

We are carrying out the preliminary desktop research through

I. Reviewing studies funded by multilateral agencies such as The World Bank, GIZ, ADB, JICA, UNDP etc.,

II. Retrieving documentation on hazardous waste site management for countries such as US, EU, Canada, and Germany,

III. Referring to relevant technical literatures that are publicly available, and

IV. Examining policy and regulatory framework adopted in selected developed countries.

Our initial research reveals a variety of approaches implemented in these countries. We are reviewing these along site specific and risk based approaches to understand procedures followed for site remediation.

Using the preliminary evaluation matrix, we have chosen USA, Canada, China, EU (with a focus on Netherlands and Germany) for further analysis. The analysis is based on our initial review of the policies. This may be further refined during the course of the assignment taking into account the comments received during the inception meeting, interaction with experts and further research of other relevant international experience. Our research will consider the following details:

I. Approaches to land contamination, and factors that encourage companies to remediate and redevelop their own sites

II. Brownfield programs, which target areas of mixed use and ownership, with the aim of supporting urban redevelopment

III. Remediation funds, which use different financing mechanisms to provide funds to clean up priority sites

We shall also cover cases with issues and approaches that bring in the relevance of this learning to the Indian context.

C.4. Information Sources

C.4.1. Stakeholder Consultations

We provide below a complete list of the various organizations we met in order to gather information for our review. The categories of classification are similar to what we mentioned in our approach, with a few more added on later.

Table 7: Stakeholders Met

Stakeholder Category	Stakeholder Consulted
Central and State Pollution Control Boards (Including Pollution Control Committees for Union Territories)	Andhra Pradesh Pollution Control Board Central Pollution Control Board Central Pollution Control Board Zonal office Gujarat Pollution Control Board

Stakeholder Category	Stakeholder Consulted
	Haryana State Pollution Control Board Karnataka State Pollution Control Board Madhya Pradesh Pollution Control Board Maharashtra Pollution Control Board Odisha Pollution Control Board Rajasthan Pollution Control Board Tamil Nadu State Pollution Control Board Uttar Pradesh Pollution Control Board West Bengal Pollution Control Board
District (Local) Administration and Urban Local Body	Ahmedabad Municipal Corporation Bruhat Bangalore Mahanagara Palike (BBMP) District Magistrate, Hooghly District, West Bengal Greater Hyderabad Municipal Corporation Kolkata Metropolitan Development Authority (KMDA) Kolkata Municipal Corporation (KMC) Ludhiana Municipal Corporation Municipal Corporation Greater Mumbai The Collectorate, Udaipur Urban Improvement Trust (UIT) [Under the Urban Development and Housing Department, Government of Rajasthan]
State Health and Environment Departments	Department of Environment, West Bengal
Generators of hazardous waste	Berger Paints India Ltd Exide Industries Ltd.
Operators of TSDFs	Ramky Enviro Engineers (p) Ltd. Mumbai Waste Management Ltd. Tamil Nadu Waste Management Ltd. UPIL
Industries Department of the state government (including Industrial Development Board and SEZ)	Maharashtra Industrial Development Corporation Delhi State Industrial and Infrastructure Development Corporation Ltd.
Industry Associations	Confederation of Indian Industry
Ministerial Bodies	Hazardous Substances Management Division (MoEF) Planning Commission, GoI
Non-governmental organisations (NGOs)	ToxicsLink Hazard Center
Funding Agencies	Gesellschaft für Internationale Zusammenarbeit (GIZ)
Other Government Agencies or Authorities	National Highway Authority of India

Stakeholder Category	Stakeholder Consulted
Technical Institutions and Experts	Indian Institute of Toxicology Research, Lucknow National Environmental Engineering Research Institute

C.4.2. Documents and Desktop Research

In relation to Laws and Regulations for Hazardous Waste Management/ Handling/ Transportation and Treatment

1. CPCB Publication – Hazardous Waste Management Series (HAZWAMS)
2. Computation of Societal Risk Abatement Cost and Long Run Marginal Financial Cost with regard to Dioxin and Furan Emission Standards for Common Hazardous Waste Incinerator
3. Evaluation Study of Functioning of State Pollution Control Boards, Planning Commission, Government of India, September 2000
4. Findings of Menon Committee Report of Supreme Court of India
5. H.P.C, Report of the High Powered Committee on Management of Hazardous Wastes, Volume I, Volume II and Volume III (2001)
6. National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India February 2009 Central Pollution Control Board Hazardous Waste management Division Delhi
7. Action Plan for Abatement of Pollution in Critically Polluted Area of Ludhiana City, Punjab Pollution Control Board, June 2010
8. State-wise Availability of Common Hazardous Waste Treatment, Storage & Disposal Facility (TSDF)
9. LIST OF HAZARDOUS WASTE CONTAMINATED DUMP SITES IN THE COUNTRY (Having Preliminary Information)

Guidelines

10. CPCB, Inventorisation of Hazardous Waste Generating Units in Orissa, Hazardous Waste Management Series: Hazwams / 21/ 2002-03
11. CPCB Publication – Hazardous Waste Management Series (HAZWAMS)
12. CPCB Guidelines for Conducting EIA: Site Selection for Common Hazardous Waste Management Facility
13. CPCB Guidelines for Proper functioning and Upkeep of Disposal Sites
14. CPCB Guidelines for the Selection of site for Land-filling
15. CPCB Guidelines for Transportation of Hazardous Wastes
16. Guidelines For Evaluation And Recognition Of Environmental Laboratories (Revised & Updated Version)

Planning Commission Reports

17. Report of the Working Group on Environment & Environmental Regulatory Mechanisms

18. Report of the Sub-Group on “Environment” for 12th Five Year Plan

Others

19. Pilot project on HW management in Karnataka for carrying state wide survey of industries on quantities and qualities of HW, by GIZ (ASEM)
20. Hazardous Waste MGT Project Formulation Study in GUJARAT, INDIA
21. Environmental and Social Assessment (ESA) Study by ICT for MoEF
22. Overview Of The Current Situation On Brownfield Remediation And Redevelopment In China, the World Bank

References for international overview

Australia

23. Government of New South Wales: Office of Environment and Heritage
<http://www.environment.nsw.gov.au>

EU

24. Consultation on the proposed EU Soil Framework Directive and initial Regulatory Impact Assessment by the Scottish Executive Environmental Quality Directorate, Soil Policy Coordination Team.

http://europa.eu/legislation_summaries

<http://eur-lex.europa.eu>

<http://www.scotland.gov.uk/Resource/Doc/184887/0052024.pdf>

Germany

25. EUGRIS portal for soil and water management in Europe - <http://www.eugris.info>
26. Kiel, Martin. “The remediation of contaminated sites removes barriers to investments and promotes economic growth” Italian Journal of Engineering Geology and Environment, Special Issue 1 (2007)
27. European Environment Agency

<http://www.ehu.es/europeanclass2003/eeasoil.pdf>

<http://www.bmu.de/>

Netherlands

28. Into Dutch Soils, Ministry of Housing, Spatial Planning and Environment
29. Netherlands Soil Remediation Circular 2009, www.esdat.net
30. Policy Development in Soil Remediation in The Netherlands, Co Molenaar, Ministry of Housing Spatial Planning and the Environment

<http://www.agentschapnl.nl/en>

www.cabernet.uk

Romania

31. A Survey of the Romanian Environmental Fund, D.nule.iu Dan-Constantin, Lecturer PhD, University of Alba Iulia, Faculty of Science, Romania
32. Directive 2004/35/CE and Romania, by Mónika Józson
33. Getting the Deal Through- Musat & Asociatii
<http://www.law.muni.cz/content/cs/proceedings/>

Others

34. Sustainable Development – East Asia And Pacific Region, Discussion Paper on “International Experience in Policy and Regulatory Frameworks for Brownfield Site Management” – World Bank – September 2010
http://www.blacksmithinstitute.com/projects/regions/e_europe

Appendix D. - Detailed Review of Acts and Laws

D.1. List of regulations reviewed

Table 8 Comprehensive list of regulations reviewed

Policies	Found to be relevant to aspects of the NPRPS
National Environment Policy, 2006	Yes
National Policy on Resettlement, Rehabilitation, 2007	Yes
National Policy on Disaster Management 2009	Yes
National Mineral Policy, 1999	Not directly relevant
Acts	
The Environment (Protection) Act, 1986	Yes
The National Green Tribunal Act, 2010	Yes
The Water (Prevention and Control of Pollution) Act, 1974	Yes
The Air (Prevention and Control of Pollution) Act, 1981	Yes
The Civil Liability for Nuclear Damage Act, 2010	Yes
The Land Acquisition Act, 1894 amended 1984	Yes
Forest (Conservation) Act, 1980	Yes
The Industries (Development & Regulation) Act, 1951	Yes
The Mines and Minerals (Development and Regulation) Act, 1957	Not directly relevant
The Coking Coal Mines (Nationalisation) Act, 1972	Not directly relevant
The Coal Mines (Nationalisation) Act, 1973	Not directly relevant
Atomic Energy Act, 1962	Yes
The Indian Forest Acts, 1927	Yes
The Carriage by Road Act, 2007	Not directly relevant
The Disaster Management Act, 2005	Not directly relevant
Rules	
Environmental (Protection) Rules, 1986 and amendments thereof	Yes
Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008	Yes
Bio-Medical Waste (Management and Handling) Rules, 1998	Yes
The Batteries (Management & Handling) Rules, 2001	Yes
E-Waste (Management & Handling) Rules, 2011	Yes
Dumping & disposal of Fly-ash Rules, 1999	Yes
The Mineral Conservation and Development Rules, 1988	Yes
Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987	Yes
Municipal Solid Wastes (Management and Handling) Rules, 2000	Yes
The Public Liability Insurance Act and Rules, 1991	Yes

Granite Conservation and Development Rules, 1999	Not directly relevant
The Mining Leases (Modification of Terms) Rules, 1956	Not directly relevant
State, Local Laws and Bye Laws	
West Bengal Municipal Act, 1993 (Functionally the same as Kolkata Municipal Act, 1980)	Yes
The East Kolkata Wetlands (Conservation and Management) Act, 2006	Yes
East Kolkata Wetlands (Conservation & Management) Rules, 2006	Yes
The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004)	Yes
Andhra Pradesh Minor Mineral Concession Rules, 1966	Not directly relevant
The Andhra Pradesh Mica Act, 1957	Not directly relevant
The Andhra Pradesh Forest Act, 1967	Not directly relevant
The Andhra Pradesh Motor Vehicles Rules, 1989	Not directly relevant
Maharashtra Non-biodegradable Garbage (Control) Act, 2006	Yes
Delhi Motor Vehicles Rules, 1993	Not directly relevant
Maharashtra Groundwater Development and Management Act, 2009	Yes
The Tamil Nadu Motor Vehicles Rules, 1989	Not directly relevant
Municipal Corporation of Greater Mumbai Bylaws, 2006	Yes
The Bombay Provincial Municipal Corporations Act, 1949	Not directly relevant
Mumbai Municipal Corporation Act, 1888	Not directly relevant
Karnataka Shops and Commercial Establishments Act, 1961	Yes
Karnataka Municipal Corporations Act, 1976	Yes
Delhi Municipal Council Act, 1994	Not directly relevant
The Himachal Pradesh Municipal Act, 1994	Yes
Rajasthan Municipalities Act, 2009	Not directly relevant
The Uttar Pradesh Municipalities Act, 1916	Yes
The Uttar Pradesh Municipal Corporation Act, 1959	Yes
The West Bengal Municipal Act, 1993	Not directly relevant
The Kerala Municipality Act, 1994	Not directly relevant

D.2. National Environment Policy 2006

History

The National Environment Policy formulated by the Ministry of Environment and Forests, was approved by the Union Cabinet on 18th May, 2006. It was the outcome of extensive consultations with experts in different disciplines, Central Ministries, Members of Parliament, State Governments, Industry Associations, Academic and Research Institutions, Civil Society, NGOs and the Public.

Selection (relevance and merit of review):

The National Environment Policy seeks to extend the coverage, and fill in gaps that still exist in the present national policies for the environmental management. It does not displace, but builds on the earlier policies. It intends to be a statement of India's commitment to making a positive contribution to international efforts. It is a response to our national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), strengthened by judicial interpretation of Article 21. It is recognized that maintaining a healthy environment is not the state's responsibility alone, but also that of every citizen. It briefly describes the key environmental challenges currently and prospectively facing the country, the objectives of environment policy, normative principles underlying policy action, strategic themes for intervention, broad indications of the legislative and institutional development needed to accomplish the strategic themes, and mechanisms for implementation and review. The policy encompasses all the various ingredients of environmental problems. It describes in detail the problems of many environment components like land, water, soil, noise, natural heritage, biodiversity, forests, wildlife etc and at the same time it also highlights the steps that are required to be taken to mitigate such concerns.

Objectives and principles

Precautionary measures to prevent the serious threats to key ingredients of environment by cost effective means is one of the major highlights of the policy. Economic efficiency may be sought to realize environment conservation. The technique that must be adopted is that that the environmental resources must be given economic value. "Polluters pay" principle has a significant role that has to be considered while measuring the economic value of a resource. The principle actually means "the implications of the act of production and consumption of one party must not be borne by another party who is unknowingly subjected to the implications, If the costs (or benefits) of the externalities are not re-visited on the party responsible for the original act, the resulting level of the entire sequence of production or consumption, and externality, is inefficient." Economic efficiency may be restored by making the perpetrator of the externality bear the cost (or benefit) of the same. The policy will, accordingly, promote the internalization of environmental costs, including through the use of incentives based policy instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest, and without distorting international trade and investment. Equity in every sense is something that is sought.

Legal liability "the principle of legal liability may be viewed as an embodiment in legal doctrine of the "polluter pays" approach, itself deriving from the principle of economic efficiency."

The following alternative approaches to civil liability may apply:

"In a fault based liability regime a party is held liable if it breaches a pre-existing legal duty, for example, an environmental standard."

"Strict liability imposes an obligation to compensate the victim for harm resulting from actions or failure to take action, which may not necessarily constitute a breach of any law or duty of care."

The policy also encourages the use of Economic Principles in Environmental Decision-making.

Specific Context

It suggests the creation of a National Environment Restoration Fund from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary

contributions which may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.

The policy while explaining the pollution of the ground water mentions that the water table has been falling rapidly in many areas of the country in recent decades. Some pollution of groundwater occurs due to leaching of stored hazardous waste and use of agricultural chemicals, in particular, pesticides. Contamination of groundwater is also due to geogenic causes, such as leaching of arsenic and fluoride from natural deposits. The policy further suggests that:

“Suitable sites for dumping the toxic waste material may be identified and remedial measures may be taken to prevent the movement of the toxic waste in the ground water.”

The policy when talking about the wetlands have mentioned that the wetlands may be employed as an alternative to power, technology, and capital intensive municipal sewage plants; however, if used for this purpose without proper reckoning of their assimilative capacity, or for dumping of solid and hazardous waste, they may become severely polluted, leading to adverse health impacts. It further suggests setting up a legally enforceable regulatory mechanism for identified valuable wetlands, to prevent their degradation and enhance their conservation.

The policy further goes on to explain pollution and various types of pollution, *“Pollution is the inevitable generation of waste streams from the production and consumption of anything.”*

Soil pollution: *“Management of industrial and municipal waste is the major cause of soil pollution and is a serious challenge in terms of magnitude and required resources.”*

Performing institutions

A number of policy objectives, principles and the action plans have been suggested by the policy for different areas of the key environmental challenges. Such plans would need to be prepared on identified themes by the concerned agencies at all levels of Government Central, State/UT, and Local. In particular, the State and Local Governments would be encouraged to formulate their own strategies or action plans consistent with the National Environment Policy. Empowerment of Panchayats and the Urban Local Bodies, particularly, in terms of functions, functionaries, funds, and corresponding capacities, will require greater attention for operationalising some of the major provisions of this policy.

An Action Plan as suggested by the policy to mitigate ‘soil pollution’ will comprise:

- (a) Develop and implement viable models of public-private partnerships for setting up and operating secure landfills, incinerators, and other appropriate techniques for the treatment and disposal of toxic and hazardous waste, both industrial and biomedical, on payment by users, taking the concerns of local communities into account. Develop and implement strategies for clean up of toxic and hazardous waste dump legacies, in particular in industrial areas, and abandoned mines, and reclamation of such lands for future, sustainable use.*
- (b) Survey and develop a national inventory of toxic and hazardous waste dumps, and an online monitoring system for movement of hazardous wastes. Strengthen capacities of institutions responsible for monitoring and enforcement in respect of toxic and hazardous wastes.*
- (c) Strengthen the legal arrangements and response measures for addressing emergencies arising out of transportation, handling, and disposal of hazardous wastes, as part of the chemical accidents regime.*

(d) *Develop and enforce regulations and guidelines for management of e-waste, as part of the hazardous waste regime.*

(e) *Promote, through incentives, removal of barriers, and regulation, the beneficial utilization of generally nonhazardous waste streams such as fly ash, bottom ash, red mud, and slag, including in cement and brick making, and building railway and highway embankments.*

D.3. The Environment (Protection) Act, 1986

Selection

Environment Protection Act, 1986 is an act to provide for the protection and improvement of environment and for matters connected therewith. The act not only defines “hazardous waste” but also elaborates the steps that the central government is required to take for laying down procedures and safeguards for the handling of hazardous substances. It provides for the detailed provisions under which the central government is empowered to make rules and see to it that they are complied with by the people. The act lays down the penalty for the contravention of the act and the rules and directions.

History

Environment Protection Act, 1986 was formulated on 19th November, 1986 vide Notification No. G.S.R. 1198(E) dated 12-11-86 published in the Gazette of India No. 525 dated 12-11-86. It was the outcome of the discussions held in the United Nations Conference on the Human Environment held at Stockholm in June, 1972, in which India participated, to take appropriate steps for the protection and improvement of human environment. Hence it was felt necessary further to implement the decisions aforesaid in so far as they relate to the protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property and therefore this act was an effort on the part of the legislators to incorporate those decisions and combating the environmental threats.

Objective and principles of the regulation

The entire act has been divided into four chapters. The first chapter mentions the title and commencement of the act and it also includes the definitions where it specifically defines “hazardous substance”. The second chapter refers to the powers of the central government to make laws, rules and directions for laying down procedures and safeguards for the handling of hazardous waste. The third chapter refers to the steps that have to be taken by the government for the prevention, control and abatement of environmental pollution. It also includes penalty for contravention of prevention of the act, rules, direction etc. it also includes the procedure to be followed while carrying on the investigation, the method of collecting the sample, provisions of governmental analysts and laboratories etc. The fourth chapter includes miscellaneous provisions.

Context

It defines the hazardous waste under section 2(C) *“hazardous substance means any substance or preparation which, by reason of its chemical or physico-chemical properties or handling, is liable to cause harm to human beings, other living creatures, plant, micro-organism, property or the environment.”*

Under sections 3, 6 and 25 of the act, it gives the power to, the Central Government, to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the

quality of the environment and preventing controlling and abating environmental pollution for laying down procedures and safeguards for the handling of hazardous substances. Section 3 (2) provides the various matters on which the Central Government may take measures:

(vii) *Laying down procedures and safeguards for the handling of hazardous substances.*

Section 8 further provides that “*No person shall handle or cause to be handled any hazardous substance except in accordance with such procedure and after complying with such safeguards as may be prescribed.*”

Performing institutions

By the virtue of section 3 the Central Government is vested with the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.

U/s 3 (3) the Central Government is empowered to constitute an authority or authorities by such name or names as may be specified in the order for the purpose of exercising and performing such of the powers and functions (including the power to issue directions under section 5) of the Central Government under this Act and for taking measures with respect to such of the matters referred to in sub-section (2) as may be mentioned in the order and subject to the supervision and control of the Central Government and the provisions of such order, such authority or authorities may exercise and powers or perform the functions or take the measures so mentioned in the order as if such authority or authorities had been empowered by this Act to exercise those powers or perform those functions or take such measures.

Section 6 (2) provides that the Central Government may in particular, and without prejudice to the generality of the foregoing power may make such rules that may provide for all or any of the following matters, namely:--

(c) The procedures and safeguards for the handling of hazardous substances

(d) The prohibition and restrictions on the handling of hazardous substances in different areas

Section 25 of the act provides that “*The Central Government may, by notification in the Official Gazette, make rules for carrying out the purposes of this Act for all or any of the following matters:*

2(b) the procedure in accordance with and the safeguards in compliance with which hazardous substances shall be handled or caused to be handled under section 8.”

The Act has special provisions in various sections that gives any person empowered by the Central Government in this behalf, a right to enter, at all reasonable times with such assistance as he considers necessary, any place subject to certain conditions.

The Central Government or any officer empowered by it in this behalf shall have power to take, for the purpose of analysis, samples of air, water, soil or other substance from any factory, premises or other place in such manner as may be prescribed. The Central Government may by notification in the Official Gazette, appoint or recognize such persons as it thinks fit and having the prescribed qualifications to be Government Analysts for the purpose of analysis of samples of air, water, soil or other substance sent for analysis to any environmental laboratories.

Impact

The act also mentions the penalties for non compliance with the provisions of the act, rules, directions etc. Section 15 of the act provides for:

(1) Whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued thereunder, shall, in respect of each such failure or contravention, be punishable with imprisonment for a term which may extend to five years with fine which may extend to one lakh rupees, or with both, and in case the failure or contravention continues, with additional fine which may extend to five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

(2) If the failure or contravention referred to in sub-section (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

On the basis of the powers granted by the act to the Central Government to make rules it has formulated Hazardous Wastes (Management and Handling) Rules, 1989, Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989; and Rules for the Manufacture, Use, Import, Export and Storage of Hazardous Micro organisms, Genetically-engineered organisms or Cells.

D.4. Environmental (Protection) Rules, 1986 and amendments thereof

History

A notification of the Government of India by the Ministry of Environment and Forests was published in the Gazette of India and a corrigendum was published in the Gazette of India dated 19.11.1986 under powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986.

Selection

The Environment (Protection) Rules, 1986 inter alia deals with the prohibition and restriction on the handling of hazardous substances. The Environment (Protection) Act, 1986 u/s 3 and 6 conferred a duty on the Central Government to draft the Environment (Protection) Rules, 1986 to lay down procedures and safeguards for handling hazardous waste. These rules provide in detail the procedures to handle hazardous waste and at the same time set up the emission standards of the various industries with respect to hazardous wastes in its schedules.

Objective and Principles

With reference to environmental pollutants, the Rules set standards of emission and discharge of environmental pollutants from various industrial emissions, and define processes for preventing and abating environmental pollution, by the Central Government. The State Government may set more stringent standards.

The time period of compliance of these standards by the industries is also defined in the Rules. Rule 3 (B) provides ambient air quality standards for emission of environmental pollutants for an area from industries, operations, processes, automobiles and domestic sources collectively. It also outlines the procedure that the Central Government must follow while prohibiting or restricting the location of industries and carrying on of processes and operations in an area. It lays down the procedure for collection, submission of samples for analysis, and the form of laboratory reports thereon. It lays down the functions of laboratories and the manner of giving notices to the various

industries, sectors and operations.

Context

Rule 13 provides for the factors that the Central Government may consider while prohibiting or

(i) The hazardous nature of the substance (either in qualitative or quantitative terms as far as may be) in terms of its damage causing potential to the environment, human beings, other living creatures, plants and property;

(ii) the substances that may be or likely to be readily available as substitutes for the substances proposed to be prohibited or restricted;

(iii) the indigenous availability of the substitute, or the state of technology available in the country for developing a safe substitute;

(iv) the gestation period that may be necessary for gradual introduction of a new substitute with a view to bringing about a total prohibition of the hazardous substance in question; and

(v) any other factor as may be considered by the Central Government to be relevant to the protection of environment.

restricting the handling of hazardous substances:

Rule 13 (2) lays down the procedure that is required to be followed by the Central Government while prohibiting or restricting the handling of hazardous substances in an area including their imports and exports. The Central Government must publish in the official gazette (by notification) prohibition or handling of hazardous substances in a particular area. This notification must include the reason of the imposition, the nature of the hazardous substance and the geographical area. The rules also specify the time limit for raising objections to the notification and the time period of addressing the same by the central government.

Rule 14 requires that industries shall submit an environmental audit report for the financial year ending the 31st March in Form V to the concerned State Pollution Control Board as per the provisions of this rule and under the Hazardous Wastes (Management and Handling) Rules, 1989 issued under the Environment (Protection) Act, (9 of 1986).

Performing Institutions

Rule 4 provides for the procedure that needs to be followed by the Central Government and the Central Pollution Control Board to issue directions under Section 5 of the Environment Protection Act. The Central Government may issue directions under Section 5 for closure, prohibition or regulation of any industry, operation or process or the stoppage of electricity or water or any other service.

Rule 5 lays down the factors that the Central Government may take into consideration while prohibiting or restricting the location of industries, processes and operations and lays down the procedure for issue of notifications for the same.

Rule 14 requires any person carrying on an industry, operation or process, requiring authorization under the Air Act, Water Act and Hazardous Waste Rules to submit an environmental audit statement annually.

Impact

The present rules have been given effect by the Central Government by passing a number of notifications. There are notifications relating to the standards regarding the iron ore industry, dying industry, organic chemicals manufacturing industries, plaster of Paris industry, brick kiln sector, petroleum industry, sponge iron plants, sulphuric acid plant, dg sets industry etc.

Environment (Protection) Amendment Rules, 2008 (Common Hazardous Waste Incinerator) highlights the emission levels of various chemicals in an incinerator and it also highlights a few safety measure that is required to be followed.

The Environment Rules do not provide for assigning liability. Applicable fines and penalties are as per the provision of the Environment Protection Act.

D.5. Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008

Selection

These rules related to several important aspects of hazardous waste disposal. Ultimate safe disposal of hazardous waste depends upon its proper handling and transport. An important feature is the coverage of transboundary movement. Apart from the technical risks associated with movement of waste from where it is generated to its final destination for disposal, there are many administrative considerations that need to be addressed as the waste crosses administrative boundaries.

History

The Rules have been framed in exercise of the powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986.

Objective

It regulates storage, import and export of hazardous waste. It attempts to address the issue of risk transferred when hazardous waste is moved from one location to another.

Context/Relevant Sections

These rules do not cover waste water and exhausts under the Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 respectively; biomedical wastes; municipal solid wastes ; wastes from ships and radio active wastes.

3. Definitions

(h) “environmentally sound management of hazardous wastes” means taking all steps required to ensure that the hazardous wastes are managed in a manner which shall protect health and the environment against the adverse effects which may result from such waste;

(i) “hazardous waste” means any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment, whether alone or when in contact with other waste or substances, and shall include wastes specified under Schedule 1, constituents specified in Schedule II in concentration exceeding limits indicated ; import or export of such wastes specified in Part A or Part B of the Schedule-III in respect of import or export of such wastes in accordance with rules 12, 13 and 14 or the wastes other than those specified in Part A or Part B if they possess any of the hazardous characteristics specified in Part C of the Schedule.

(m) “hazardous waste site” means a place of collection, reception, treatment, storage of hazardous wastes and its disposal to the environment which is approved by the competent authority;

(zd) “treatment” means a method, technique or process, designed to modify the physical, chemical or biological characteristics or composition of any hazardous waste so as to reduce its potential to cause harm;

Rule 4. Places primary responsibilities on the occupier for handling of hazardous wastes for safe and environmentally sound handling of hazardous wastes generated in his establishment;

- for sale to a recycler or re-processor or re-user registered or authorized under these rules or shall be disposed of in an authorized disposal facility;
- for storage of hazardous wastes in a prescribed manner and for limited time at the site;
- and for transportation in accordance with the provisions of these rules. The occupier or any other person acting on his behalf who intends to get his hazardous wastes treated and disposed of by the operator of a Treatment, Storage and Disposal Facility shall give to the operator of a facility, such information as may be determined by the State Pollution Control Board.
- The occupier shall take adequate steps to prevent accidents and limit their consequences on human beings and the information necessary to ensure their safety.

As per Rule 8 every person desirous of recycling, reprocessing, and reuse of hazardous wastes shall obtain registration from the Central Pollution Control Board. In granting such permission the Central Pollution Control Board shall be satisfied that such person is using environmentally sound technologies and has technical facilities and capabilities. The occupier generating the hazardous

waste specified in Schedule-IV may sell it only to the recycler having a valid registration from the Central Pollution Control Board for recycling or recovery. As per Rule 10 the Central Pollution Control Board may issue the guidelines for standards of performance for recycling processes. As per Rule 11 the utilization of hazardous wastes as a supplementary resource for energy recovery, or after processing shall be carried out by the units only after obtaining approval from the Central Pollution Control Board.

Import and export (transboundary movement) of hazardous wastes

The Ministry of Environment and Forests shall be the nodal Ministry to deal with the transboundary movement of the hazardous wastes and to grant permission for transit of the hazardous wastes through any part of India. Rule 13 does not permit import of hazardous wastes; however, import is permitted for recycling, recovery and reuse. Wastes categorized under the different Schedules are regulated differently for imports and exports. Generally, the Central Government shall permit exports subject to full cover insurance policy and prior informed consent of the importing country. Rule 16 provides that Central Government shall permit import of Hazardous Wastes. The Central Government shall refer the application to Ministry of Environment and Forests and the relevant State Pollution Control Board to ensure that environmentally sound recycling, recovery and reuse facilities, and adequate facilities for treatment and disposal are available. The Customs Authority is to collect 3 samples as per provision of the Customs Act for analysis and retain the report.

Rule 17 export and import of hazardous wastes from and into India shall be deemed illegal if it is without permission of the Central Government; permissions are obtained through falsification, mis-representation or fraud; it does not conform to the shipping details; it results in deliberate disposal (i.e.dumping) of hazardous wastes in contravention of the Basel Convention and of general principles of International or National Law. In case of illegal import of the hazardous wastes, the importer shall re-export the waste in question at his cost within a period of ninety days from the date of its arrival into India and its implementation will be ensured by the concerned State Pollution Control Board.

Chapter V deals with facilities for treatment, storage and disposal of hazardous wastes. The State Government, occupier and operator of any facility or any association of occupiers shall individually or jointly or severally be responsible to identify sites for establishing the facility for treatment, storage and disposal of hazardous wastes.

Central Pollution Control Board is required to issue technical guidelines for such TSDF. The State Pollution Control Board shall approve the design and layout of such facility and monitor the setting up and operation of such TSD facility. The Operator of such TSDF shall be responsible for safe and environmentally sound operation and closure and post closure phase as per the Guidelines of the Central Pollution Control Board.

Chapter VI deals with Packaging Labelling and Transport of Hazardous Wastes. The CPCB is to issue Guidelines for safe packaging, labelling and transportation of wastes. Transportation of Hazardous Wastes is to be in accordance with provisions of the Central Government under the Motor Vehicles Act, 1988 and other guidelines. Both State Pollution Control Board NOC is required in case the wastes are disposed in a state other than where it is generated.

Performing institutions

As per Rule 5 every person engaged in generation, processing, treatment, package, storage, transportation, use, collection, destruction, conversion, offering for sale, transfer or the like of the hazardous waste shall require to obtain an authorization from the State Pollution Control Board. Similarly registration for recycling and reprocessing is also granted by the State Pollution Control Board. Ministry of Environment is the nodal agency acts as the nodal agency for imports and exports of hazardous waste.

Similarly, the occupier may sell hazardous waste as laid down in the Schedule only to a recycler having a valid registration form the Central Pollution Control Board. The occupier is bound to inform the State Pollution Control Board in case of any accident. The State Government and the occupier are jointly and severally responsible for treatment, storage and disposal of hazardous waste.

Central Pollution Control Board is required to issue Technical Guidelines for operation of TSDFs, closure and post closure guidelines for TSDFs and guidelines for safe handling storage and transport.

Also Customs authorities are required to take samples and permit imports and exports as per the Rules.

Impact

The occupier , importer, transporter and operator shall be liable for damage caused to the environment resulting due to improper handling of hazardous waste. Rule 25 (2) provides for financial penalties for violation of provisions as levied by the State Pollution Control Board with the prior approval of the Central Pollution Control Board . Penalty provisions are more precise and usually set out the penalty in terms of money or penal punishment. Rule 25 (2) is vague. The basis on which the Central Board should grant approval for penalties imposed by the State Board is not provided.

D.6. Bio-Medical Waste (Management and Handling) Rules, 1998

Selection

The Bio-Medical Waste (Management and Handling) Rules, 1998 should be included in the review of the current systems as it deals with the all forms of usage of bio – medical wastes right from generation to disposal of the same. The Environment (Protection) Act, 1986 u/s 3, 8 and 25 had conferred a duty on the central government to draft the Bio-Medical Waste (Management and Handling) Rules, 1998 to lay down procedures for storage, transportation, disposal etc. of bio-medical waste, which also includes hazardous waste in the form of solids and liquid chemicals. These rules in detail mention the procedures to dispose hazardous bio-medical waste and at the same time formulate the duties towards all occupiers in respect to bio-medical waste handling sites.

History

A notification in exercise of the powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986) was published in the Gazette vide S.O. 746 (E) dated 16 October, 1997 inviting objections from the public within 60 days from the date of the publication of the said notification on the Bio-Medical Waste (Management and Handling) Rules, 1998 and whereas all objections received were duly considered.

Objective and Principles

These rules apply to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form. It imparts a duty on every occupier of an institution generating bio-medical to ensure that such waste is handled without any adverse effect to human health and the environment. All wastes generated from these institutions shall be treated and disposed of in accordance with Schedule I, and in compliance with the standards prescribed in Schedule V of these rules. Occupier in relation to any institution generating bio-medical waste means a person who has control over that institution and/or its premises.

These rules classify type of wastes in accordance to their properties and prescribe appropriate methods for their disposal keeping in mind appropriate methods that suit best for those properties.

Context

SCHEDULE V

STANDARDS FOR TREATMENT AND DISPOSAL OF BIO-MEDICAL WASTES...

...Toxic metals in incineration ash shall be limited within the regulatory quantities as defined under the Hazardous Waste (Management and Handling Rules,) 1989

... Microwave treatment shall not be used for cytotoxic, hazardous or radioactive wastes, contaminated animal car casses, body parts and large metal items...

Though these rules directly do not name any waste as hazardous in any of its categories under Schedule I of the rules, under Schedule V i.e. for the standard for treatment and disposal of Bio – Medical waste. It lays down specifically which of the forms of treatments are not to be used for hazardous wastes. Also it refers to regulatory quantities under Hazardous Waste (Management and Handling) Rules, 1989 for limitation of emission from toxic wastes.

Performing Institutions

The rules provide for the procedure that the Government of every state and union territory to establish a competent authority for the implementation of these rules. The authorities are to work under the supervision and control of the State Government. It shall be the duty of the authority to enquire whether an applicant is capable of handling bio-medical wastes. Along with questioning and enquiring whether a new applicant is capable of handling these wastes in accordance to these rules it shall follow same procedure while renewing an authorization. These authorizations shall be valid for a term of 3 years with the 1st years being for trial period, all subsequent authorizations will be valid for a further period of 3 years.

The Prescribed authority so formed by the respective government shall have all powers in respect to these institutions from granting authorizations to renewals to keep records of annual reports and forwarding them to the concerned authority and also to accept details of accident if any while handling.

Impact

The Rules were formulated in 1998 and have been amended in 2003 subsequently to include the armed forces medical services under ministry of defence under these rules. Though the rules provide that if an accident at any institution or facility or at any site where these wastes are handled

or during the course of transportation takes place, it needs to be reported by the authorized person to the prescribed authority, the rules do not empower the prescribed authority to enquire into the matter and punish the offenders.

D.7. The Batteries (Management and Handling) Rules, 2001

Selection

The Batteries (Management and Handling) Rules, 2001 is included in the review of the current systems as it deals with the handling and recycling of used Batteries. The used batteries are non-biodegradable in nature and thus, their handling becomes of vital importance. The Batteries (Management and Handling) Rules, 2001 also should be included in the present system because; it serves as an important legislation targeting a specific hazardous waste.

History

A notification of the Government of India in the Ministry of Environment and Forests was published in the Gazette of India and a corrigendum was published in the Gazette of India dated 23d June, 2000 under powers conferred by sections 6, 8 and 25 of the Environment (Protection) Act, 1986 inviting objections from persons likely to be affected after which all objections received were duly considered by the Central Government. It was subsequently amended in 2010.

Objective and Principles

The objectives of The Batteries (Management and Handling) Rules, 2001 are, to regulate proper management & handling of Lead Acid Batteries, to collect back the batteries sold in a phased manner and to ensure that such handling/ reprocessing is done by authorized recyclers who have the requisite technology without adversely affecting the environment and human health.

The Batteries (Management and Handling) Rules, 2001 places **certain liability** on various individuals, including the producers, dealers, recyclers, auctioneers, importers and consumers of batteries in order to prevent any untoward environmental degradation.

Context

Clause 7 of The Batteries (Management and Handling) Rules, 2001, describes the duties of the dealer and his liabilities. It lays down activities that he needs to take. Subsection (i) makes it clear that it is the dealer's duty to make sure that the Batteries are collected back and to give a discount on returned batteries. An obligation is also put on the dealer to provide safe transportation of collected batteries and to ensure no environmental damage occurs during storage.

5. *It shall be the responsibility of the manufactures, importers, assemblers and re-conditioners to:*
 - (i) *Ensure that the number of the used batteries collected back should be at least 90 percent of the new batteries sold excluding those sold to original equipment manufacturer and bulk consumers.*
 - (ii) *Ensure that used batteries collected back are of similar type and specifications as that of new batteries sold.*
 - (iii) *File half yearly return of their sales and buy back to the State Board*
 - (iv) *Set up the collection centres either individually or jointly at various places for collection of used batteries from consumers or dealers.*

- (v) *Ensure that used batteries collected are sent only to the registered recyclers.*
- (vi) *Ensure that necessary arrangements are made with dealers for safe transportation from collection centres to the premises of the registered recyclers.*
- (vii) *Ensure that no damage to the environment occurs during transportation.*
- (viii) *Create public awareness through advertisements, publications, posters or by other means with regard to the following:*
 - a) Hazards of Lead b) Responsibility of Consumers to return their used batteries only to the dealers or deliver and designated collection centers. c) Addresses of dealers and designated collection centers.*
- (ix) *Use the international recycling sign on batteries.*
- (x) *Buy recycled lead only from registered recyclers and*
- (xi) *Bring to the notice to the State Board or the Ministry of Environment and Forests any violation by the dealer*

7. Responsibilities of dealer. - *It shall be the responsibility of a dealer to*

- (i) ensure that the used batteries are collected back as per the Schedule against new batteries sold;*
- (ii) give appropriate discount for every used battery returned by the consumer;*
- (iii) ensure that used batteries collected back are of similar type and specifications as that of the new batteries sold;*
- (iv) file half-yearly returns of the sale of new batteries and buy-back of old batteries to the manufacturer in Form V by 31st May and 30th November of every year-;*
- (v) ensure safe transportation of collected batteries to the designated collection centres or to the registered recyclers ; and*
- (vi) ensure that no damage is caused to the environment during storage and transportation of used batteries.*

Performing Institutions

As per Cl. 5 the Importers are to register with the Ministry of Environment and Forests, and Cl. 6 provides for an additional requirement of a valid registration with Reserve Bank of India, and latest half yearly return for Custom Clearance for Imports of new lead acid batteries. Cl. 7 provides that a half yearly return has to be filed by the Dealer with the Manufacturer. Cl. 8 provides that a Recycler shall apply for registration to the Ministry of Environment and Forests, and shall submit annual returns to the State Board for inspection. The Recycler is also required to make available all records to the State Board for inspection. As per Cl. 9 every Recycler of used batteries shall make an application as per the prescribed form to the Joint Secretary of Ministry of Environment and Forests for grant of registration or renewal in along with the following permissions: Valid consents under the Water Act and Air Act, authorisations under the Hazardous Wastes (Management and Handling) Rules, certificate of registration with the District Industries Centre and proof of installed

capacity from the State Pollution Control Board/ District Industries Centre. Joint Secretary of the Ministry is to take a decision on the Application for registration or renewal or refuse the Application. As per Cl. 8 (9) the State Boards are to monitor the compliance with conditions imbibed while according registration. As per Cl. 10 bulk consumers are also required to file half yearly returns with the State Boards. As per Cl. 11 an Auctioneer shall file half yearly returns of their auctions to the State Board and the State Boards make these records available for inspection.

The Batteries (Management and Handling) Rules, 2001's prescribed authority for ensuring compliance of the provisions of these rules is the State Board which files an annual compliance status report to the Central Pollution Control Board by 30th April of every year. The Central Pollution Control Board compiles and publishes the data received every year from the State Boards. It also reviews the compliance of the rules periodically to improve the collection and recycling of used lead batteries and to appraise the Ministry of Environment and Forests, Government of India. The Ministry of Environment and Forests also has to develop computerised systems for tracking of: distribution and sale of batteries; collection, auction, transport and re-processing of used batteries; sale of re-processed lead by registered recyclers; sale of lead from all domestic producers or importers.

Accumulative Capacity is not covered in these rules. There is a need that the number of used batteries which are collected back should be 90% of new batteries sold. These are to be done regularly and not merely after accumulation.

Impact

The Lead Acid Battery Rules was introduced in 2001. This rule represents a major step forward in the effort to facilitate the recycling of nickel-cadmium and lead-acid rechargeable batteries. At present, approximately 73 percent of municipal solid waste is either land filled or incinerated. Neither of these methods is ideally suited for batteries that contain heavy metals. A public education program can heighten awareness of the recycling program, involve more individuals and businesses, and increase the number of batteries collected.

However it must be noted that neither fine nor penalty is imposed under these Rules. Therefore, only the duties of the various stakeholders are mentioned and not any fine for contravention of such duties.

A Workshop for Mass Awareness on implementation of the Rules held by the Maharashtra Pollution Control Board held in March 2009 reported the discussion and conclusion on implementation of the Rules.

Difficulties faced by Manufacturers of Batteries

- Offering best price possible for scrap battery.
 - requires documentation to be done
 - cannot pay cash
 - cannot make the payment without bill
- Cannot compete with unauthorized users.
- Problems in collecting used batteries from dealers and sending them to the collection centers.
 - Normally takes 7 days,

- Payment can be made only after 7 days to the dealer in that manner
- Cannot compete with unauthorized users as they are ready to pay cash on the spot.
- Market share of authorized manufacturers only 40% against 60% market share by unauthorized manufacturers, who are not effectively covered under the Rules.
- Only manufacturer is penalized, as it is the sole responsibility of manufacturers to get the forms (returns) from Dealers and fill the same with the state pollution control board.

Difficulties faced by the Dealers

- There is no guarantee that the customer will return the used battery after purchase of new battery to the same dealer.
- Legislation cannot cover the customer effectively.
- In case of battery sold to UPS/ Invertors as new assembly, dealer may not in a position to collect the used battery.
- Dealers can earn cash money if batteries are sold to unauthorized smelters. For that no paper work is required.

Difficulties faced by the Importers

- Sealed Maintenance Free L A B (SMF) Valve Regulated L A B (VRLA) are the main batteries imported.
- Sale of batteries along with consumer product: indirect contact with consumers economical
- SMF/ VRLA have new market having durability of life of four years
- There is no contract agreement between consumer and importer/dealer
- Presently there is no set-up/network of dealers of individual importers
- Presently there is no co-ordination amongst dealers of imported batteries, manufacturers and other dealers to collect used LABs.

Difficulties faced by the Recyclers

- In between period of application of Renewal of Registration up to obtained renewal of registration, they cannot purchase batteries.
- Xerox copies of registration are used by some other parties for purchasing batteries.
- Confusion due to lack of clarity between Batteries Rules 2001 and H. W. (M& H) Rules, 2003.

Due to all these difficulties, the proper implementations of these Rules are seen as difficult.

D.8. E-Waste (Management And Handling) Rules 2011

Selection

In view of the significant amount of e-wastes generated, there is an urgent need to regulate the same. E-Waste is considered a type of hazardous wastes. This notification refers to the concept of Extended Producer Responsibility which requires the producer to ensure producers are responsible for collection at the “end of life” of the product.

History

E-waste rule which has just been legislated has come into effect from May 1st 2012 e-waste management and handling rules 2010 was published by the Government of India in Ministry of Environment and Forest vide no S.O. 1125 (E) dated 14th May in the gazette of India. The Central Government while exercising power under section 3, 6 and 25 of the Environment Protection Act, 1986 has formulated the following rules.

Objective and Principles

From 1st May 2012, it is illegal to dump an old TV, mobile or laptop into the garbage bin or sell any of these to the local scrap dealer. Under the Electronic Waste (Management and Handling) Rules, 2011, such waste must be routed to one of only 73 authorized recyclers (like Eco Raksha) in India. The rules give a series of definitions like e-waste, bulk consumer, producer, extended producer responsibility etc. The second chapter refers to the responsibilities of the producers, bulk consumers and consumers collection centers while they are handling e-waste. It categorically defines the responsibilities of the consumer, bulk consumer, producer, collection centre, dismantler, and recycler of electronic equipment. Chapter III of the rules specifically talks about the procedure for authorizing and registration of handling e-waste and procedure of cancelling the authorization. Chapter V provides for reduction in the use of hazardous material in the production of electrical and electronic equipment, it mentions in details the responsibilities of producers producing the electrical appliances and using hazardous materials in the same. It has a special section for transportation of e waste and accident reporting and follows up.

Context

Rule 3 clause (k) 'e-waste' means waste electrical and electronic equipment, whole or in part included in, but not confined to equipment listed in Schedule-I and scraps or rejects from their manufacturing process, which is intended to be discarded.

Rule 3 clause (c) 'bulk consumer' means bulk users of electrical and electronic equipment such as Central or State Government Departments, Public sector undertakings, banks, Private companies, Educational institutions, Multinational organizations and others that are registered under the Factories Act 1948, Companies Act 1956 or the Societies Registration Act 1860, and the Micro, Small and Medium Enterprises Development Act, 2006 including the international agencies;

Rule 3 clause (q) 'producer' means any person who, irrespective of the selling technique used;

- manufactures and offers to sale electrical and electronic equipment under his own brand; or
- offers to sale under his own brand, the assembled electrical and electronic equipment produced by other manufacturers or suppliers; or
- offers to sale imported electrical and electronic equipment;

Rule 3 clause (l) 'extended producer responsibility' (EPR) means responsibility of any producer of electrical or electronic equipment, for their products beyond manufacturing until environmentally sound management of their end-of-life products.

Rule 4 Responsibilities of the Producer

1. Collection of e-waste generated during the manufacture of electrical and electronic equipment and channelizing the same for recycling of disposal.

2. Collection of e-waste from the 'end of life' of their product in line with the principle of 'Extended Producer Responsibility (EPR)', and to ensure that such e-wastes are channelized to registered refurbisher or dismantler or recycler.
3. Setting up collection centers or take back system either individually or collectively
4. Financing, and organizing a system to meet the costs involved in the environmentally sound management of e-waste generated from the 'end of life' of its own products and historical waste available on the date from which these rules come in to force. Such financing system shall be transparent. The producer may choose to establish such financial system either individually or by joining a collective scheme.
5. Creating awareness through publications, advertisements, posters, or by any other means of communication and information booklets accompanying the equipment, with regard to the following:-
 - Information on hazardous constituents in e-waste electrical and electronic equipment
 - Information on hazardous or improper handling, accident breakage, damage and/or/ improper recycling of e-waste.
 - Instructions for handling the equipment after its use, along with the Do's and Don'ts;
 - Affixing the symbol given on the product to prevent e-waste from being dropped in garbage bins containing waste destined for disposal.

Rule 6 Responsibilities of consumer or bulk consumer

1. *Consumers of electrical and electronic equipment shall ensure that e-waste are deposited with the dealer or authorized collection centers.*
2. *Bulk consumers of electrical and electronic equipment shall ensure that e-waste are auctioned to or deposited with the dealer or authorized collection centers or refurbisher or registered dismantler or recyclers or avail the pick-up or take back services provided by the producers; and*
3. *Bulk consumers shall file annual returns in Form 3, to the concerned State Board.*

Other rules lay down the safeguards to be adopted by recyclers and dismantlers.

Chapter V rule 13 provides: Responsibilities of producers while using hazardous substances in the manufacture of electronic equipments

- *Every producer of electrical equipment listed in schedule I (information technology, telecommunication and consumer electrical and electronics) shall ensure that the new electrical equipment must not contain lead, mercury, cadmium, hexavalent chromium, and polybrominated biphenyl or polybrominated diphenyl ethers. Only 0.1% proportion of this material by weight is allowed.*
- *Information of such reduction in hazardous waste and detailed information of such equipment must be provided in the booklet.*
- *Imports and placement in the market shall be allowed for those electrical appliances that abide by the clause 1 of rule 13.*

Performing Institutions

Rule 5 requires the producers to obtain authorization from the State Pollution Control Board, file annual returns with the Board and maintain records in the prescribed format.

Schedule III read with Rule 14 provides that the that main duties of the Central Pollution Control Board has the duty to take prepare guidelines for management of e-wastes, co-ordinate with State Boards, conduct assessment of e-waste generation, recommend standards and specifications, document data on e-waste, enforce provisions for reduction of hazardous substances in electronic equipment. The duties of the State Pollution Control Board include inventorization of e-waste, grant renewal and authorization, register recyclers of e-waste, monitoring and take action against violators. Local bodies are required to segregate e-waste from municipal wastes and ensure proper disposal of orphaned products.

Impact

This law introduces the concept of “Extended Producer Responsibility” in case of management of wastes. It also creates a regulatory frame work from cradle to grave of a product.

D.9. Dumping and disposal of Fly-ash Rules, 1999

Selection

The importance of including the Dumping and disposal of Fly-ash Rules, 1999, in the current system is that it covers a very important hazardous waste, namely fly-ash. The Rules issued in the official gazette clearly enumerate the need, necessity, and manner of management of Fly-ash. This is a land related selection, which deals with top soil, the effect of fly ash on land and the ability of reusing fly ash with regards to building constructions.

History

This regulation was first promulgated in the year 1998, when under Sub rule (3) of Rule 5 of the Environment (Protection) Rules, 1986 under the notification of the Government of India in the Ministry of Environment and Forests, asking for recommendations and objections for a draft notice of Fly ash Rules. Subsequently, via a Public Interest Litigation(PIL) in August,1999 the Hon’ ble High Court of Delhi issued a notice to the Central Government, to publish the final notification in respect of fly ash on or before 26th October, 1999. The final notification was published on 14th September, 1999, and later amended on 27th August, 2003.

Objective

Purpose:

- *To conserve top soil.*
- *To prevent the dumping and disposal of fly ash discharged from coal or lignite based thermal power plants on land.*
- *To restrict the excavation of top soil for manufacturing of bricks and;*
- *To promote the utilization of fly ash in the manufacturing of building materials and in construction activities.*

Fly Ash is meant to be given free of cost to consumers as per the MoEF Notification dated 14th September, 1999. Lately, thermal power plants have resorted to charging for supply of Fly Ash under the pretext of certain development charges. It is therefore essential that clear cut and

unambiguous instructions be given to Thermal Power Plants that Fly Ash should be supplied to cement manufacturers free of all cost. Supply of free Fly Ash will also translate the principle “Polluter Pays” into a reality, as of now, it is merely a principle in theory but the practical applicability of it as envisioned by the act is not seen in reality.

Context

1 *Use of fly ash, bottom ash or pond ash in the manufacture of bricks and other construction activities:-*

- (1) *No person shall within a radius of 100 Kilometers from coal or lignite based thermal power plants, manufacture clay bricks or blocks or tiles for use in construction activities without mixing at least 25 percent of ash (fly ash, bottom ash, or pond ash) with soil on weight to weight basis.*
- (IA) *Every construction agency engaged in the construction of buildings within a radius of 50 to 100 Kms from a coal or lignite based thermal power plant shall use fly ash bricks or blocks or tiles or clay fly ash bricks or cement fly ash bricks or blocks or similar products or a combination or aggregate of them in such construction as per the following minimum percentage (by volume) of the total bricks, blocks and tiles, as the case may be, used in each construction project, namely:~*
 - i. 25 percent by 31st August 2004;
 - ii. 50 percent by 31st August 2005;
 - iii. 75 percent by 31st August 2006; and
 - iv. 100 percent by 31st August 2007.

In respect of construction of buildings within a radius of 50 Kms, from a coal of lignite based thermal power plant the following minimum percentage (by volume) of use of bricks, blocks and tiles shall apply:-

- i. 50 percent by 31st August 2004;
- ii. 100 percent by 31st August 2005.

This section clearly enunciates and lays out the necessary criteria to be followed by construction agencies when manufacturing bricks and cement. The amended version of the Rules increased the number of kilometers from 50 to 100, increasing the distance and mitigating the waste that can be caused through the pollution caused by Fly Ash.

Performing Institutions

(2) *The authority for ensuring the use of specified quantity of ash as per sub- paragraph (1) shall be the concerned Regional officer of the State Pollution Control Board or the Pollution Control Committee as the case may be.*

A decision on the application for manufacture of fly ash bricks, blocks and tiles and similar other fly ash based products shall be taken within thirty days from the date of receipt of the application by the competent authority. A decision on consent to establish the brick kiln shall be taken by the Pollution Control Board or the Pollution Control Committee as the case may be within a period of thirty days from the date of receipt of application by it.

(3B) *In case of non - compliance of the provisions of sub-paragraph (1) of paragraph 1, the competent authority, in addition to cancellation of consent order issued to establish the brick kiln, shall move the district. administration for cancellation of the mining lease.*

Also, the Rule states that each coal or lignite based thermal power plant shall have a dispute settlement committee which shall include the General Manager of the thermal power plant and a representative of All India Brick and Tile Manufacturer's Federation (AIBTMF). This committee should make sure there is unhindered loading and transport of ash without any undue loss of time. Any unresolved dispute shall be dealt with by a State/ Union Territory Level committee to be set up by State/ Union Territory Government comprising Member Secretary of the State Pollution Control Board/ Pollution Control Committee, representatives of Ministry of Power in the State/ Union Territory Government and a representative of AIBTMF or a representative of local brick kiln owners association, federation group, in order to resolve the dispute.

Therefore, the competent authority to deal with any such matter is the SPCB (State Pollution Control Board), which is set up in each state to monitor fly ash levels. The competent authority can also cancel and revoke licenses of construction, and mining in addition to refusing to allow the formation of the brick kiln. This places considerable power upon the SPCB's to take necessary action in this regard.

A report of compliance of this notification shall be submitted by the 30th April, every year to the Central Pollution Control Board, the State Pollution Control Board and the Regional Office of the Ministry of Environment and Forests by the coal or lignite based thermal power plant.

Impact

Regarding the implementation of said notification the Maharashtra Pollution Control Board has taken following steps:

1. Identified the Brick Kilns located within 100 Km radius from Coal/Lignite based thermal power plants with the help of revenue department.
2. Concern District Collector have been asked through DO letters dated 27.01.2003 & 11.07.2003, to initiate action against the defaulting brick kilns by way of cancelling lease agreement.
3. News paper advertisement has been given.
4. Co-ordination meeting of all head of thermal power plants with Hon'ble Chairman, Member Secretary & Senior Officers of the Board.
5. As per the provisions of the rules Regional officers of the Board submitted proposals to the District Collectors to take action against non complying Brick Kilns.
6. As per the directions of Hon'ble High Court Delhi in its order dated 05.08.2004 Regional Officers of the Board has issued closure directions to those brick Kilns those who are not complying with the guide lines of the above said notification.
7. The Board has filled three affidavits regarding steps taken, steps to be taken & difficulties expressed by brick manufacturing association.
8. One Brick Kiln manufacturing association approached the Environment Minister, Govt. of Maharashtra and expressed their difficulties. Accordingly, Humble Minister of Environment, Govt. of Maharashtra called meeting on 24/11/2004. In the meeting it was decided to consider the request of the brick manufacturers and allow them to restart their manufacturing activity subject to some conditions.

9. After due considerations it was decided to allow restarting of brick kilns subject to following conditions:

- i. The brick kiln owner shall submit an undertaking to revenue authorities on Stamp paper of INR 100/- with copy to MPCB for utilization of fly ash in proportion as per the notification.
- ii. The permission initially be granted for one year.
- iii. The permission may be without prejudice to the action taken in the Court matter.

D.10. The Mineral Conservation & Development Rules, 1988

Selection

Mining, like the release of hazardous waste adversely affects the quality of land. It is therefore necessary to see the parallel processes that mining law has imposed with regards to the restoration of land.

These rules contain the mechanisms for the procedure of opening, operating and closing mines. Most importantly, it also contains a specific chapter on the duty to protect the environment. These Rules are therefore are pollution related (insofar as they refer to emission limits), remediation related and land related.

History

These rules were instituted in exercise of the powers conferred by section 18 of the Mines and Minerals (Regulation and Development) Act, 1957 (67 of 1957), and repealed The Mineral Conservation and Development Rules, 1958. It is important to note that the erstwhile rules did not contain the obligations on license holders towards the environment that the current rules contain.

Objective

The primary objective of these rules is to promote the sustainable extraction of minerals (minerals here refers to all minerals except for petroleum and natural gas, coal lignite, sand for stowing, any mineral declared as prescribed substances for the purposes of the Atomic Energy Act, 1962 and minor minerals.) These rules encompass the polluter pays principle as far as an obligation is imposed on mining companies to restore land to its original state.

Pertinent Rules

31. Protection of environment:

Every holder of a prospecting licence or a mining lease shall take all possible precautions for the protection of environment and control of pollution while conducting prospecting, mining, beneficiation or metallurgical operations in the area.

This particular rule provides for a general obligation on licence holders for the protection of the environment.

33. Storage of overburden, waste rock, etc.:

(1) Every holder of a prospecting licence or a mining lease shall take steps so that the overburden, waste rock, rejects and fines generated during prospecting and mining operations or tailings, slimes and fines produced during sizing, sorting and beneficiation or metallurgical operations shall be stored in separate dumps.

(2) The dumps shall be properly secured to prevent escape of material therefrom in harmful quantities which may cause degradation of environment and to prevent causation of floods.

(3) The site for dumps, tailings or slimes shall be selected as far as possible on impervious ground to ensure minimum leaching effects due to precipitations.

(4) Wherever possible, the waste rock, overburden etc. shall be back-filled into the mine excavations with a view to restoring the land to its original use as far as possible.

(5) Wherever back-filling of waste rock in the area excavated during mining operations is not feasible, the waste dumps shall be suitably terraced and stabilised through vegetation or otherwise.

(6) The fines, rejects or tailings from mine, beneficiation or metallurgical plants shall be deposited and disposed in a specially prepared tailings disposal area such that they are not allowed to flow away and cause land degradation or damage to agricultural field, pollution of surface water bodies and ground water or cause floods.

This rule contains specific provisions with regards to the various waste products generated by mines and how to deal with such waste. Particularly important are the obligations to prevent the escape of materials in harmful quantities as per subrule (2) and the duty to prevent degradation of surrounding land contained in subrule (6). What constitutes “harmful quantities” has, however, not been defined.

34. Reclamation and rehabilitation of lands:

Every holder of prospecting licence or mining lease shall undertake the phased restoration, reclamation and rehabilitation of lands affected by prospecting or mining operations and shall complete this work before the conclusion of such operations and the abandonment of prospect or mine.

Particularly important amongst these rules is rule 34. It prevents mining companies from leaving mine sites abandoned and the obligation of restoration before abandonment. Unlike the previous rules, this rule is not precautionary and creates a direct obligation.

37. Precaution against air pollution:

Air pollution due to fines, dust, smoke or gaseous emissions during prospecting, mining, beneficiation or metallurgical operations and related activities shall be controlled and kept within ‘Permissible Limits’ specified under various environmental laws of the country including the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the Environment (Protection) Act, 1986 (29 of 1986) by the holder of prospecting licence or a mining lease.

38. Discharge of toxic liquid:

Every holder of prospecting licence or a mining lease shall take all possible precautions to prevent or reduce the discharge of toxic and objectionable liquid effluents from mine, workshop, beneficiation or metallurgical plants., tailing ponds, into surface water bodies, ground water aquifer and useable lands, to a minimum. These effluents shall be suitably treated, if required, to conform to the standards laid down in this regard.

40. Permissible limits and standards:

The standards and permissible limits of all pollutants, toxins and noise referred to in rules 37, 38 and 39 shall be those notified by the concerned authorities under the provisions of the relevant statutes from time to time.

Rules 38-40 refer to the pollution standards as set in other Acts.

41. Restoration of flora:

(1) Every holder of prospecting licence or a mining lease shall carry out prospecting or mining operations, as the case may be, in such a manner so as to cause least damage to the flora of the area held under prospecting licence or mining lease and the nearby areas.

(2) Every holder of prospecting licence or a mining lease shall

(a) take immediate measures for planting in the same area or any other area selected by the Controller General or the authorised officer not less than twice the number of trees destroyed by reason of any prospecting or mining operations;

(b) look after them during the subsistence of the licence/lease after which these trees shall be handed over to the State Forest Department or any other authority as may be nominated by the Controller General or the authorised officer and;

(c) restore to the extent possible, other flora destroyed by prospecting or mining operations.

This is another very important provision. The primary goal is to prevent environmental degradation, particularly of forest land.

58. Penalty:

Whoever contravenes any of the provisions of these rules shall be punishable with imprisonment for a term which may extend up to two years, or with fine extending to fifty thousand rupees or with both, and in the case of continuing contravention with an additional fine which may extend up to five thousand rupees for every day during which such contravention continues, after conviction for the first such contravention:

Provided that for repeated contravention the punishment should be in the form of imprisonment only:

Provided further that any offence punishable under these rules may either before or after the institution of the prosecution, be compounded by the authorized officer to make a complaint to the court with respect to that offence, on payment to that officer for credit to the Government, of such sum that officer may specify:

Provided also that in case of an offence punishable with fine only, such sum shall not exceed the maximum amount of fine which may be imposed for that offence:

Provided further that where an offence is compounded under these rules, no proceeding or further proceeding, as the case may be, shall be taken against the offender in respect of the offence so compounded, and the offender, if in custody shall be released forthwith.

This rule contains the criminal penalty attracted by the violation of any of the rules contained here. These are above and beyond the civil damages that are to be paid for any degradation of the environment.

Performing Institutions

The enforcement authority is the Indian Bureau of Mines set up under The Mines and Mineral (Regulation and Development) Act 1948. The Bureau has the power to enter and inspect mines and pass orders. Any person aggrieved by any order made or direction issued under these rules by any officer sub-ordinate to the Controller General may within thirty days of the communication of such order or direction, apply to the Controller General for a revision of the order or direction, provided that any such application may be entertained after the said period of thirty days if the applicant satisfies the Controller General that he had sufficient cause for not making the application within time. (Rule 57)

Impact

The most important case with regards to these rules is the case of M.C. Mehta v. Union of India (Writ Petition (C) No. 4677 of 1985 decided in 2009) pertaining to the stopping of mining work in the Aravalli hills in Haryana. The violation of Rule 34 (Reclamation and rehabilitation of land) was seen as one of the primary reasons for stopping mining in the area.

The case also noted that these rules had continuously been flouted. It was found that most of the mines in the State were operating in violation of Approved Plans. In most cases, mining operations were carried out unscientifically with the sole aim of maximizing profits which resulted in indiscriminate scattering of the overburden, wasteful manner of mining with complete disregard to mineral conservation aspect, rendering reclamation of mined area impossible. The Court further found that mining leases were granted by the State in areas where plantations were undertaken with the financial assistance provided by international donor agencies. That, mining was permitted in a manner which was destroying the groundwater table as also causing irreparable damage to the critical groundwater reserves. That, there was no effective mechanism to ensure compliance of various conditions stipulated while giving approvals and, lastly, no deterrent action was taken against mines for serious violations and non-compliance of conditions were found.

Cases

In Commissioner of Income Tax v. Gogte Minerals ILR 1995 KAR 3358 where the Karnataka High Court held that these rules were retrospective insofar as they would apply to all the agreements entered into even prior to the adoption of these rules

It should further be noted that identical provisions also exist in the Granite Conservation and Development Rules, 1999 and the Marble Conservation and Development Rules, 2002 under Chapter VI entitled “Systematic and Scientific Mining”.

D.11. The Public Liability Insurance Act and Rules, 1991

History

This Act was passed to provide for mandatory public liability insurance for installations and handling hazardous substances in order to provide minimum relief to the victims of accidents arising out of the activities of hazardous industries, not only to the workman but also to the members of the public who may be in the vicinity.

Objective

The main objective of the Act is to provide for damages to victims of an accident which occurs as a result of handling any hazardous substance. The Act applies to all owners associated with the

production or handling of any hazardous chemicals. The Act provides for No Fault Liability under Section 3, and every owner must take insurance policies to cover such liability before he starts activities involving the use of hazardous substances.

Relevant Sections

2. Definitions

(d)"hazardous substance" means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act, 1986 (29 of 1986), and exceeding such quantity as may be specified, by notification, by the Central Government;

3. Liability to give relief in certain cases on principle of no fault:

Where death or injury to any person (other than a workman) or damage to any property has resulted from an accident, the owner shall-be liable to give such relief as is specified in Schedule for such death, injury or damage.

The claimant shall not be required to plead and establish that the death, injury or damage in respect of which the claim has been made was due to any wrongful act, neglect or default of any person.

4. Duty of owner to take out insurance policies

(1) Every owner shall take out, before he starts handling any hazardous substance, one or more insurance policies providing for contracts of insurance thereby he is insured against liability to give relief under sub-section (1) of section 3;

Provided that any owner handling any hazardous substance immediately before the commencement of this Act shall take out such insurance policy or policies as soon as may be and in any case within a period of one year from such commencement.

(2) Every owner shall get the insurance policy, referred to in subsection (1), renewed from time to time before the expiry of the period of validity thereof so that the insurance policies may remain in force throughout the period during which such handling is continued.

4[(2A) No insurance policy taken out by an owner shall be for a amount less than the amount of the paid-up capital of the under taking handling any hazardous substance and owned or controlled by that owner and more than the amount, not exceeding fifty crore rupees, as may be prescribed.

Explanation.- "Paid-up capital" in this sub-section means, in the case of an owner not being a company, the market value of all assets and stocks of the undertaking on the date of contracts of insurance.

(2B) The liability of the insurer under one insurance policy shall not exceed the amount specified in the terms of the contract of insurance in that insurance policy.

(2C) Every owner shall also, together with the amount of premium, pay to the insurer, for being credited to the Relief Fund established under section 7A, such further amount, not exceeding the amount of premium, as may be prescribed.

(2D) The insurer shall remit the further amount received from the owner under sub-section (2C) to the Relief Fund in such manner and within such period as may be prescribed and where the

insurer fails to so remit the further amount, such amount shall be recoverable from insurer as arrears of land revenue or of public demand.]

(3) The Central Government may, by notification, exempt from the operation of sub-section (1) any owner, namely:-

(a) the Central Government;

(b) any State Government,

(c) any corporation owned or controlled by the Central Government or a State Government; or

(d) any local authority:

Provided that no such order shall be made in relation to such owner unless a fund has been established and is maintained by that owner in accordance with the rules made in this behalf for meeting any liability under sub-section (1) of section 3.

13. Power to make application to Courts for restraining owner from handling hazardous substances:

(1) If the Central Government or any person authorised by that Government in this behalf has reason to believe that any owner has been handling any hazardous substance in contravention of any of the provisions of this Act, that Government or, as the case may be, that person may make an application to a Court, not inferior to that of a Metropolitan Magistrate or a Judicial Magistrate first class for restraining such owner from such handling.

(2) On receipt of the application under sub-section (1), the Court may make such order as it deems fit.

(3) Where under sub-section (2), the Court makes an order restraining any owner from handling hazardous substance. it may, in that order-

(a) direct such owner to desist from such handling;

(b) authorise the Central Government or, as the case may be, the person referred to in sub-section (1), if the direction under clause (a) is not complied with by the owner to whom such direction is issued, to implement the direction in such manner as may be specified by the Court.

(4) All expenses incurred by the Central Government, or as the case may be, the person in implementing the directions of Court under clause (h) of sub-section (3), shall be recoverable from the owner as arrears of land revenue or of public demand

Critique

The Public Liability Insurance Act, 1991 being one of the statutes which were legislated in the wake of the Bhopal disaster creates a statutory duty upon owners to take out insurance policies before starting to handle any hazardous substance, with a purpose to provide immediate relief to victims in case of any accident that occurs while handling hazardous substances. The Act also lays down the procedure to make an application to the Court if the authority has reason to believe that the owner is handling hazardous material in contravention of the provisions of the Act. Thus, the Act provides a framework to ensure prompt payment to victims of an accident. Whether the amount insured will be sufficient to provide relief to all the victims affected by the incident is questionable.

D.12. The National Green Tribunal Act, 2010

History

The Act was passed to give effect to the decisions laid down by the Stockholm Declaration and the Rio Declaration and in light of judicial pronouncements reading the right to a healthy environment into Article 21 of the Constitution. The Act provides for the establishment of a National Green Tribunal (Tribunal) for the effective and expeditious disposal of cases relating to environmental protection and to give relief to persons affected. The Act provides for the establishment, composition of the Green Tribunal and qualifications for appointment to the Tribunal. It also lays down the terms and conditions of service of the members of the Tribunal. It lays down the jurisdiction, powers and procedure of the Tribunal. The Act also provides for penalties for non-compliance with the orders of the Tribunal. It also lays down the procedure where offences are committed by companies or government departments.

Objective and principles

Chapter 2 of the Act deals with the establishment and composition of the Tribunal. This chapter prescribes the qualification and procedure for appointment of Chairpersons, Judicial Members and Expert Member.

The Tribunal shall have jurisdiction over all civil cases relating to environment that is defined as violation of specific statutory environmental obligation which the community at large is affected by or likely to be affected by, the damage to the environment or property is substantial or the damage to public health is measurable. Rule 15 provides that the Tribunal may by an order provide relief and compensation to the victims of pollution and other environmental damage including accidents occurring while handling any hazardous substance, restitution of property damaged; or restitution of the environment for such area or areas as the Tribunal may deem fit (and in addition to the compensation and relief under the Public Liability Insurance Act, 1991). The Tribunal has appellate powers in respect of orders, decisions and directions under provisions of the Air Act, Environment Protection Act, Forest Conservation Act and the Water Act.

Section 17 read with Schedule II provides for heads of compensation and or damages, the following relevant heads can be awarded in cases by the Tribunal: damages to private property; expenses incurred by the Government or any local authority the providing relief, aid and rehabilitation to the affected persons; expenses incurred by the Government to cope with the harm or damage, including compensation for environmental degradation and restoration of the quality of the environment; claims on account of destruction to flora, fauna, crops, trees, orchards, vegetation, cattle; claims including costs for restoration on account of any harm or damage to the environment including pollution of soil, air, water, land and eco-systems; any other claim arising out of, or connected with any activity of handling of hazardous substance. Award of amounts for damages or compensation shall be credited to the Environment Relief Fund established under the Public Liability Insurance Act, 1991.

Section 20 provides that while passing any order or decision or award, apply the principles of sustainable development, the precautionary principle and the polluter pays principle.

Therefore Section 15, 17, and 20 of the National Green Tribunal Act is the clearest statement and grant of jurisdiction on the National Green Tribunal to implement the polluter pays principle to the extent of restitution of the environment.

Penalties and impact

A person (including a Director or any other person responsible for a Company, and the Head of Department or other responsible officer in case of Government Departments) failing to comply with any order or decision of the Tribunal shall be punished with a fine which may extend to INR 10 Crore and INR 25,000/- a day for continuing default and/ or imprisonment which may extend to 3 years. The fine payable by Companies shall extend to INR 25 crore and INR 1 lakh a day in case of continuing default.

The National Environment Appellate Authority Act, 1997 (Now Repealed)

This Act provides the establishment of a National Environment Appellate Authority to hear appeals regarding areas wherein certain industries and processes may or may not be carried out. It lays down the composition of the authority and the qualifications of its members. It provides for the jurisdiction and powers of the authority. It provides that all proceedings before the Authority shall be considered as judicial proceedings.

The National Environment Tribunal Act, 1995 (Now Repealed)

This Act provides for strict liability for damages arising out of any accident occurring while handling any hazardous substance, based on the principle of no fault liability, for damage caused to any person, property or the environment wherein the affected person need not prove any wrongful act, negligence or default of any person. The Act also provides for the setting up of the National Environment Tribunal for expeditious disposal of cases relating to such accidents and the subsequent claim for compensation. The Act further lays down the composition, powers and procedure and jurisdiction and powers of the Tribunal as well as the qualifications and terms of service of its members. It also provides for penalties for non-compliance with the orders of the Tribunal and lays down the procedure where offences are committed by companies or government departments.

D.13. Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987

Selection

Under the Atomic Energy Act, the Central Government exercises tight control over all business related to atomic material. Only those businesses utilising radioactive materials who have received licences may operate. Further, the Government has absolute control over the extraction and enrichment of such materials.

Due to its inherently hazardous nature, the handling of atomic waste requires special care. To this end, two sets of rules are applicable, The Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 and the Atomic Energy (Radiation Protection) Rules, 2004. The first contains rules to deal with hazardous atomic waste and the latter deals with the opening, operating and closing of any business or institution that makes use of radioactive materials. The two have to be read together as they jointly govern the disposal of atomic waste.

The level of caution and detailed safety procedures and compliances for the disposal Atomic Wastes under the Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987, is very high, it is important to study these and import/ adapt the same for Hazardous Substances.

History

The Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 and the Atomic Energy (Radiation Protection) Rules, 2004 have been made in exercise of the powers conferred upon the Central Government by sub-section (1) read with clause (i) of subsection (2) of Section 30 and clause (b) of sub-section (1) of Section 17 of the Atomic Energy Act, 1962 (33 of 1962). The Atomic Energy (Radiation Protection) Rules, 2004 have been made in supercession of Radiation Protection Rules 1971 except as respects things done or omitted to be done before such supercession.

Objective and Principles

The primary objective of these rules is to provide a procedural framework for atomic waste and the operation of businesses that use atomic material. These rules do not provide for the strict liability, polluter pays principle or the precautionary principle largely due to the stranglehold on atomic material held by the Central Government.

Pertinent Rules:

The Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987:

3. Restrictions on the disposal of radioactive waste — *No person shall dispose of radioactive waste —*

(a) unless he has obtained an authorisation from the competent authority under these rules;

(b) in any manner other than in accordance with the terms and conditions specified in the authorisation issued under these rules;(c) in any location different from those specified in the authorisation;(d) in quantities exceeding those specified in the authorisation.

4. Application for authorisation — *Each application for authorisation to dispose of or transfer radioactive waste shall be made (save as provided in rule 15) in Form I and shall include information like a brief description of the process, materials and equipment generating radioactive wastes; the equipment and systems provided in the waste generating installation to monitor and control the radioactive wastes and to reduce environmental releases; the environment around the installation; the processes and equipment in the installation for conditioning, treatment and disposal of radioactive waste and the staff employed for the purpose; safety devices incorporated in the waste disposal installation to contain the radioactive effluents and control their release to unrestricted areas during normal operations, including anticipated operational occurrences and to keep these releases as low as reasonably achievable (ALARA); an estimate of the amounts of annual releases, discharges and leakages from radioactive waste repositories during normal condition and an analysis of their anticipated environmental impact; an analysis of the potential accidents which may occur in the installation and design features and monitoring equipment incorporated in the waste disposal installation to control the release of radioactivity in the event of such accidents; procedures to be followed for safe collection of radioactive wastes arising from such accidents and design features of surveillance equipment incorporated or otherwise provided in and around the waste disposal installation to monitor the normal releases of activity and those released in the event of an accident; estimates of the quantities of each of the principal radionuclides expected to be released in the environment annually (in solid, liquid and gaseous form) during normal operations;) any other information, which the competent authority may deem necessary to evaluate the safety status of waste disposal operations.*

This rule contains all the requirements to be fulfilled when disposing of nuclear waste.

6. Duties for Disposal of radioactive wastes— *Every authorised person shall ensure that —*

- (i) disposal of radioactive wastes is done in accordance with the provisions of these rules, and in accordance with the terms and conditions laid down in the authorisation;*
- (ii) records of waste disposal are maintained in Form III for the periods stipulated by the competent authority;*
- (iii) all the requirements of the Radiation Protection Rules, 1971 are complied with;*
- (iv) any operation likely to result in a more hazardous accident than that envisaged in the safety analysis given by the applicant which are not carried out in the installation;*
- (v) personnel monitoring and environmental surveillance is carried out on a continued basis to evaluate the risks and to monitor the environmental impact of the waste disposal operations;*
- (vi) quarterly reports are submitted to the competent authority in Form IV;*
- (vii) reports received on any hazardous situation, as provided under clause (g) of rule 13, are forthwith transmitted to the competent authority;*
- (viii) that the Radiological Safety Officer discharges his duties under rule 13 of these rules;*
- (ix) after the waste disposal installation is closed, institutional control is maintained for such time as stipulated by the competent authority in each specific case under rule 11.*

7. Maintenance of Records of Waste Disposal — *Every authorised person shall maintain records of disposal or radioactive waste giving the following particulars —*

- (a) the description, quantity, physical state, chemical characteristics and the date of disposal of each consignment of radioactive waste;*
- (b) mode of disposal, concentration of radioactive material in the waste disposed of and site of disposal;*
- (c) names of the workers and the Radiological Safety Officer associated with the disposal of the radioactive waste;*
- (d) data on periodic radiation surveillance in and around the site of the disposal of radioactive waste, as specified in the authorisation;*
- (e) any other information which the competent authority deems necessary.*

9. Entry and Inspection *The authorised person shall make adequate arrangements to prevent entry of unauthorised members of the public in the restricted areas. Any person duly authorised by the competent authority under section 17 of the Act, for purposes of inspection and enforcement of these rules may at any time inspect any installation, equipment, make such tests and or measurements as may be necessary, order disposal of such radioactive wastes and take other necessary steps.*

11. Closure and Institutional Control — *Decommissioning or closure of a radioactive waste disposal installation and institutional control shall be undertaken by the authorised person after*

obtaining permission from the competent authority and in accordance with the procedure as prescribed by the competent authority in each case.

12. Accidental release of radioactive waste – In the event of accidental release of any radioactive material resulting in personnel, surface or environmental contamination, the Radiological Safety Officer shall –

(a) take steps to arrange for the immediate decontamination of the affected personnel and areas and other remedial measures as required;

(b) inform immediately the employer and the competent authority; details of the incident, remedial measures initiated and programme for disposal of contaminated material, if any.

13. Competent Authority shall also have the following powers: grant approval of modifications to any installation for the disposal of radioactive waste or any change in the working conditions therein, shall be done only with the approval of the competent authority.

14. Power to suspend or cancel an authorisation and prescribe conditions precedent to the issuance of a licence. No licence to handle radioactive material, or to operate radiation generating equipment, shall be issued to a person unless, in the opinion of the competent authority - approval for siting, design, construction, commissioning and decommissioning, of a radiation installation, the proposed equipment, facilities and handling procedures afford adequate protection during normal or intended operations; the applicant has demonstrated compliance with the provisions of the relevant safety codes and safety standards specified by the competent authority. In respect of licence for operation of a radiation installation requirements relating to safety specified by the competent authority in the relevant safety codes and safety standards have been satisfied in the construction of the radiation installation;

workers have appropriate training and instructions in radiation safety, in addition to the appropriate qualification and training required for performing their intended tasks;

a Radiological Safety Officer is designated, appropriate radiation monitors and dosimetry devices are available with the applicant for purposes of radiation surveillance, the equipment, facilities and handling procedures afford adequate protection during normal operations, minimize occurrence of potential exposures and enable appropriate remedial actions to be taken in the event of an accident. No type approval of sealed sources, radiation generating equipment and equipment containing a radioactive source for the purpose of manufacture and supply or package design approval for transport of radioactive material or shipment approval for radioactive consignment shall be issued by the competent authority issued unless the applicant has demonstrated compliance with the relevant safety codes and safety standards specified by him.

The Rules also provide that the competent authority to: may suspend, modify or withdraw the licence, permit modifications in working conditions; restrict practices such as deliberate addition of radioactive substances in foodstuffs, beverages, toys, personal ornaments, and cosmetics or any other commodity or product intended for ingestion, inhalation or percutaneous intake by, or application to, a human being and sale, import or export of such products shall not be permitted; put a radiation symbol or warning sign shall be conspicuously and prominently radiation equipment, and containers for storage of radioactive materials; packages for radioactive materials and vehicles carrying such packages, at the entrance to the room housing the radiation generating equipment; and at the entrance of controlled area and supervised area; ensure

compliance with dose limits and other regulatory constraints specified by the competent authority by order under these rules.

The competent authority may issue safety codes and safety standards, from time to time, prescribing the requirements for radiation installation, equipment and transport of radioactive material.

15. Responsibilities of the employer

ensure that provisions of these rules are implemented by the licensee, Radiological Safety Officer and other worker(s),

(b) provide facilities and equipment to the licensee, Radiological Safety Officer and other worker(s) to carry out their functions effectively in conformity with the regulatory constraints,

(2) The employer shall be the custodian of radiation sources in his possession and shall ensure physical security of the sources at all times.

(3) The employer shall inform the competent authority, within twenty four hours, of any accident involving a source or loss of source of which he is the custodian.

16. Responsibilities of the licensee:- *(1) The responsibility for implementing the terms and conditions of the licence shall rest with the licensee.*

(2) The licensee shall comply with the surveillance procedures, safety codes and safety standards specified by the competent authority.

(3) Every licensee shall establish written procedures and plans for controlling, monitoring and assessment of exposure for ensuring adequate protection of workers, members of the public and the environment and patients, wherever applicable.

(4) The licensee shall comply with the provision of rules for safe disposal of radioactive waste issued under the Act.

(5) The licensee shall ensure that the workers are familiarised with contents of the relevant surveillance procedures, safety standards, safety codes, safety guides and safety manuals issued by the competent authority and emergency response plans.

(6) The licensee shall also in consultation with the Radiological Safety Officer, investigate any case of exposure in excess of regulatory constraints received by individual workers and maintain records of such investigations; inform competent authority promptly of the occurrence, investigation and follow-up actions in cases of exposure in excess of regulatory constraints, including steps to prevent recurrence of such incidents; carry out physical verification of radioactive material periodically and maintain inventory; inform appropriate law enforcement agency in the locality of any loss of source; inform the employer and the competent authority of any loss of source; investigate and inform the competent authority of any accident involving source and maintain record of investigations; verify the performance of radiation monitoring systems, safety interlocks, protective devices and any other safety systems in the radiation installation; in consultation with Radiological Safety Officer, prepare emergency plans, as specified in rule 33, for responding to accident to mitigate their consequences and ensure emergency preparedness measures conduct or arrange for quality assurance tests of structures, systems, components and sources and related equipment;

17. Responsibilities of the Radiological Safety Officer:-*(1) The Radiological Safety Officer shall be responsible for advising and assisting the employer and licensee on safety aspects aimed at ensuring that the provisions of these rules are complied with.*

(2) The Radiological Safety Officer shall:-

(a) carry out routine measurements and analysis on radiation and radioactivity levels in the controlled area, supervised area of the radiation installation and maintain records of the results thereof;

(b) investigate any situation that could lead to potential exposures;

(c) advise the employer regarding the necessary steps aimed at ensuring that the regulatory constraints and the terms and conditions of the licence are adhered to; the safe storage and movement of radioactive material within the radiation installation; initiation of suitable remedial measures in respect of any situation that could lead to potential exposures; and routine measurements and analysis on radiation and radioactivity levels in the off-site environment of the radiation installation and maintenance of the results thereof;

(d) ensure that reports on all hazardous situations along with details of any immediate remedial actions taken are made available to the employer and licensee for reporting to the competent authority and a copy endorsed to the competent authority; quality assurance tests of structures, systems, components and sources, as applicable are conducted; and monitoring instruments are calibrated periodically.

(e) assist the employer in - instructing the workers on hazards of radiation and on suitable safety measures and work practices aimed at optimising exposures to radiation sources; and

the safe disposal of radioactive wastes; and developing suitable emergency response plans to deal with accidents and maintaining emergency preparedness;

(f) advise the licensee on the modifications in working condition of a pregnant worker; and the safety and security of radioactive sources;

(g) furnish to the licensee and the competent authority the periodic reports on safety status of the radiation installation; and

(h) inform the competent authority when he leaves the employment.

18. Inspection of premises, radiation installations and conveyances:- *(1) Any person duly authorised under sub-Section (4) of Section 17 of the Act may, for the purposes of enforcement of these rules, inspect any premises, or radiation installation, or conveyance. Such inspections may be without prior notice and at any stage of the licensing process. Person inspecting shall inspect from a safety point of view, ensure periodic measurements are take, investigate incidents and accidents and recommend corrective measure, inspect radioactive consignments in any conveyance carrying radioactive material and inspect any package containing radioactive material.*

19. The Rules also empower such person authorised under Section 17 to investigate, seal or seize radiation installation or radioactive material and to give direction to the employer.

20. Directives in case of accidents:- *(1) In the event of an accident involving the source or release of radioactive material, the competent authority may -*

issue such directions interest of safety of the radiation installation, workers, public and the environment, as deemed fit and proper and the employer shall act as per the directions of the competent authority and shall make every effort to mitigate the consequences of the accident, or may obtain experts advice for mitigating the consequences of the accident.

21. Emergency preparedness:- (1) The licensee shall prepare emergency response plans as specified by the competent authority in the relevant safety codes and maintain emergency preparedness response. Such plans are to be approved by the competent authority.

Licensee shall also make plans for off-site emergencies to be reviewed by the Competent Authority.

22. Decommissioning of radiation installation. When a radiation installation or radiation generating equipment ceases to be in use, the employer shall ensure its decommissioning, with the prior approval of the competent authority. The decommissioning plan shall take due cognizance of disposal of radioactive wastes, recycling of materials, and reuse of equipment and premises. The licensee ensure the competent authority adequate protection of the persons in and around the decommissioned installation.

Performing Institutions.

Competent Authority: Empowered by Section 17 of the Act by the Central Government. The powers granted to such an authority include

1. Power to enter, inspect etc.
2. Issues authorisation to the authorised person (to handle atomic waste) and may cancel or otherwise modify the authorisation.
3. Issue licences to businesses etc. using atomic material.

Every employer shall designate, with the written approval of the competent authority, a person having appropriate qualifications as Radiological Safety Officer.

Authorities under the Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 (Atomic Waste Rules):

Authorised person: One who has received authorisation under Rule 4 of the Atomic Waste Rules.

Radiological Safety Inspector: Must be nominated by the Authorised Person under Rule 12. Oversees all safety requirements including but not limited to the acceptable limits of exposure, safe handling etc. and is the officer in charge in case of accidents.

Authorities under the Atomic Energy (Radiation Protection) Rules, 2004 (Radiation Protection Rules) are as follows:

Employer: The person who owns the business and authorises the licensee to apply for a licence and is the custodian of radiation source material.

Licensee: A person who has received a licence after having complied with Rule 7 of the Radiation Protection Rules. This person may or may not be the same person as the employer. This person must comply with the terms of the license and all safety protocols.

Radiological Safety Inspector: Must be nominated by the Employer under Rule 19. Oversees all safety requirements including but not limited to the acceptable limits of exposure, safe handling etc., and is the officer in charge in case of accidents.

35. Offences and penalties:- Any person who contravenes the provisions of these rules or any of the terms and conditions of licence issued hereunder, shall be punishable as provided for under the Act.

The Atomic Energy Act, 1962

24. Offences and Penalties

(1) Whoever –

(a) contravenes any order made under section 14 or any condition subject to which a licence is granted under that section; or

Section 14 provides for the absolute control over production and use of atomic energy for the Central Govt.

(b) contravenes any rules made under section 17 or any requirement, prohibition or restriction imposed under any such rule; or

(c) obstruct any person authorised by the Central Government under sub-section (4) of section 17 in the exercise of powers under that sub-section; or

Section 17 of the Act provides for special provisions as to safety. This section also provides for the creation of rules to further safety. Both sets of rules discussed here were made in furtherance of this section.

(d) contravenes sub-section (2) of section 18;

Section 18(2) contains a provision to prevent attempts to obtain information regarding the functioning of an installation or any authority under the Act or Rules.

shall be punishable with imprisonment for a term which may extend to five years, or with fine, or both.

(2)Whoever –

(a) fails to comply with any notice served on him under section 5 or with any terms and conditions that may be imposed on him under that section; or

(b) fails to comply with any notice served on him under section 7 or knowingly makes any untrue statement in any return or statement made in pursuance of any such notice; or

(c) obstructs any person or authority in the exercise of powers under section 8 or 9; or

(d) contravenes any other provision of this Act or any order made thereunder;

shall be punishable with imprisonment for a term which may extend to one year, or with fine, or with both.

The Act also punishes companies by punishing all persons who at the time the offence were committed were responsible for the offence. It also treats negligence of other officers on par with the offence itself and no leniency for the same is granted.

Impact

The major problem with these rules is that they do not have any specified procedure for the actual waste disposal. The Nuclear Waste Rules do not prescribe any guidelines for site characterisation and merely provide that no person shall dispose of radioactive waste in a location other than that

which is prescribed in the authorisation granted under Rule 3. Thus it is not clear on whom the responsibility rests for site selection for disposal of radioactive waste. Ideally, the government should conduct site characterisation surveys and decide upon the most appropriate location for disposal of radioactive waste. State and public participation in the planning and development of repositories is essential in order to promote public confidence in the safety of disposal of such waste and spent fuel.

Similarly, the rules contain no actual provisions for liability assessment. There is no procedure to hold responsible parties liable and similarly, no fund has been earmarked to perform immediate damage control. These rules therefore leave a lot to be desired.

D.14. Municipal Solid Wastes (Management and Handling) Rules, 2000.

Selection

The Municipal Solid Wastes (Management and Handling) Rules, 2000, apply to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes. Often industrial wastes and hazardous wastes are mixed with Municipal Solid Wastes for disposal. Large tracks of land have been devoted to disposal of Municipal Solid Wastes.

History

Municipal Solid Wastes Rules are passed under Sub rule (3) of Rule 5 of the Environment (Protection) Rules, 1986 the notification was published on the 25th of September 2000. The Supreme Court's directions in a public interest litigation Almitra Patel Vs. Union of India was an impetus to passing of this Notification.

Context

The rule makes every municipal authority, responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of Municipal Solid Wastes. The municipal authority shall obtain authorization from the State Board for setting up waste processing and disposal facility including landfills. Schedule I provides a timeframe the Municipal authorities for setting up waste processing and disposal facilities, improving landfills and identifying sites for future use.

The compliance criteria, and procedure laid down for municipal solid wastes to be managed and handled are provided for in the Notification. The specifications and standards specified for setting up waste processing and disposal facilities are also provided in the Notification.

The Municipal Solid Wastes (Management and Handling) Rules, 2000, in Rule 4 and 5 allocated responsibilities to state governments and municipal authorities of the states for proper management of municipal solid waste.

According to Rule 4, every municipal authority shall, within the territorial area of the municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes. In addition, the municipal authority or an operator of a facility had to make an application for the grant of authorisation for setting up waste processing and disposal facility including landfills from PCB of the state.

The State Pollution Control Board shall monitor compliance with regard to ground water, ambient air, incineration standards, leachate quality and compost quality as per standards specified in the Notification. The State Boards shall also obtain the opinion of other relevant authorities while examining the proposal of setting up waste processing and disposal facilities including landfills.

Thus, the rules only state the specific action to be taken by municipalities and PCBs but do not lay down specific action to be taken by the state governments. According to the rules, the state government shall be responsible only for the enforcement of the provisions of these rules. Thus, the role of the state government in planning and setting up of waste processing and disposal facilities was negligible and as such, the state government cannot be held responsible if municipalities do not have a waste management plan in place or if municipalities do not set up municipal solid waste management systems.

Performing Institutions

According to Rule 5, the state government shall have complete responsibility for the enforcement of the provisions of these rules. According to Rule 6, PCB of a state shall be responsible for monitoring compliance and issuing authorisations for waste processing and disposal facilities.

The municipal authority shall furnish its annual report into the Secretary-in-charge of the Department of Urban Development of the concerned State or as the case may be of the Union territory, in case of a metropolitan city; or to the District Magistrate or the Deputy Commissioner concerned in case of all other towns and cities,

In addition to this, the Rules also purports that the State Boards and the Committees shall prepare and submit to the Central Pollution Control Board an annual report with regard to the implementation of these rules by the 15th of September every year. Therefore, a hierarchy is created, whereby the State Boards and the Committees prepare and submit reports to the Central Pollution Control Board. The State boards receive reports from the municipal bodies.

Impact

The rules should specify action to be taken by the states, and not just municipalities for improving the management of municipal solid waste in the state. Authorisations for setting up waste processing and waste disposal facilities should be made mandatory for each municipality. States and municipalities should make greater efforts to collect, regularly and completely, the municipal solid waste generated. Waste generated by activities like dairies, slaughter houses, restaurants etc., should also be collected and each municipality should aim for collection of 100 per cent of the municipal solid waste generated. Segregation should be made mandatory and not only be given publicity and awareness campaigns and holding regular meetings with housing associations and NGOs. State governments implement waste segregation and the municipality could be authorised to levy fines if segregated waste is not made available to the municipality for collection. Waste processing should be made mandatory in each municipality. CPCB could help each municipality in identifying the waste processing technology best suited to the needs of the municipality. Sufficient funding should be provided by MoEF/MoUD to set up waste processing infrastructure in each municipality. All municipalities should take steps to improve the existing dumpsites to make them more sanitary and aesthetic. Dumpsites in residential areas and near water sources/water bodies should be closed down and periodic monitoring of dumpsites for contamination of environment should take place. Identification of land for setting up landfills should be done on a priority basis

and landfills should be developed by each municipality according to a time bound programme. Landfilling should be restricted to non-biodegradable/inorganic waste.

D.15. Local Laws and Municipal Bye Laws

Municipal Laws have an important role in the matters related with solid waste. These often intersect with rules to deal with hazardous waste. These Acts are therefore pollution related.

These Laws deal with all matters related to the functioning of Municipalities. The primary focus in this note is to study the provisions related to waste management. These acts encompass the polluter pays rule insofar as they provide for imputing liability. They do not encompass the precautionary principle

D.15.1. West Bengal Municipal Act, 1993 (Functionally the same as Kolkata Municipal Act, 1980)

263. The Municipality to provide for cleansing of streets and removal of solid wastes.—

(1) The Chairman shall take measures for securing —

...

(b) the removal of the contents of all receptacles and depots and of the accumulations at all places provided or appointed by the Municipality under the provisions of this Act for the temporary deposit of rubbish, trade refuse, carcasses of dead animals and excrementitious and polluted matters;

(c) the removal of special wastes and hazardous wastes and other solid wastes from premises.

(2) The Chairman may, by public notice, issue directions as to the time at which, the manner in which, and the conditions subject to which, any matter referred to in sub-section (1) may be removed along a street or may be deposited or otherwise disposed of.

(3) The Chairman shall make adequate provision for preventing receptacles, depots, places, vehicles and vessels referred to in this Chapter from becoming sources of nuisance.

266. Removal of solid wastes accumulated on non-residential premises. — The Chairman-in-Council may, if it thinks fit, —

(a) by written notice, require the owner or the occupier of any premises used —

(i) as factory, workshop or for carrying on any manufacture, or

(ii) as a trade premises or shop or as a market or slaughter house, or

(iii) as a hotel, eating-house or restaurant, or

(iv) as a hospital or nursing home, or

(v) as a warehouse or godown, or

(vi) as a place to which large number of persons resort, or

(vii) in any other way

where rubbish, offensive matter, filth, trade refuse, special wastes, hazardous wastes, or excrementitious and polluted matters are accumulated in large quantities, to collect such matters accumulating thereon by such means of receptacles or construction on the premises as may be

determined, or to remove the same at such time and in such trailers or receptacles and by such routes as may be specified in the notice to a depot or place provided or appointed by the Municipality, or

(b) after giving the owner or the occupier of any premises notice of its intention so to do, cause all rubbish including building rubbish, offensive matter, trade refuse, special wastes, hazardous wastes, or excrementitious and polluted matters accumulated in such premises to be removed, and charge the said owner or the occupier, as the case may be, for such removal such fee as may be determined by the Board of Councillors and specified in such notice.

271. Presumption as to offender. – If any rubbish, offensive matter, trade-refuse, special waste, hazardous waste or excrementitious and polluted matter accumulating on any premises is deposited in any place in contravention of the provisions of this Act, it shall be presumed, unless the contrary is proved, that such contravention has been committed by the occupier of such premises.

350. Power to abate nuisances caused by pollution. – Subject to the provisions of this Act and of any other law for the time being in force, the Board of Councillors may take measures for abatement of any nuisance caused by the pollution of noise, foul odors, visual irritation, sensory annoyance, respiratory affection or the like in such cases and manners, and by fixing such standards, as may be prescribed.

No such standards appear to be prescribed.

Impact

Since no standards have been set by the West Bengal Municipal Corporation, it is difficult to actually estimate impact.

D.15.2. Municipal Corporation Of Greater Mumbai Bylaws, 2006

The Municipal Corporation of Greater Mumbai has framed bye-laws under section 461 (ei) of MMC Act for Regulating all matters and things connected with the collection, removal and disposal of solid waste. These byelaws are known as Greater Mumbai cleanliness and sanitation bye-laws, 2006.

3(23) “hazardous waste” means any waste which by reason of any of its physical, chemical, reactive, toxic, causing danger or is likely to cause danger to health or environment, whether alone or when in contact with other wastes or substances and shall include wastes specifically listed in Schedule III, of these bye-laws and all other hazardous wastes as defined in the definition No. 14 of “The hazardous wastes (Management and Handling) Byelaws, 1989” (as amended, May, 2003).

(5) Segregation, storage, delivery and collection of Municipal Solid Waste:

5.1 Segregation of waste into six specified groups: Every generator of Municipal Solid Waste shall store unmixed in or separate the waste at the source of waste generation into the following six categories:

- 1) Bio-degradable (wet) waste
- 2) Specified hazardous waste
- 3) Bio-medical waste

- 4) Construction and demolition waste
- 5) Bulk garden and horticulture waste including recyclable tree trimmings.
- 6) All other nonbiodegradable (dry) waste including recyclable and non-recyclable waste.

Proviso: The Municipal Commissioner may separately notify different stages for implementation of this rule by initially limiting these above categories taking into account the level of awareness among generators of waste as well as availability of infrastructural support in the city.

5.5 Specified household hazardous waste: (as listed in Schedule III) shall be stored and delivered by every generator of waste to the collection vehicle which shall be provided weekly/periodically by BMC or any other Agency authorized by the Maharashtra Pollution Control Board (MPCB) for collection of such waste, or to a center designed for collection of such waste for disposal in a manner that is mandated by the Government of Maharashtra or the MPCB.

8.1 On and after the date of commencement of these byelaws, there will be a familiarization / warning period of 30 days, after which, any contravention of these byelaws shall be punishable with fines as per the Schedule of Fines (Schedule I) for every instance of breach of these byelaws. In case the generator of waste is found contravening any of these byelaws next time, the fine amount will be doubled.

8.2 In case the person or any other generator of garbage is not able to pay the fine as mentioned in Schedule I while contravening any of these byelaws he will be required by the byelaws implementing authority or Nuisance Detectors or Enforcement Squad to do the community work for at least one hour like road sweeping or graffiti cleaning etc.

Proviso: Penalty of 'Community Service' will first be implemented in notified areas, as decided by the Municipal Commissioner, for the first 3 months on pilot basis, and after its successful implementation will be made applicable in the whole of the MCGM jurisdiction.

These byelaws have also been adopted by the Srinagar Municipal Corporation.

Performing Institutions

The party responsible for the enforcement of these measures is the Municipal Corporation itself.

Impact

In Mumbai, only 15% of household waste has been segregated as per the bye laws.² On an average, said an official from the solid waste management drive, just about 500 kg of dry waste is segregated in every ward. There are only three wards: M-west, R-south and K-west that have a good collection of dry waste about three tonnes per day. The primary reason for the failure of these byelaws is the failure to actually fine people for non compliance.

D.15.3. Delhi Municipal Council Act, 1994

Delhi has no specific provisions for dealing with hazardous waste. The only provision which considers this in the New Delhi Municipal Council Act, 1994 contains provisions for the abatement of nuisance. Nuisance is defined as follows:

² http://articles.timesofindia.indiatimes.com/2012-04-24/mumbai/31392351_1_garbage-segregation-project-solid-waste-management-dry-waste

2(28) " nuisance" includes any act, omission, place, animal or thing which causes or is likely to cause injury, danger, annoyance or offence to the sense of sight, smell or hearing or disturbance to rest or sleep, or which is or may be dangerous to life or injurious to health or property;

This definition is wide enough to encompass the removal of hazardous waste under the broader head of nuisance since it also considers things which are “dangerous to life or injurious to health or property”.

The only provision for the cleanup of solid waste is provided as follows.

266. Removal of rubbish, etc., accumulated on premises used as factories, workshop, etc. The Chairperson may, if he thinks fit,--

(a) by written notice require the owner or occupier of any premises used for carrying on any manufacture, trade or business or used as a factory, workshop, trade premises or market or in any way so that rubbish, filth and other polluted and obnoxious matter are accumulated in large quantities, to collect all such rubbish, filth and other polluted and obnoxious matter accumulating thereon and to remove the same at such times and in such carts or receptacles and by such routes as may be specified in the notice to a depot or place provided or appointed under section 263, or

(b) after giving such owner or occupier notice of his intention, cause all rubbish, filth and other polluted and obnoxious matter accumulated in such premises to be removed, and charge the said owner or occupier for such removal such fee as may, with the sanction of the Council, be specified in the notice issued under clause (a).

D.16. A study of important court cases and writ petitions

D.16.1. Supreme Court

Research Foundation for Science, Technology and Natural Resource Policy v. Union of India (UOI) and ORS. MANU/SC/0528/2012

Context and Description

The basic grievance of the Writ Petitioner was with regard to the import of toxic wastes from industrialized countries to India, despite such wastes being hazardous to the environment and life of the people of this country

Basis

- H.W.M.H. Rules, 1989.
- BASEL Convention and Articles 21, 47 and 48A of the Constitution.

Outcome and Learning

- Directions contained in the BASEL Convention have to be strictly followed by all the concerned players, before a vessel is allowed to enter Indian territorial waters.
- Central Government is also directed to ban import of all hazardous/toxic wastes which had been identified and declared to be so under the BASEL Convention and its different protocols.
- The Central Government is also directed to bring the Hazardous Wastes (Management & Handling) Rules, 1989, in line with the BASEL Convention and Articles 21, 47 and 48A of the Constitution.
- Declaration has also been sought that without adequate protection of the workers and the public and without any provision of sound environment management of disposal of hazardous/toxic wastes, the Hazardous Wastes (Management & Handling) Rules, 1989, are

violative of the Fundamental Rights guaranteed under the Constitution and, therefore, unconstitutional.

Research Foundation for Science, Technology and Natural Resource Policy v. Union of India (UOI) and Ors (2005) 13 SCC 186

Context and Description

The issue is in regard to the appropriate directions for dealing with the consignments in question, having regard to the precautionary principle and polluter pays principle.

Basis

- Environment (Protection) Act 1986
- The Hazardous Wastes (Management and Handling) Rules 1989

Outcome and learning

The liability of the importers to pay the amounts to be spent for destroying the goods in question cannot be doubted on applicability of precautionary principle and polluter pays principle. These principles are part of the environmental law of India. Precautionary principle and Polluters Pay principle upheld as fundamental law of the land.

Research Foundation for Science, Technology and Natural Resource Policy v. Union of India (UOI) and Ors AIR 2007 SC 3118

Context and Description

Ship breaking activity at Alang resulted in Environment hazards and pollution. A committee of technical experts was appointed, that is well known as the Menon committee.

Basis

- Recommendations of MGK Menon High Power Committee are accepted by court and on the basis the directions were issued. The relevant section of the Supreme Court Order is reproduced in Italics below (numbering 1 through 18)

Outcome and Learning

Government of India needs to formulate a comprehensive Code incorporating the recommendations and the same has to be operative until the concerned Statutes are amended to be in line with the recommendations.

- 1. Before a ship arrives at port, it should have proper consent from the concerned authority or State Maritime Board, stating that it does not contain any hazardous waste or radioactive substances. AERE should be consulted in the matter in appropriate cases.*
- 2. The ship should be properly decontaminated by the ship owner prior to the breaking. This should be ensured by the SPCB.*
- 3. Waste generated by the ship breaking process should be classified into hazardous and non-hazardous categories, along with their quantity.*
- 4. Disposal of waste material, viz. Oil, cotton, dead cargo of inorganic material like hydrated/solidified elements, thermocol pieces, glass wool, rubber, broken tiles, etc. should be disposed in a proper manner, utilizing technologies that meet the criteria of an effective destruction efficiently of 99.9 per cent, with no generation of persistent organic pollutants, and complete containment of all gaseous, liquid and solid residues for analysis and, if needed,*

reprocessing. Such disposed of material –to be kept at a specified placed earmarked for this purpose. (Special care in the handling of asbestos wastes). The Gujarat Pollution Control Board should authorize appropriate final disposal of asbestos waste.

5. The ship breaking industries should be given authorization under Rule 5 of the H.W. Rules, 2003, only if they have provisions for disposal of the waste in environmentally sound manner. All authorizations should be renewed only if an industry has facilities for disposal of waste in environmentally sound manner.

6. The State Maritime Board should insist that all quantities of waste oil, sludge and other similar mineral oils and paints chips are carefully removed from the ship and taken immediately to areas outside the beach, for safe disposal.

7. There should be immediate ban of burning of any material whether hazardous or non-hazardous on the beach.

8. The State Pollution Control Board (of Gujarat and other coastal States where this ship breaking activity is done) be directed to close all units which are not authorized under the HW Rules.

9. The plots where no activities are being currently conducted should not be allowed to commence any fresh ship breaking activity unless they have the necessary authorization.

10. The Gujarat PCBs should ensure continuous monitoring of ambient air and noise level as per the standards fixed. The Gujarat PCBs be further directed to install proper equipment and infrastructure for analysis to enable it to conduct first level inspection of hazardous material, radio-active substances (wherever applicable). AERB shall be consulted in such cases.

11. The Gujarat SPCB will ensure compliance of the new Gujarat Maritime Board (Prevention of Fire & Accidents for Safety & Welfare of Workers and Protection of Environment during Ship breaking Activities) Regulations, 2000, by Gujarat Maritime Board and should submit a compliance report to the Court within one year of the coming into force of the said regulations

12. The Notification issued by GMB in 2001 on Gas Free for Hot Work, should be made mandatory and no ship should be given a beaching permission unless this certificates is shown. Any explosion irrespective of the possession of certification should be dealt sternly and the license of the plot holder should be cancelled and Explosives inspector should be prosecuted accordingly for giving false certificate.

13. A complete inventory of hazardous waste on board of ship should be made mandatory for the ship owner. And no breaking permission should be granted without such an inventory. This inventory should also be submitted by the GMB to concerned SPCBs to ensure safe disposal of hazardous and toxics waste.

14. Gujarat Maritime Board and Gujarat SPCB officers should visit sites at regular intervals so that the plot owner know that these institutions are serious about improvement in operational standards. An Inter-Ministerial Committee comprising Ministry of Surface Transport, Ministry of Steel, Ministry of Labour and Ministry of Environment should be constituted with the involvement of labour and environment organizations and representatives of the ship breaking industry.

15. The SPCBs along with the State Maritime Board should prepare land fill sites and incinerators as per the CPCB guidelines and only after prior approval of the CPCB. This action should be taken in a time bound manner. The maximum time allowed should be one year.

16. At the international level, India should participate in international meetings on ship breaking at the level of the International Maritime Organization and the Basel Convention's Technical Working Group with a clear mandate for the decontamination of ships of their hazardous substances such as asbestos, waste oil, gas and PCBs prior to exports to India for breaking. Participation should include from Central and State level.

17. The continuation or expansion of the Alang ship breaking operations should be permitted subject to compliance with the above recommendations by the plot holders.

18. That the above conditions also apply to other ship breaking activities in other Coastal States.

M. C. Mehta v. Union of India AIR 1987 SC 1086

Context and Description

This was a Writ Petition filed for reliefs as a consequence of leak of Oleum Gas from the Shriram Foods and Fertilizer Industries. The Petitioners sought compensation for the persons affected by the escape of Oleum gas.

Basis

➤ In India absolute liability is a standard of tort liability which stipulates that:

“where an enterprise is engaged in a hazardous or inherently dangerous activity and harm results to anyone on account of an accident in the operation of such hazardous or inherently dangerous activity resulting, for example, in escape of toxic gas the enterprise is strictly and absolutely liable to compensate all those who are affected by the accident and such liability is not subject to any of the exceptions which operate vis-à-vis the tortious principle of strict liability under the rule in Rylands v. Fletcher.”

Outcome and Learning

- The Court evoked the principle of “Absolute liability” in this case, which is a higher standard of liability than that of strict liability laid down in the famous English case of ‘Rylands v. Fletcher’. The Court held that when an enterprise is engaged in hazardous activity, resulting in an accident, like release of a toxic gas, the enterprise shall be absolutely liable to compensate the victims of the same; there shall be no exceptions under this rule like those under the rule of strict liability.
- The Court, by this judgment, has created a new standard of liability keeping in view the damage that is capable of being caused by industries involved in hazardous activities and the damage it may cause to the environment. The judgment is, therefore, of immense importance.

Tirupur Dyeing Factory Owners Association vs .Noyyal River Ayacutdars Protection Association and Ors AIR 2010 SC 3645

Context and Description

A Public Interest Litigation was filed by the Noyyal River Ayacutdars Protection Association, for seeking directions for preservation of ecology and for keeping the Noyyal river in Tamil Nadu free from pollution.

Basis

- Articles 21, 47, 48-A, 51-A (g) of the Constitution of India

Outcome and learning

- The principles of "polluters-pay" and "precautionary principle" have to be read with the doctrine of "sustainable development".
- Industries are bound to meet the expenses of removing the sludge of the river and also for cleaning the dam. It becomes the responsibility of the members of the appellant Association that they have to carry out their industrial activities without polluting the water.

Vellore Citizens' Welfare Forum v. Union of India AIR 1996 SC 2715

Context and Description

A Public Interest Litigation was filed against pollution caused by discharge of untreated effluents by tanneries.

Basis

- Environment Protection Act, Polluter Pays and Precautionary Principle was applied. The SC directed that the 'Green Bench' would be constituted to deal with this case and other environmental matters.

Outcome and Learning

- The Court issued directions to the Government to set up an authority to deal with the situation as well as to enforce the polluter pays and precautionary principles. The Court also imposed pollution fine on the tanneries. The Court also directed the authority to compute the compensation payable for reversing damage to the ecology as well as for payment to individuals. The SC directed that the 'Green Bench' would be constituted to deal with this case and other environmental matters.
- Also the court observed the concept of sustainable development. The SC directed to the tanneries to establish a common effluent treatment plants or other pollution control devices before applying for the consent. The SC also directed to close down tanneries to which consent was refused.
- The SC observed that the Central Government should constitute u/s 3(3) of EPA an "Authority" headed by a retired judge of the HC and it may have other members –preferably with expertise in the field of Pollution control and environmental protection. The court not only contemplated the combination of a judge and technical person but also an appeal to the SC from the environmental court.
- The judgment upholds the polluter pays principle making the pollutant tanneries liable to pay compensation for the damages caused to the environment as well as to pay pollution fine, to be deposited under an Environment Relief Fund.

D.16.2. High Courts

Ramgopal Estates Pvt .Ltd., rep .by Managing Director K. S. Hemanth Kumar vs. The State of Tamil Nadu, rep. by Commissioner and Secretary to Govt., Industries Department 2007(2) CTC369

Context and Description

The State Government with an aim to improve the economic growth, decided to set up a Petrochemical Park, spreading over four villages. The proposal was challenged under Articles 14, 19(i)(g) and 21 of The Constitution of India. The meat of the matter is the tussle between eco-environmental maintenance and vigorous industrialization

Basis

- Articles 14, 21, 39, 47, 48A, 51A (g) of The Constitution of India.
- It was observed that the principle of precaution involves the anticipation of environmental harm and taking measures to avoid it or to choose the least environmentally harmful activity. (cases referred: Vellore Citizens Welfare Forum v. Union of India; Enviro-Legal Action v. Union of India)
- Environment (Protection) Act, 1986

Outcome and Learning

- The writ petition was dismissed and all legal hurdles were vacated in the execution of the Petrochemical Park. The Court held that the proposal of setting up the Petrochemical Park shall be subject to the environmental clearance by the Union of India under the provisions of the environment (Protection) Act, 1986 and the Union of India shall take note of the findings and recommendations of the NEERI. The concept of sustainable development shall be put into force, applying the yardstick of (i) Precautionary Principle; and (ii) Polluter Pays Principle, while issuing the environmental clearance for each and every activity proposed to be undertaken.
- The judgment talks in great detail about the Precautionary Principle as well as the Polluter Pays Principle. It was held that Sustainable Development was the only way a balance could be maintained between the need for industrialization and eco-environmental maintenance.
- The setting up of the Petrochemical Plant was allowed after taking adequate measures to ensure the protection of the surrounding environment.

Mahendra Prasad Sonkar son of Sri Chunni Lal Sonkar and Surya Prakash Singh son of Late Chhavi Nath Singh vs. State of Uttar Pradesh through Secretary Urban - Development and Or.

Context and Description

This was a Petition for issuing a writ in the nature of mandamus directing the respondents to stop the dumping of garbage and waste material into the river Gomti in the district of Jaunpur

Basis

- Article 21 of the Constitution of India,
- Cases Referred: Subhash Kumar v. State of Bihar; Chameli Singh v. State of U.P.; Delhi Water Supply and Sewage Disposal Undertaking and Anr. v. State of Haryana and Ors

Note: Although the petition was restricted to the pollution caused in the District of Jaunpur, the Court expanded the scope of the petition to include all areas through which the river Gomti flows

Outcome and Learning

- The Court directed the State Government to set up a Committee to formulate an action plan for keeping the Gomti river clean and unpolluted throughout its flow from its place of origin to the place where it meets the river Ganga. The Committee was also to ensure that polluters are prosecuted under the Water Pollution Act, Environment Protection Act and other Acts. Steps were to be taken to ensure adequate supply of pure drinking water to the citizens.
- The Court has actively taken steps in the current case to ensure that the Gomti river remains unpolluted throughout its course; also it expanded the scope of the petition to include such other cities that maybe situated on the banks of the river.

Om Prakash Bhatt and Others v. State Of U.P. And Others

Context and Description

Residents of the hills of Garhwal, felt that development initiatives by State Organisations invaded the sanctity and peace of the “bugiyal” (meadows and pastures). The first issue was that the GarhwalMandalVikas Nigam had put up pre-fabricated lodging houses as a hotel for tourist on the slopes of a bugiyal and the second issue was that the indiscriminate import of plastic and non-biodegradable material was playing havoc with the environment of the hills. The submission was that the bugiyal is basically an ecosystem in itself and this delicate balance between ecology and environment has to be understood and respected.

Basis

- Articles 48A and 51A(g) of the Constitution of India
- Cases referred: K. RamdasShenoy v. The Chief Officers, Town Municipal Council, Udipi; Enviro-Legal Action v. Union of India; Vellore Citizens Welfare Forum v. Union of India

Outcome and Learning

- The Court directed the Nigam cease activities on the bugiyal and directed the Chief Conservator of Forests (Mills) un-do the damage and protect the environment. The Court laid down a very important principle that remediation of the damaged environment is a part of the process of sustainable development and as such the polluter is liable to pay the cost to the individual sufferers as well as the cost of reversing the damaged ecology. Merely because money has been spent is no ground to degrade ecology and environment.

Pravinbhai Jashbhai Patel and Anr. v. State of Gujarat and Ors *1995(2)GLR1210*

Context and Description

This case is about large scale pollution of the Kharicut canal and the areas in the vicinity due to the discharge of polluted effluents by the neighbouring industrial areas. Due to this pollution the water in the Khari river was rendered unsuitable for the purpose of agriculture. It is further alleged that representations have been filed before the Gujarat Pollution Control Board since about 1978 and other authorities, but no action has so far been taken.

Basis

- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act,1981
- The Environment (Protection) Act, 1986
- Cases referred: Narula Dyeing & Printing Works v. Union of India and ORS.;

Outcome and Learning

- The court ordered for the identification of the most polluting units and action to be taken against these units. The Court further directed the State to evolve a policy for the location of chemical and other hazardous industries in such a way so that they are located in areas, where population is scarce. It was also suggested that the state set up a State-level Ecological Science and Research Group, to provide information on 'Industrialisation with Environment Protection'
- The Court took into consideration the fact that the citizens had been suffering due to the pollution for a number of years and hence awarded a lump sum payment to be made by the 756 industrial units, calculated at the rate of 1% of their one year's gross turnover for the year 1993-94 or 1995-96, whichever is more and that amount should be kept apart by the Ministry of Environment and should be utilised for the works of socio-economic uplift of the affected villages.
- The Court in this case has not only taken precautions to prevent further pollution of the canal but has also remediated for the loss accrued by the villagers.

The reports and application of 113 villagers of Digwal village and The Chairman, District Legal Services Authority vs . Management of Global Bulk Drugs and Fine Chemicals Ltd .

Context and Description

This Petition was filed to find a solution to the acute industrial pollution in the area, due to the release of industrial wastes by Global Bulk Drugs and Fine Chemicals Ltd. The villagers complained of the water not being potable even agricultural lands being adversely affected. The deponent confirmed the discharge of effluents but also maintained that the necessary precautions were taken.

Basis

- Articles 21, 48A and 51A(g) of the Constitution of India

Outcome and Learning

The Court upheld the polluter pays principle and also maintained that the Constitution confers upon its citizens the right to free air and water. The Court directed the District management to find out the amount of damage caused to the villagers and the respondent to pay for the same. The Court also held that monetary constraints of the respondent should not come in the way of the court to award damages according to the polluter pays principle.

D.16.3. National Green Tribunal

Gram Panchayat Totu vs. State of Himachal Pradesh

Context and Description

This is a case where the MSW landfill caught fire and released obnoxious fumes into the atmosphere. The case was filed to restrain the Municipal Corporation, Shimla and Himachal Pradesh State Government from undertaking construction of the "Solid Bio-Waste Management Plant" at Village BHARYAL on TARA DEVI - TOTU BYE PASS about 9 kms away from Shimla Town

Basis

- The Municipal Solid Waste (Management and Handling) Rules 2002.

Directions Passed and Learning

The court upheld the decision to set up the MSW plant and landfill site at village Bharyal in tara-devi totu bye pass; however, it was stipulated that the said plant should be set up only after

following the mandatory requirement stipulated in The Municipal Solid Waste (Management and Handling) Rules 2002 as well as after obtaining EC under the provisions of EIA notification, 2006 as amended in 2008 before the commissioning of the MSW facilities.

Hindustan Coca-Cola Beverages Pvt. Ltd. Vs. West Bengal Pollution Control Board APPEAL No. 10 of 2011

Context and Description

The Appellant was granted consent under Section 25 and 26 of the Water (Prevention and Control of Pollution) Act, 1974 (Water Act) and Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 (Air Act) by the WBPCB, for operating, a manufacturing and bottling plant at Raninagar Industrial Growth Centre, Jalpaiguri, on 19th September, 2000

The West Bengal PCB directed the company to deposit INR 5,00,000 by way of a Bank Guarantee.

It was observed that there is presence of heavy metals such as lead (Pb) and cadmium (Cd.) in the discharged effluent. Presence of said substances in the effluent would finally contaminate the environment, and shall cause hazards to human life

Basis

➤ NGT Act, 2010:

“20. Tribunal to apply certain principles: The Tribunal shall, while passing any order or decision or award, apply the principles of sustainable development, the precautionary principle and the polluter pays principle.”

Directions Passed and Learning

- WBPCB’s direction to the Company to deposit Rs. 5,00,000/- by way of Bank Guarantee was not upheld as WBPCB does not have penal powers.
- The tribunal directed the WBPCB as well as the Appellant to conduct analysis of the water and raw materials used for the purpose, and not only detect the source but also take appropriate steps for eradicating the same so as to avoid any adverse health impacts.

V. Srinivasan v. Union Of India Appeal No. 18 of 2011 (T)

Context and Description

This Appeal was directed against the Environmental Clearance (EC) granted in favour of the Corporation of Chennai by the Tamil Nadu State Environment Impact Assessment Authority for setting up of Integrated Municipal Solid Waste Processing Plant of 1400 TPD capacity at Pallikaranai village for the treatment of Municipal Solid Waste.

Basis

➤ Environment Impact Assessment Notification dated September 14, 2006.

➤ Grant of Environmental Clearance- Two categories of projects, A and B. Based on potential impacts, Environment clearance granted by Central Govt (MOEF) or State territory environment impact authority.

Directions passed and learning

- The Tribunal found that since Guindy National Park is located within a distance of 10 km from the project site, the EC should have been obtained from the Central Government (MoEF), New Delhi.

Nandhivaram Radha Nagar, Residential Welfare Association v. I. P. Bhaskar Appeal No. 20/2011 and Appeal No. 21/2011

Context and Description

Garbage dumped in a water body in Radha Nagar caused the water to be polluted. As a result, the water body and the water-area were shrinking

Basis

- The Municipal Solid Waste (Management and Handling) Rules 2002.

Directions passed and learning

- On the basis of video-graphic evidence submitted by the State Board the matter was disposed off with a direction to regularly monitor and be vigilant to ensure no dumping of waste so as to keep the water bodies clean.
- Nandhivaram Panchayat to take appropriate steps by deputing personnel every alternate day to ensure that there is no dumping of garbage in the water body or Radha Nagar residential area.

K. G. Mathew v. State of Kerala (Original Application No. 1/2011)

Context and Description

A case was filed for removal of the entire Solid Bio-waste Treatment Plant set up for the restitution of the public stadium to its original state. The case was to award adequate compensation to the petitioner for the damages caused to public health and environment due to the erection of Bio-waste Treatment Plant .

Basis

- The Municipal Solid Waste (Management and Handling) Rules 2002.

Directions passed and learning

On perusing the report of the District Environmental Engineer's the Tribunal found no violations of standards or law. The application was dismissed. As a precautionary measure the State Board was to monitor standards for a year.

Detailed Case Studies

We have identified and analysed some remediation cases to demonstrate the role of different elements involved and offered a review of systems (This would also extend our evaluation of the regulatory, institutional and legal machinery that addresses rehabilitation and methods for prevention of contamination. Each of these cases has been selected on the basis of a topic relevant to rehabilitation. Subsequent to this section we provide a consolidated review of these cases.

An Orphan site

Background: Eastern districts of Kanpur (Noraiakheda area) feature about 350 industrial leather tanneries, many of which discharge untreated waste into local groundwater sources and the Ganges River. The pollutants mainly include metal contaminants such as chromium, mercury, and arsenic.

Case: Following reports of outbreak of skin diseases and visible change in the colour of groundwater, a local Non Governmental Organization (NGO) in January 2006 sought attention of the relevant authorities on possible contamination of groundwater citing "pollution issue owing to indiscriminate industrial waste disposal". This resulted in an increased public awareness of the

issue. The direct involvement of the district magistrate (DM) led to an establishment of a multi-stakeholder committee comprising of representatives from various concerned government agencies and civil society to oversee the pollution issue. The polluted area, densely populated with settlements and households was reportedly once occupied by an old chemical plant that supported the tanneries and emitted toxic sludge consisting of hexavalent chromium. Hence, there was no known current ownership of the existing polluted area. As a matter of priority, samples were taken at different locations and at varying depths to identify the spread of the problem; this analysis was conducted under the umbrella programme 'ESS' of the Central Pollution Control Board (CPCB) zonal office in partnership with Industrial Toxicology Research Center (IITRC), Indian Institute of Technology (IIT)-Kanpur, and National Geophysical Research Institute (NGRI). Further analysis emphasized on the best possible way to undertake the remediation activity that is not only cost effective but within the gamut of available institutional resources. In terms of planning of the remediation activity, the Uttar Pradesh Pollution Control Board (UPPCB) liaised with the U.S. based Blacksmith Institute with the latter providing financial assistance and the technical know-how. The CPCB zonal office conducted a mathematical modelling exercise over 2 years that estimated the proliferation of the pollutant both horizontally and vertically at varying depth over a span of 125 years; it also predicted the effects of 'do-nothing' scenario and 'remediation' (utilizing additive injection technology) scenario. To carry out the remediation activity, the technology was provided by GZA Inc, USA free of cost on demonstration basis while the additive was provided by a firm in Toyoma, Japan. Utilizing the U.S. EPA guidelines on monitoring, a performance evaluation was conducted for 108 days and the remediation outcome was found to be convincing – that is not only hexavalent chromium, but total chromium, was found to be reduced.

Outcome: This was the first such project in India's history carried out by the CPCB, UPPCB and various collaborators, with a successful case of chemical remediation. From a public awareness perspective, the intervention resulted in installation of two new submersible water pumps that would supply the area with potable drinking water.

Our review of this case: In terms of identification, the case came to light because of an external impetus to the existing institutional structure, i.e. active work of a local based Non Governmental Organization (NGO) and remediation outcome was highly dependent on forming partnerships across networks since the area of concern had no known ownership. Access to sites for the purpose of determining the existence/ extent of contamination was not an issue. Overall, while many factors led to identification of a polluted area/site, there was no specific pre-defined trigger that may be highlighted. For notification, delineation of the polluted site, issuance of moratorium, fixing of liability - the onus of the 'playing' the part of a regulator was taken up by the district magistrate (DM), and not the Uttar Pradesh State Pollution Control Board (UPPCB) which while having a clear mandate to deal with hazardous waste, does not have the prerequisite authorization to issue Orders for initiating remediation. For remediation planning, the Uttar Pradesh Pollution Control Board (UP PCB) liaised with the Blacksmith Institute for receiving financial assistance and the technical know-how, highlighting somewhat of a weakness in the current institutional setting in terms of both capacity and finance such as to deal with a legacy site. Also research shows that there was no mention of pre-emptive planning in terms of relocation and resettlement of the communities settled on the contaminated area or of conducting a social audit / due diligence for gainful re-use of land.

A Legacy site (An ongoing effort under NCEF)

Background: Nibra, a village in district Howrah of West Bengal, is built upon contaminated land that has hazardous waste dumps (consisting of chromium) created by neighbouring industries that were existent 15 to 20 years ago.

Case: The case came to light based on prior knowledge of contamination by the concerned agencies mainly through visible discoloration of soil due to chromium contamination. There was no identification and/or prioritization methodology followed. The detailed project report to enable remediation is under preparation.

Outcome: A decision of remediation is likely to take place only once the detailed project report is prepared.

Our review of this case: With the current available information, it has been difficult to ascertain the roles of different elements that are involved or would be involved for the remediation process except for the Central Pollution Control Board, West Bengal Pollution Control Board, and the land dwellers (villagers). Nibra has been prioritized for remediation under NCEF funding programme and identification was due to prior knowledge of the legacy site. Though it may be possible to identify the polluters that have contributed to legacy pollution from the past land records, the current legal framework does not have a provision that enables or authorizes the concerned agencies to trace back to industries that were potentially responsible for causing contamination, make them liable and pay for the remediation activity. In other words, notification, delineation of polluted site(s), issuance of moratorium, and fixing of liability is at a moot point. The concerned agencies have demonstrated an ability to take action in case of either non-responsiveness of responsible party or inability to identify and contact responsible party, by putting the area on the priority list of sites under the NCEF. Furthermore, the detailed project report (DPR) is under preparation which will serve as an impetus to the remediation planning and gainful re-use of the land; important to note would be the status of the current land dwellers post remediation of the site.

A Municipal Waste Site

Background: The Gorai dumpsite, located in the western suburbs of Mumbai, spreads over an area of 19.6 ha and was operational since 1972. The site is adjacent to Gorai creek and close to habitation. Approximately 2.34 million tons of waste up to an average height of 26 m is at the site.

Case: The Gorai closure project envisaged converting about 19 hectares of land at Gorai dumping ground into green landscaped spaces. The existing practice of open dumping that has been followed since 1972 had caused significant environmental damage in neighbourhoods adjoining the disposal site, including potential contamination by hazardous waste dumping. The creek waters were polluted due to inflow of leachate and the air quality had deteriorated from the frequent burning of garbage at the dumping ground. The Municipal Corporation extended a partnership with the IL&FS who in turn recommended levelling and reforming the existing heap of municipal solid waste (MSW) and incorporating environmental mitigation measures.

Outcome: The Gorai Landfill Closure and Methane Capture Project converted about 19 hectare of a dumping ground into green landscaped spaces for the Citizens of Mumbai. It set a benchmark in urban rejuvenation.

Our review of this case: The identification resulted due to prior and established knowledge of the site. The Municipal Corporation of Greater Mumbai (MCGM) showed leadership in addressing the challenge of disposal of municipal solid waste (MSW). The outcome was highly dependent on

forming partnerships such as the Public Private Partnership (PPP) model based on Design, Build, Own, Operate, and Transfer (DBOOT) model and facilitation by the IL&FS. The most important value of this project is the demonstration impact of a successful and balanced PPP project which can be modified for local requirements and replicated across the open dumpsites in the Country.

Rehabilitation vis-à-vis Polluter Pays Principle

Example 1

Background: The source of pollution in Daurala (Meerut, UP) was chemical manufacturing associated with the pharmaceutical and pesticides industries in the region. The pollutants mainly included lead, aluminium, nickel and cyanide.

Case: In terms of identification, the case came to light because of an external impetus to the existing institutional structure, i.e. active work of a local based Non Governmental Organization (NGO), followed by a comprehensive health survey (covering 15,000 persons) conducted by an external partner - Janhit Foundation in 2004-2005; the result of which provided a clear and direct linkage between the health issues of the villagers and the presence of pollutants in the water sources situated in the vicinity of one 'DCM group' of factories. All in all the survey data was so thoroughly compiled that the DCM group had no room for deniability. Due to media coverage, the National Human Rights Commission took suo moto notice of the Daurala issue and directed the UP government to respond on the matter. In mid 2005 the DCM group officials met with the Daurala residents and listened to their demands. As a result of this consultation, a 12 point action plan was presented to the industry on an approach to be taken to set site-specific remediation requirements; and the industry agreed to implement the action plan by December 2007.

Outcome: Acknowledging the "polluter pays" principle, the DCM group has so far spent Rs 8,000,000 to remediate the adverse negative impacts caused by its factory operations. Furthermore, a 3 member citizen committee has been formed to liaise and monitor compliance.

Our review of this case: For purpose of identification of the site and the polluter, technical knowhow was utilized for demonstrating that a particular site is the source of off-site or downstream pollution. This helped in forwarding Orders to landowners (or other responsible parties) and fixing liability to undertake remediation planning. State entities failed in terms of monitoring, compliance, and enforcement which resulted in unchecked dumping of liquid waste in the first place, exhibiting a possible gap in the existing institutional capacity. A bottom up approach consisting of mobilization of local populace, marshalling of non-governmental support, and external partnership such as with the Blacksmith Institute helped turn the picture around and raise public awareness for the contamination issue and led to a remediation outcome.

Example 2

Background: Situated about 12-15 km from Udaipur, the groundwater of Bicchri, spread over an area of 300 hectares, is stark red due to indiscriminate surface dumping of sludge. The site was a small industrial estate (791 acres) manufacturing dyes and dye intermediaries. The site was ordered closed by the government in 1990 after villagers and several Non Governmental Organizations (NGO) (e.g. Ubeshwar Vikas Mandal) filed a Public Interest Litigation (under the PIL Act, 1991) against the polluting company; however some factories continued their operations till 1995.

Case: Indiscriminate surface dumping of sludge, along with irrigation with contaminated groundwater since 1989-90, has contributed to devastating soil contamination. Up to 70 wells used

by some 10,000 residents have been rendered useless, and the 22 villages in the vicinity are without drinking water. After a Supreme Court (SC) order (1996), concerned officials have tried hard to clean up the water but till date it remains a significantly polluted area mainly due to three reasons: 1) clean up of groundwater is difficult, and 2) the cost is prohibitive - the estimated cost of the clean-up at Bicchri is approximately INR 40 crore. The Supreme Court (SC) ordered the clean-up of groundwater after auctioning of the factory's property, which resulted in generating funds equivalent to INR 500,000 only; and 3) even after 16 years of the "final judgment of this court (date of judgment 13th February, 1996) the litigation has been deliberately kept alive by filing one interlocutory application or the other in order to avoid compliance of the judgment". The National Environmental Engineering Research Institute has been assigned the task of cleaning the water.

Outcome: This town in Rajasthan is still analysing solutions to remediate its groundwater contamination. The Blacksmith Institute worked in coordination with the Non Governmental Organization (NGO) ALERT which led to the formation of a stakeholder group consisting of representatives from government agencies, Pollution Control Board officials, scientists, Non Governmental Organizations (NGO) and villagers.

Our review of this case: In terms of identification, the Bicchri case came to light because of an external impetus to the existing institutional structure, i.e. active NGOs and residents of the area. The case presents lessons not only in terms of severity of ground water contamination, but also where neither the Center nor the State took clear responsibility (NEERI, July 12, 2012). The remediation planning was marred by the slow institutional process such as long term judicial involvement from the time of the litigation to pending implementation of a remediation action vid a Supreme Court Order. Although by the powers vested by the judiciary, the concerned agencies took away the factory property as basis for cost recovery, it was not sufficient clearly suggesting an impetus to look for long term financing options for remediation.

Precautionary Principle

Background: The Vellore Citizen Welfare Forum filed a Writ Petition as public interest litigation, alleging that the tanneries and other industries in the area were discharging untreated effluent into the agriculture fields, roadsides, waterways and open lands. The untreated effluents were finally discharged in the river Palar that served as the main source of water supply to the residents of the area.

Case: The Petition further alleged that the entire surface and sub-soil water of river was polluted resulting in non-availability of potable water to the residents of the area. The operation of the tanneries in the state of Tamil Nadu resulted in severe environmental degradation. A survey conducted by the Tamil Nadu Agricultural University Research Centre, Vellore, concluded that approximately 35,000 hectares of agricultural land in the tanneries belt had turned out partially or totally unfit for cultivation. These tanneries used about 170 types of chemicals in the Chrome tanning processes. These chemicals included common salt, lime, sodium sulphuric, chromium sulphate, fat liquor, ammonia and sulphuric acid besides dyes which are used in large quantities. Furthermore, an independent survey conducted by a Non Governmental Organization (NGO) found that 350 wells out of total 467 used for drinking and irrigation purposes were polluted, while a total of 59 villages were affected by the pollution. The Tamil Nadu Pollution Control Board also submitted that their Board persuaded for the last 10 years to control the pollution generated by these tanneries. These tanneries were given option by the Board that either to construct common

effluent treatment plants (CETPs) for a cluster of industries or to setup individual pollution control devices, which was not fully enforced.

Outcome: As per the direction of the Court, the central government constituted an Authority under section 3(3) of the Environment (Protection) Act, 1986 and conferred on the Authority all the powers necessary to deal with the tanneries and other polluting industries in the State of Tamil Nadu (August 28, 2006). The authority so constituted invoked the ‘precautionary principle’ and the ‘polluter pays principle’. The Authority determined the compensation to be recovered from the polluters as cost of reversing the damaged environment. The Authority directed the closure of the industry owned/managed by a polluter in case he evades or refuses to pay the compensation awarded against him. A fine of INR10,000/- each on all the tanneries in the districts of North Arcot, Ambedkar, Erode Periyar, Dindigul Anna, Trichi and Chengai M.G.R. was imposed.

Our review of this case: We observe that the although the compensation was very low in view of the substantial and long term environmental impacts, the Court prevented future contamination by utilizing an international norm of the precautionary principle in context of the Indian law and considered its application mandatory in the interest of sustainable development. The precautionary principle, asserts “that a lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation where there are threats of serious and irreversible damage if the action is not taken”. The Court observed that the tanneries, which were of vital importance in terms of generation of foreign exchange and employment avenues; had no right to destroy the ecology, degrade the environment and cause a health hazard. Hence, it could not be permitted to expend or even to continue with the present production unless appropriate action taken by the industry itself. The traditional concept that development and ecology are opposed to each other was no longer acceptable. "Sustainable Development" would be the answer. In this context, as held by the Supreme Court in the Vellore tanneries pollution case, it was stated,” We are however, of the view that “The Precautionary Principle” and “The Polluter Pays Principle” are essential features of “Sustainable Development.”

D.17. List of regulations reviewed

Policies	Found to be relevant to aspects of the NPRPS
National Environment Policy, 2006	Yes
National Policy on Resettlement, Rehabilitation, 2007	Yes
National Policy on Disaster Management 2009	Yes
National Mineral Policy, 1999	Not directly relevant
Acts	
The Environment (Protection) Act, 1986	Yes
The National Green Tribunal Act, 2010	Yes
The Water (Prevention and Control of Pollution) Act, 1974	Yes
The Air (Prevention and Control of Pollution) Act, 1981	Yes
The Civil Liability for Nuclear Damage Act, 2010	Yes
The Land Acquisition Act, 1894 amended 1984	Yes
Forest (Conservation) Act, 1980	Yes

The Industries (Development & Regulation) Act, 1951	Yes
The Mines and Minerals (Development and Regulation) Act, 1957	Not directly relevant
The Coking Coal Mines (Nationalisation) Act, 1972	Not directly relevant
The Coal Mines (Nationalisation) Act, 1973	Not directly relevant
Atomic Energy Act, 1962	Yes
The Indian Forest Acts, 1927	Yes
The Carriage by Road Act, 2007	Not directly relevant
The Disaster Management Act, 2005	Not directly relevant
Rules	
Environmental (Protection) Rules, 1986 and amendments thereof	Yes
Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008	Yes
Bio-Medical Waste (Management and Handling) Rules, 1998	Yes
The Batteries (Management & Handling) Rules, 2001	Yes
E-Waste (Management & Handling) Rules, 2011	Yes
Dumping & disposal of Fly-ash Rules, 1999	Yes
The Mineral Conservation and Development Rules, 1988	Yes
Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987	Yes
Municipal Solid Wastes (Management and Handling) Rules, 2000	Yes
The Public Liability Insurance Act and Rules, 1991	Yes
Granite Conservation and Development Rules, 1999	Not directly relevant
The Mining Leases (Modification of Terms) Rules, 1956	Not directly relevant
State, Local Laws and Bye Laws	
West Bengal Municipal Act, 1993 (Functionally the same as Kolkata Municipal Act, 1980)	Yes
The East Kolkata Wetlands (Conservation and Management) Act, 2006	Yes
East Kolkata Wetlands (Conservation & Management) Rules, 2006	Yes
The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004)	Yes
Andhra Pradesh Minor Mineral Concession Rules, 1966	Not directly relevant
The Andhra Pradesh Mica Act, 1957	Not directly relevant
The Andhra Pradesh Forest Act, 1967	Not directly relevant
The Andhra Pradesh Motor Vehicles Rules, 1989	Not directly relevant
Maharashtra Non-biodegradable Garbage (Control) Act, 2006	Yes
Delhi Motor Vehicles Rules, 1993	Not directly relevant
Maharashtra Groundwater Development and Management Act, 2009	Yes
The Tamil Nadu Motor Vehicles Rules, 1989	Not directly relevant
Municipal Corporation of Greater Mumbai Bylaws, 2006	Yes

The Bombay Provincial Municipal Corporations Act, 1949	Not directly relevant
Mumbai Municipal Corporation Act, 1888	Not directly relevant
Karnataka Shops and Commercial Establishments Act, 1961	Yes
Karnataka Municipal Corporations Act, 1976	Yes
Delhi Municipal Council Act, 1994	Not directly relevant
The Himachal Pradesh Municipal Act, 1994	Yes
Rajasthan Municipalities Act, 2009	Not directly relevant
The Uttar Pradesh Municipalities Act, 1916	Yes
The Uttar Pradesh Municipal Corporation Act, 1959	Yes
The West Bengal Municipal Act, 1993	Not directly relevant
The Kerala Municipality Act, 1994	Not directly relevant

Appendix E. - Details of Institutional Frameworks

E.1. List of Authorities and Duties under HW(MHT) Rules 2008

Table 9: Authorities and Duties under HW Rules

S.No	Authority	Corresponding Duty
1	Ministry of Environment and Forests under the Environment (Protection) Act, 1986	<p>Identification of hazardous wastes</p> <p>Permission to exporters of hazardous wastes</p> <p>Permission to importers of hazardous wastes</p> <p>Permission for transit of hazardous wastes throughout India</p> <p>Sponsoring of training and awareness programme on Hazardous Waste Management related activities</p>
2	Central Pollution Control Board constituted under the Water (Prevention and Control of Pollution) Act, 1974	<p>Coordination of activities of State Pollution Control Boards / Committees</p> <p>Conduct training courses for authorities dealing with management of hazardous wastes</p> <p>Recommend standards and specifications for treatment and disposal of wastes and leachates</p> <p>Recommend procedures for characterization of hazardous wastes.</p> <p>Sector specific documentation to identify waste for inclusion in Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.</p> <p>Prepare guidelines to prevent/reduce/ minimize the generation and handling of hazardous wastes</p> <p>Registration and renewal of registration of Recyclers/Re-processors</p> <p>Any other function under Rules delegated by the Ministry of Environment & Forests.</p>
3	State Government/Union Territory Government/Administration	<p>Identification of site(s) for common Hazardous Waste Treatment Storage and Disposal Facility (TSDF)</p> <p>Assess EIA reports and convey the decision of approval of site or otherwise</p> <p>Acquire the site or inform operator of facility or occupier or association of occupiers to acquire the site</p> <p>Notification of sites</p> <p>Publish periodically an inventory of all disposal sites in the State/Union Territory</p>
4	State Pollution Control Boards or Pollution Control Committees constituted under the Water (Prevention	<p>Inventorisation of hazardous wastes</p> <p>Grant and renewal of authorization</p> <p>Monitoring of compliance of various provisions and conditions of authorization including conditions of</p>

S.No	Authority	Corresponding Duty
	and Control of Pollution) Act, 1974	<p>permission for issued by MoEF exports and imports</p> <p>Examining the applications for imports submitted by the importers and forwarding the same to Ministry of Environment and Forests</p> <p>Implementation of programmes to prevent/reduce/minimize the generation of hazardous wastes</p> <p>Action against violations of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008</p> <p>Any other function under these Rules assigned by MoEF from time to time.</p>
5	Directorate General of Foreign Trade constituted under the Foreign Trade (Development and Regulation) Act, 1992	<p>Grant of licence for import of hazardous wastes</p> <p>Refusal of licence for hazardous wastes prohibited for imports and export</p>
6	Port Authority under Indian Ports Act, 1908 (15 of 1908) and Customs Authority under the Customs Act, 1962 (52 of 1962)	<p>Verify the documents</p> <p>Inform the Ministry of Environment and Forests of any illegal traffic</p> <p>Analyse wastes permitted for imports and exports</p> <p>Train officials on the provisions of the (Management, Handling and Transboundary Movement) Rules, 2008 and in the analysis of hazardous wastes</p> <p>Take action against exporter/importer for violations under the Indian Ports Act, 1908/Customs Act, 1962</p>

E.2. Existing systems for management of toxic / hazardous wastes

E.2.1. Institutions for Environmental policy / planning

The Ministry of Environment and Forest (National level policies and planning)

The Ministry of Environment & Forests (MoEF) is the nodal agency for the planning, promotion, co-ordination and overseeing the implementation of the country's environmental and forestry related policies and programmes.

The broad objectives of the Ministry are³:

- Conservation and survey of flora, fauna, forests and wildlife
- Prevention and control of pollution
- Afforestation and regeneration of degraded areas
- Protection of the environment and

³ <http://moef.nic.in/modules/about-the-ministry/introduction/>

- Ensuring the welfare of animals

In its functioning, the MoEF is guided by legislations & regulations, national policies and other international policies that the country is party to.

Some of the important functions of the MoEF relate to the following⁴:

- Environment and Ecology and its health
- Environmental Research and development, education, training, information and awareness.
- Survey and Exploration of Natural Resources particularly of Forests, flora, Fauna, Ecosystems etc.
- Bio-diversity Conservation including that of lakes and Wetlands.
- Conservation, development, management and abatement of pollution of rivers which shall include National River Conservation Directorate.
- Wildlife conservation, preservation, protection planning, research, education, training and awareness including Project Tiger and Project Elephant.
- International Co-operation on issues concerning Environment, Forestry and Wildlife.

Organization Structure:

The Minister of Environment (MEF) is at the apex in the organization structure of the MoEF; the MEF is assisted by the Minister of State (Environment) and the Minister of State (Forests and Wildlife). There are separate organization structures for the Environment, Forestry and Wildlife sectors. The functions of these sectors are overseen by the respective Secretaries who are in-turn assisted by Joint and/or Additional Secretaries. Further, the MoEF also has six zonal offices, each headed by a Chief Conservator of Forests.

State Departments of Environment (and forest)

The State Departments of Environment (and Forest/ecology) have a mandate to work towards the preservation of the natural environment and resources including water, air and soil quality; conserve and protect flora, fauna and other natural resources; enforce environmental Acts and Rules made by the Central and State governments and to coordinate various environmental policies and programs that are being conducted by the state governments. Apart from these the important functions undertaken by the DOE are the award of Environmental Clearances to industries/projects, coastal management and overseeing the activities of the state pollution control boards.

Organization Structure: The state DOEs are typically headed by the State level ministers for Environment and Forests; functioning of the DOE is managed by Directors (IFS/IAS cadre). The state DOEs typically have separate bodies for the management of individual divisions like coastal zones, forests, water resources etc.

⁴ <http://www.moef.nic.in/rti/item01.htm>

E.2.2. Institutions for Environmental compliance / policy enforcement

Central Pollution Control Board (CPCB)

The CPCB was constituted as a statutory body under the Water Act of 1974 (it was then called “Central Board for the Prevention and Control of Water Pollution”). The ambit of CPCB has been widening since its formation and now includes The Air Act of 1981, The Environment Act of 1986, Bio-medical waste rules of 1998 and so forth. It now acts as a central body with “an overall mandate for environmental planning and its management”⁵. Following are the important functions performed by the CPCB currently:

- Advise the Central Government on any matter concerning prevention and control of water and air pollution
- Plan and execute nation-wide pollution control programmes in collaboration with SPCBs
- Co-ordinate the activities of SPCBs and Pollution Control Committees
- Provide technical assistance and guidance to the SPCBs and PCCs
- Carryout and sponsor investigation and research related to pollution control
- Plan and organize training programmes for SPCBs and other target groups
- Organize mass awareness programmes
- Collect, compile and publish technical and statistical data relating to water and air pollution
- Lay down, and where necessary modify, water and air quality standards

SPCBs/PCC

The State Pollution Control Boards (or correspondingly Pollution Control Committees in Union Territories) were established following the adoption of the Water Act of 1974 and then the Air Act of 1981 at the state legislature level. At the State level, the SPCBs are attached either to the Environment Department, or to the Forest and Wildlife Department. In general, SPCBs perform the following functions:

- Advise the state governments on pollution related issues;
- Plan comprehensive state-level pollution control/prevention/abatement programs;
- Implement and enforce national standards, making them more stringent if warranted by local conditions
- Grant consents to establish and to operate under the Air and Water Acts and authorize hazardous
- Waste disposal as per rules under the EPA; and
- Collect water cess for the use of water

⁵ <http://www.cpcb.nic.in/divisionsofheadoffice/rti/Manual-1.pdf>

Organization Structure of SPCBs

The State Pollution Control Boards are headed by their respective Chairpersons, who are assisted by the Member Secretaries (MS). Along with the Chairperson and the MS, Chief Environment Engineers (CEE) /Joint Chief Environment Engineers/Additional Chief Environment Engineers form the apex of the SPCB's organization structure. The SPCBs and also have district offices (that may be headed by District Environment Engineers) and air/water/soil testing laboratories.

E.2.3. Other government entities

The entities responsible for regulating and enforcing responsible management of hazardous wastes are described in the preceding section. The management of contaminated sites, however, requires the involvement of several other government agencies, in addition to those responsible solely for environmental protection. This is necessary due to two critical issues that need to be addressed when dealing with contaminated sites

1. Ownership of contaminated land and restriction on the use of such contaminated lands.
2. Health impacts resulting from the contamination

These are important aspects that may not be regulated by the environmental protection agencies by themselves. It is important for these agencies, most likely through the MoEF, to engage with other Ministries of the Government of India that deal with land development, land use, own large tracts of land for public use or deal with public health.

In the following sections, we identify and describe the primary roles of such entities that need to be involved in the management of contaminated sites, either for management of land use or for understanding and mitigating health impacts from such contamination. A review of publicly available information suggests that there is a lack of any coordinated interaction between different Ministries on the issue of managing contamination or its impacts on land use or public health. This is elaborated further in the discussion on each agency below.

Ministry of Urban Development

The Ministry of Urban Development (MoUD) is the nodal Ministry in charge of various aspects of Urban Development including urban water supply, sanitation & municipal solid waste in the country. MoUD formulates policies, supports and monitors programmes and coordinates the activities of various Central Ministries, State Governments and other nodal authorities that are related to urban development issues in the country. Some of the important items in relation to which the MoUD carries out business are⁶ :

- Water supply, sewage, drainage and sanitation relating to urban areas and linkages
- Local Government, that is, the constitution and powers of the Municipal Corporations, Municipalities, other Local Self-Government Administrations.
- Planning & coordination of urban transport systems (technical planning of rail based systems are work allocated to the Ministry of Railways), fixing maximum and minimum rates and fares for rail-based urban transport systems, tramways including elevated high speed trams within municipal limits

⁶ http://www.urbanindia.nic.in/Organizations/Mandate_Ministry.htm

- Town and Country Planning - matters relating to the Planning and Development of Metropolitan Areas
- Matters of the Housing and Urban Development Corporation (HUDCO) relating to urban infrastructure.
- Administration of Government estates, civil works and buildings
- Properties of the Union (with some exceptions)
- Delhi Development Authority, water supply and sewage disposal

With rapid urbanization and increase in industrial activity, management of hazardous waste is an issue that has become increasingly important for urban centres. It is likely that contamination from hazardous waste may have resulted in the creation of legacy or orphan sites, and the nature and extent of contamination on these sites needs to be communicated to MoUD and should be given due consideration during the executing of the responsibilities described above.

The Central Public Health and Environmental Engineering Organisation (CPHEEO) is the technical wing of the MoUD and deals with matters related to urban water supply and sanitation including Solid Waste Management in India. While water supply and sanitation is a state subject, the policies, strategies and guidelines are provided by CPHEEO to the Governments of States & UTs (including Municipal Corporations / Committees). It acts as an advisory body at central level to advise the concerned State agencies and Urban Local Bodies (ULBs) in implementation, operation & maintenance of urban water supply, sanitation and Solid Waste Management projects and helps in adoption of latest technologies in these sub sectors.

Extending the mandate of this office to deal with hazardous waste and contamination from hazardous waste may be explored as part of developing the NPRPS.

The Ministry of Health and Family Welfare

The Ministry of Health and Family Welfare comprises the following departments, each of which is headed by a secretary to the government of India⁷:-

- Department of Health & Family Welfare
- Department of Ayush
- Department of Health Research
- Department of AIDS Control

Directorate General of Health Services(Dte.GHS) is attached to the office of the Department of Health & Family Welfare and has subordinate offices spread all over the country. The DGHS renders technical advice on all medical and public health matters and is involved in the implementation of various health services.

Of the four Departments within the Ministry, Department of Health & Family Welfare is the most likely department that needs to be involved in the management of health related impacts resulting from contamination of sites. While various programs related to different health aspects have been initiated within this Department, a systematic engagement with the Ministry of Environment and Forests or any environmental enforcement agency seems to be lacking. This engagement and

⁷ <http://mohfw.nic.in/index1.php?lang=1&level=1&sublinkid=1&lid=13>

coordination will be key to managing the collateral damage on health arising out of contamination of sites.

National Highways Authority of India

The National Highways Authority of India was constituted by an act of Parliament, the National Highways Authority of India Act, 1988. It is responsible for the development, maintenance and management of National Highways entrusted to it and for matters connected or incidental thereto. In its capacity to manage large tracts of land, NHAI needs to have access to knowledge on contamination from hazardous waste resulting in the creation of legacy or orphan sites and the nature and extent of contamination on these sites.

Departments of Agriculture and Food under the Ministry of Agriculture

The Departments of Agriculture and Food under the Ministry of Agriculture (MoA) are responsible for various functions related to agriculture production, research and education; animal husbandry, fisheries, forestry; agricultural development and management of fertilizers. Two important responsibilities of these Departments under the MoA are:

- Land reclamation
- Soil conservation.

These are important mandates given the overall responsibilities of these Departments related to agriculture and food production, since it serves to address the critical requirements of land within Ministry.

The Bureau of Soil Survey and Land Use Planning (NBSS&LUP) is an independent Institute of the Indian Council of Agricultural Research (ICAR) and is responsible for research, training, correlation, classification, mapping and interpretation of soil related issues. We have identified this institute as one having possible synergies with agencies responsible for the management of contaminated sites, and may be engaged and consulted with on soil contamination issues.

State Industrial Development Corporation:

These entities are important stakeholders in the management of polluted sites as owners of land that may be subjected to contamination. They also have a role to play in assigning responsibility for contamination (if it happens as a result of industrial activity occurring within their jurisdiction), and assigning responsibility for remediation, including affixing the financial liability.

In most cases, any incidental identification by the SIDCs of contamination from hazardous wastes is informed to the PCBs, who may then take appropriate action for the characterization of waste and identification of the parties responsible for contamination.

Municipal Bodies

Municipal corporations and urban local bodies are important stakeholders in the management of hazardous waste and contaminated sites due to their involvement in the following important aspects:

1. They are mandated to monitor the industrial units located within their jurisdiction. While not many industries may be sited within municipal limits, there are cases where specific industries are located within urban areas, and may be generating hazardous waste in these units.

2. They are responsible for the collection, disposal and management of municipal solid waste within their jurisdiction. There may be contamination from hazardous waste in the waste collected by these entities, also resulting in contamination of municipal landfill.
3. They are involved in the urban and land development activities within their jurisdiction and need to be aware of any contaminated sites before determining their land use. These entities may also have to deal with legacy contaminated sites within their jurisdiction that were created as result of activities occurring at industries that, though now located outside their jurisdiction, may have operated within municipal limits in the past.

It becomes obvious that municipal bodies have a role to play in the management of contaminated sites. We discuss the challenges identified in each of areas described above based on our discussions with municipal bodies of some of the largest cities in India,

Mandate of ULBs: All the bodies we met concurred that HW identification and site remediation was not their responsibility, and any accidental discovery of a contaminated site was reported to the SPCB, who may then deal with the issue. Further, no provisions exist for assessing HW generation potential or categorization as polluting / non-polluting industry when issuing licences to businesses within their jurisdiction. Some of the ULBs consulted are developing specific programs for the management of e-waste.

Contamination of municipal waste with hazardous waste: There may be instances of illegal dumping (due to various reasons discussed when describing the industrial entities in the following section). This required a mechanism to address the need for collection mechanisms, especially from SMEs and providing support in transportation of HW.

Addressing land use of contaminated sites: Several entities described a lack of consideration to environmental issues of pollution of sites when developing and framing the planning framework for their municipalities.

- The AMC mentioned that the bye-laws for AMC, currently under development, may not have any comment or inclusion of any laws for polluted sites.
- Land use planning / zoning within the Municipal Corporation of Greater Mumbai (MCGM) jurisdiction is undergoing a change wherein due consideration needs to be given to managing unauthorized (possibly industrial) activities and constraints on development in the vicinity of previous dump sites. The MCGM also identified that is no specific consideration for sustainable or eco-sensitive, region specific planning in the Development Plan (DP) for Mumbai

The MCGM also specifically needs to deal with the issue of managing sites that were used for industrial activities in the past. The greater Mumbai area was an industrial cluster with industrial units working in chemicals and pharmaceuticals sectors. Hence, there may be a need for identification and remediation procedures.

E.2.4. Industrial entities

Industrial entities lie at the other end of the spectrum for the management of hazardous wastes, and are important stakeholders throughout this process. It is important to engage these entities; the success of a program for the management of polluted sites will rely on participation and support from industrial entities of all sizes, and those responsible for different roles ranging from hazardous waste generation to waste collection and transport, and hazardous waste disposal.

In the following section, we discuss the roles of different types of industrial entities, and the challenges that need to be overcome to encourage responsible hazardous waste management and disposal.

Manufacturing Industries: These entities are the source of hazardous waste, and are the determinants of the fate of the waste generated within their facilities. While there exist regulatory requirements for the disposal of hazardous waste through only authorized TSDFs, the existence of contaminated sites and illegal dump sites of hazardous waste are evidence that not all waste generated within industrial units is disposed off through authorized facilities. We explore the possible reasons for this as follows:

- Shops and establishments outside the jurisdiction of SPCBs: In the previous sections, we have discussed the roles of the entities responsible for the enforcement of the HW Rules. The enforcement mechanism is predominantly through the consent and inspection mechanism, wherein the SPCBs are responsible for monitoring the industrial units within their jurisdiction which includes any industry, operation or process or an extension and addition thereto, which is likely to discharge sewerage or trade effluent into the environment or likely to emit any air pollution into the atmosphere.

There may, however, be some shops and establishments, registered under the Shops and Establishments Act that may be generating some hazardous waste but lie outside the jurisdiction of SPCBs, and are therefore not required to follow the provisions of the HW rules. These commercial establishments may include⁸:

- a commercial or trading or banking or insurance establishment, or
- an establishment or administrative service in which persons employed or mainly engaged in office work, or
- a hotel, restaurant, boarding or eating house, a cafe or any other refreshment house or
- a theater, cinema or any other place of public amusement or entertainment.

These entities may come within the jurisdiction of ULBs or municipal corporations with no mandate to inspect or monitor hazardous wastes, and they may not be subject to compliance and monitoring. Any hazardous waste generated from such entities will likely be collected as part of the municipal solid waste and result in contamination at the landfill site.

To address this source of contamination, it may be necessary to empower municipal corporations to regulate hazardous waste at such establishments or legally bind these small traders establishments with appropriate provisions in Trade License requiring them to follow environmental laws including Hazardous Waste Rules and Battery Handling Rules.

- Existence of an unorganized sector: There exists a large unorganized sector in India engaging in different types of activities, including some which may generate hazardous wastes. Management of hazardous wastes from such sources may only be dealt with by increasing the regulatory reach in coordination with urban and rural local bodies, municipal corporations etc.

⁸ <http://smallbusinessindia.intuit.in/starting-business/shops-establishments-%E2%80%93-law-says/>

- Regulated industries indulging in illegal dumping: This scenario may occur due to the inability of the industrial unit to transport their hazardous waste to TSDFs due to financial constraints, the unavailability of TSDFs at a reasonable distance or unavailability of capacity at an accessible TSDF. While TSDF availability and capacity are issues that are being addressed by the Government, the former issue is more complex and difficult to deal with. The cost of transportation, treatment and disposal of waste increases the cost of doing business, and may become financially prohibitive, especially for some small and medium sized enterprises (SMEs). While there is no ambiguity about the need to responsibly manage hazardous waste, successful implementation will ensue only after addressing the financial constraints of the SMEs.

TSDF operators / waste handlers

These entities operate the TSDFs required for safe disposal of hazardous waste. During our interactions with waste management companies, we identified the need to:

1. Monitor the technical capability of authorized operators in any state to ensure they can provide the necessary technical resources to adequately treat and dispose the hazardous waste delivered to their sites.
2. Increasing utilization of TSDF to allow operation as close to design capacity as follows. TSDF operators cited various factors (including high cost of transportation, illegal dumping, inadequate compliance by industrial units) leading to underutilization of TSDFs. This results in higher costs of treatment, in turn discouraging industrial users from using these facilities.

Addressing the storage and handling of hazardous waste in cases requiring judicial intervention. Some operators mentioned that there may be occasional delays in decisions by judiciary on disposal of wastes. In this case, the TSDF operator may have to bear the cost of storage with no means of recovery.

E.3. Summary of details received from various stakeholders

E.3.1. Responses received from different PCBs related to the issue of identification of contaminated sites

Table 10: Responses on Identification

S.No	Agency	Response
1.	CPCB	<ol style="list-style-type: none"> 1. There are gaps identified in procedures for identification of dumpsites 2. There is lack of appropriate ranking criteria for dump sites 3. Site prioritizing is done by the CPCB Zonal office under their surveillance programme called ESS 4. CPCB only provides the basis for decision making in terms of remediation or in terms of land use.
2.	GPCB	<ol style="list-style-type: none"> 1. GPCB confirmed that there is no specific guideline followed by GPCB for defining “polluted sites”. 2. Declaration of polluted sites is very case specific. As example, parameters like BOD, COD, water colours are considered for water contamination.
3.	KSPCB	<ol style="list-style-type: none"> 1. KSPCB defines contaminated sites using the framework of CEPI.

S.No	Agency	Response
		<p>2. Detection of polluted sites happens only through complaint or reports.</p> <p>3. There is no regular monitoring of areas in the state.</p>
4.	OPCB	<p>1. OPCB appointed an external agency for one-time identification and investigation of major HZW dump sites in six identified locations. The study identified a total of 21 dump sites across these six locations. No further studies carried out</p> <p>2. The current situation may be different and may have aggravated. This is difficult to ascertain in the absence of any further studies on HW sites.</p>
5.	WBPCB	<p>1. Driven by the Supreme Court order that was the outcome of the Menon committee report, WBPCB informally identified the 27 dump sites in Hooghly district along Delhi Road.</p> <p>2. They confirmed that there was no identification methodology followed</p> <p>3. It was based on prior knowledge of WBPCB of visible discoloration from Chromium contamination in these areas that they happened to point out during visits to the nearby industrial units. There was no structured prioritization carried out.</p> <p>4. WBPCB reported the sites that were known to them.</p> <p>5. WBPCB observes that there may be many other illegal dump sites existing across the state that do not have visible contamination characteristics and hence not identified till date due to lack of structured identification methodology.</p> <p>6. The job related to further assessment of contamination and final identification of these sites was outsourced to National Productivity Council.</p>
6.	UPPCB	<p>1. Cases of contaminated sites in UP are those that are affected primarily by chromium and its sulphates</p>
7.	TNPCB	<p>1. There is no streamlined procedure for identification of polluted sites in the state; the SPCB does not maintain any list of polluted sites.</p> <p>2. So far, two sites have been identified in Tamil Nadu as polluted sites and identification was possible due reports by local populations and the media</p>
8.	MPPCB	<p>1. There is no framework provided by CPCB on how to assess soil and or land quality being deteriorated from contamination and extend of contamination.</p>

E.3.2. SPCB Responses : Judicial Mandate

The responses received from various SPCBs on addressing the issue of judicial mandate as it relates to their ability to manage hazardous wastes and enforce remediation of contaminated sites are presented in table below:

Table 11: Response on judicial mandate

S.No	Agency	Response
1.	CPCB	<p>1. There is no legislation for the protection of lands and environmentally critical ecosystems (wetlands, irrigation command areas) from</p>

S.No	Agency	Response
		<p>inappropriate on-site storage and indiscriminate off-site dumping (of hazardous waste).</p> <p>2. None of the acts and and/or rules address issues related to land and/or soil contamination.</p> <p>3. There are overlapping responsibilities of enforcement agencies at the central, state and local levels; duplication of efforts and contradictions has been observed while implementing the laws.</p> <p>4. There is lack of coordination between ministries⁵</p>
2.	APPCB	<p>1. APPCB has the mandate to conduct regular surveillance to monitor cases of illegal dumping;</p> <p>2. APPCB did not have jurisdiction in a specific contamination case (Voltas Case) and could not force remediation. The PCB also had to use the media to create awareness prior to a sale of the contaminated land</p>
3.	GPCB	GPCB has the mandate to oversee the operation of an "Environment Fund" which is used for financing remediation activities of polluted sites.
4.	KSPCB	1. On receiving a complaint, the area is examined and if found polluted, the KPCB may use the consent mechanism to force the polluting party to cleanup
5.	RPCB	<p>1. RPCB has the mandate for monitoring based on the schedule of inspection. The frequency of the monitoring depends on the category in which the industry falls depending on the discharge of pollutants and also their impact on the environment.</p> <p>2. RPCB has the mandate to require a comprehensive inspection of the industrial unit to assess whether there is capability to handle the treatment of effluents, air pollution, hazardous waste and other parameters.</p> <p>3. RPCB can further order any industrial unit to shut down if they are found ineffective in the handling and disposal of the waste generated. In the past, industrial units have been closed by the RPCB for not following the laws and the set regulations. "</p>
6.	WBPCB	<p>1. The WBPCB is responsible for the hazardous waste management and monitoring. No agency has been identified to deal with the identification process and remediation of orphan sites.</p> <p>2. The WBPCB, through its regulatory power to control pollution, can issue an order to the District Magistrate's (DM) office so that they can take action. "</p>
7.	HSPCB	<p>1. The Board identified the lack of autonomy of the Board as a challenge. Both enforcement activities as well as planned upgrades are generally slowed down because of control of the state government.</p> <p>2. Enforcement tools of the board include the consent mechanism and the closure mechanism. Fines or penalties are not levied"</p>
8.	TNPCB	1. TNPCB has ordered contaminating industries in the past to undertake site remediation.
9.	MPPCB	1. MPPCB investigates only when a complaint is made regarding

S.No	Agency	Response
		contamination or during the course of industrial visit by certain Regional Offices (RO). If the RO finds that waste is not stored and disposed properly or there is possibility of contamination; the RO immediately reports the matter to Head Office.

E.3.3. Summary of responses from SPCBs regarding capacity for compliance monitoring

Table 12: Response on compliance monitoring

S.No	Agency	Response
1.	CPCB	<ol style="list-style-type: none"> 1. Most SPCBs have inadequately trained technical staff to effectively plan and monitor Hazardous Waste (HW) compliance and enforcement programs. 2. CPCB provides labs for analysis. These are ISO17025 accredited labs. 3. Staff at CPCB and PCB are responsibility for enforcement of multiple Acts, may not be sufficient. 4. Testing capabilities to identify HW contamination are available only at select offices (CPCB, WBPCB)
2.	APPCB	1. APPCB has earned NABL certification for 110 parameters tested at their in-house facilities; this has given APPCB accreditation in terms of relying on results obtained from their testing facilities, and utilizing the same to establish a case while asking for compensation or fighting a case
3.	GPCB	<ol style="list-style-type: none"> 1. GPCB expressed concerns about inadequate staffing and asserted that Government of India should approve staffing position and corresponding salary for the SPCBs without any further intervention from the state governments. 2. Emphasised upon inadequate manpower of the legal departments of GPCB.
4.	RPCB	<ol style="list-style-type: none"> 1. The staff strength of the pollution control board is not adequate for the current operations in relation to waste in the state and also in case the remediation of a polluted site is required. 2. Currently ,the RPCB has two personnel with a technical background under the Group Head of the Solid Waste Management Cell for carrying out the functions of the RPCB in relation to hazardous waste, municipal waste, e-waste, bio-medical waste, waste from batteries, etc. 3. The RPCB does not have the financial resources to tackle a case of remediation of the polluted sites. The remediation of a polluted area involves a large amount of finance"
5.	WBPCB	<ol style="list-style-type: none"> 1. WBPCB identified the need for enhancing the manpower and technical capability / need for additional training 2. WBPCB is not equipped with manpower resources with the right skill set or knowledge, laboratory set up to carry out HW site identification and remediation. For example, there has to be a hydro-geologist, social officer, environmental law specialist in PCB to handle HWM and remediation

S.No	Agency	Response
		issues.
6.	HSPCB	<ol style="list-style-type: none"> 1. Currently there is a lack of staffing in the Board, and a proposal for 309 new employees has been sent to the state government 2. There is also a deficit in the laboratory capacity and the Board has proposed the setup of 4 new laboratories and 2 monitoring stations. Currently the deficit of laboratory facilities is met by recognizing private laboratories for conducting the Board's work.
7.	TNPCB	<ol style="list-style-type: none"> 1. Total Staffing details at TNPCB are as below: <ol style="list-style-type: none"> a. Engineering Staff: 124 b. Scientific (laboratory) Staff: 189 c. Administrative staff: 382 2. Facilities operated: TNPCB has twenty eight district environment offices and 15 environmental laboratories. 2. Scope of activities performed by the TNPCB has increased; a number of notifications which require SPCB's action. Overall strengthening of the organization (in terms of manpower) is required. 3. SPCB advices the industry on pollution abatement methods; there is need for awareness creation and facilitation of trainings on technologies that are being used in developed countries."
8.	MPPCB	<ol style="list-style-type: none"> 1. MPPCB does not have adequate staff strength to monitor all industries. 2. Currently there is a lack of staffing in the Board. Only 6 people monitoring more than 1000 industrial units. 3. Strengthening required in terms of: <ul style="list-style-type: none"> • Technical – Knowledge on type of hazardous waste and type of contamination regarding ground water and leachate quality and remediation techniques and technology, procurement details (if any) • Adequate laboratory operators • Increase human resources

Appendix F. - Details of Financial Mechanisms

F.1. National Clean Energy Fund (NCEF)

Table 13: NCEF Details

S. No.	Component	Remarks
1.	Objective of setting up the Fund	The fund has been set-up for funding research and innovative projects in clean energy technology. Grants for preparation of DPR and carrying out remediation are also mandated under the Fund.
2.	Year of setting up	2010
3.	Funding	<ul style="list-style-type: none"> The Fund is non lapsable fund under Public Accounts Cess on coal at an effective rate of INR 50 a tonne produced and imported in India The budgeted clean energy fund for the current financial year is Rs 3,864 crore. In 2011-12 The government expects to collect Rs 10,000 crore under the Clean Energy Fund by 2015
4.	Allocation	In 2010-11, an allocation of Rs 200 crore from the fund had been proposed for environmental remediation programmes and another Rs 200 crore for the Green India Mission.
5.	Appraisal	An inter-ministerial group (IMG) has also been set-up to pick up projects and schemes eligible for financing from the fund. The IMG may seek the assistance and views of technical experts from related organizations and individuals of repute in the area of clean energy to review, evaluate and recommend projects. To monitor progress of NCEF funded projects, the IMG will identify/appoint appropriate professional agencies
6.	Eligibility	<p>Funds would be available for specific projects relating to Innovative methods to adopt to Clean Energy technology and Research & Development:</p> <p>(a) Sponsored by a Ministry/Department of the Government; and</p> <p>(b) Submitted by Individual/ consortium of organizations in the Government/public sector/private sector</p>
7.	Project funding	<p>In the form of loan or viability gap funding, as the IMG deems fit on case to case basis. Participating organizations will have to put in a minimum financial commitment of 40%. The Government assistance under the NCEF shall in no case exceed 40% of the total project cost.</p> <p>Projects which are being funded by any other arm of the Government of India or have received grants from any other national/international body will be ineligible for applying/funding under NCEF. Further, no project relating to basic/fundamental research shall be supported through NCEF.</p> <p>In respect of time and cost overruns, a suitable accountability mechanism on lines similar to the one being followed in EFC/PIB projects/schemes shall be enforced strictly.</p>
8.	Projects	<ul style="list-style-type: none"> The Central Pollution Control Board is in talks with pollution control

approved	<p>departments of eight states to begin remediation work at 12 sites which have been contaminated by highly toxic waste. The NCEF has approved Rs 60 crore for preparing detailed project reports for the sites at 5 crore per DPR.</p> <ul style="list-style-type: none"> The central board (CPCB) had proposed that 70 per cent of the project, costing Rs 805 crore, be borne by NCEF. But after discussions, it was decided NCEF would pay 40 per cent and the grant was cleared in principle if the state governments provide 60 per cent of the total cost
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F.2. Central Government Scheme for subsidy for setting up of TSDF

Table 14: Details of TSDF Scheme

S. No.	Particulars	Details
1.	Name of the agency	Ministry of Environment & Forests (MoEF)
2.	Details of the agency	MoEF is the implementing agency
3.	Start date for funding	NA
4.	Name of programme/ fund	Subsidy for setting up of TSDFs
5.	Details of programmes funded	<p>Common Treatment, Storage, Disposal facilities (TSDF) are required to dispose the hazardous waste in an environmentally sound manner. Under the rule the State Government, the occupier and operator of any facility generating hazardous waste shall individually or jointly responsible for the identification of sites and setting up TSDF.</p> <p>To speed up the procedure of setting up TSDF in states, MoEF has implemented a scheme to provide financing support to the state government and industrial associations.</p>
6.	Source of funding	Funding from government
7.	Eligibility for financing projects	Private sector
8.	Institutional structure required	Under this funding mechanism TSDF will be set up on a Public Private basis. The principle to be followed is BOO: Build, Operate and Own.
9.	Structuring and mode of financing	Under the financing scheme MoEF provides financial assistance of a maximum of INR 2 Crore., remaining will be provided by State govt.
10.	Project Implementation Schedule	<ul style="list-style-type: none"> Timeframe for tendering (90 days) Evaluation and finalizing of tendering (60 days after tender submission) Selection of Private Operator Mobilisation of resources for PO

		<ul style="list-style-type: none"> • Start of construction • Establishment of SPV • Construction time 1 yr (approx) • Commissioning of TSDF
11.	Project stages	<ul style="list-style-type: none"> • Site selection – This step may include a public hiring, Site suitability test • The identification and quantification of landfillable Hazardous Waste to come to the site • Hazardous waste characterization • HW projection depending on industrial growth and reduction of waste generation due to various factors. • Identification of appropriate technology • Infrastructure development. • Commissioning of TSDF
12.	Project costs (example)	<ul style="list-style-type: none"> • Land cost –The land will be taken from the state government at a lease rate. (INR 100/acre/year) –for a period of 50 – 52 years; (construction - 1 year, operation – 20 years, post closure period – 30 years). • Infrastructure Cost, • Operating cost – <ul style="list-style-type: none"> ○ Staff cost (both at an expected waste generation and at any increase in waste quantity) ○ Transportation cost for waste transport (Total cost of transportation/qtr is INR70 lakh (approx), which implies an effective cost of INR 690 per ton of waste. The weighted average cost per ton km over an effective distance of 218 km is INR3.17. <p>The overall weighted average cost per tonne km for 18 t vehicle is INR 1.67/- and for 7 t vehicle is INR 3.15/-.</p> • Liability cost <ul style="list-style-type: none"> ○ Post closure monitoring of 30 yrs – yearly deposit + interest on it ○ Disasters/accidents during operations & post closure – upfront amount + interest on it (maintained by contracting authority /state government) ○ Compensation for affected people. <p>For a land of 105.18 acres and a Hazardous Waste quantity of about 38,736 TPA the total project cost will be INR 37.02 Crore, which is inclusive of 10% contingency.</p> <ul style="list-style-type: none"> ✓ The phase 1 cost is INR13.49 crore including 10% contingency. ✓ The cost of buildings is estimated to be INR4.46 Crore and ✓ The landfill cost is INR24.42 Crore. ✓ The equipment cost is INR4 Crore.
13.	% of financing of project costs	Maximum 2 crore will be provided by MoEF, remaining by state govt.

14.	Payback arrangements, if any	None since it is a grant
15.	Details of bidding arrangements, if any	(Taking the example of the Karnataka project) The PO (private operator) will be selected by a competitive bidding programme. PO will be given the responsibility of “Design, Build, Own, Operate & (Transfer).”
16.	Monitoring of projects	In case of new projects in the initial few years the monitoring can be done by a government agency and a ‘Contracting Authority (CA)’ can be formed. Gradually the control can be taken over by separate society, under the ‘Special Purpose Vehicles SPV.’
17.	Roles & responsibilities of each party	<ul style="list-style-type: none"> • Private Operator (PO) responsible for Design Construction and Operation of the TSDF • Funding is from the Central government and from SPCB.

F.3. Funding details for the Haldia TSDF

Promoters equity INR 20 crore

Promoters' name	Equity
M/s. Ramky Enviro Engineers Ltd.	INR 10 crore
Haldia Development Authority	INR 32 lakh
Others	INR 32 lakh
Deposits	INR 936 lakh

Grant INR 11 crore

Ministry of Environment & Forests	INR 2 crore
State Government	INR 2 crore
Haldia Development Authority	INR 7 crore

Term loans from financial institutions INR 23 crore

F.4. Ramky Enviro Engineers Limited (TSDF at Mumbai)

In 2002, Mumbai Waste Management Ltd (MWML) began operating as the first Common Hazardous Waste Treatment Storage and Disposal Facility (TSDF) in the state of Maharashtra. 100 acre land has been provided by MIDC on a 99 year lease to the company. The total project cost for the facility was 42.30 Crore out of which grants provided by government bodies were around 14 Crore (MoEF- 2 Crore, MIDC- 10 Crore, MPCB- 2 Cr). The residual capital investment was infused by the promoter M/s Ramky Enviro Engineers.

MWML has a capacity of handling 120,000 TMT per annum of landfillable hazardous waste. There are three ways of waste disposal: 40% by DLF-Direct landfill, 30% LAT – Landfill After Treatment and 30% by incineration (30,000 MT per annum as per MPCB consent to operate). M/s Ramky Enviro Engineers is in charge of facility operations. The disposal cost is determined by consumer price index values communicated by MIDC as well as various overhead costs such as labour, reagent and stabilisation costs. The only way costs can be reduced is to enhance membership of TSDF and run it on the designed capacity. MWML has comprehensive laboratory facilities which helps analyse and arrive at proper disposal of various types of Hazardous Waste.

The major issue faced by MWML is under utilisation. As per Detailed Project Report (DPR) prepared in 2001-02, the total quantum of waste estimated in the MIDC's i.e. Patalganga, Taloja, Dombivali, Badlapur, and Ambernath was around 1, 44, 000. To date even though the facility is accepting waste from these MIDC's as well as from other areas in Mumbai, Thane, Raigadh and Ratnagiri, the facility has at its best been able to utilise its capacity by 70%, and is currently operating at under 50% capacity.

Three more TSDF have come up since 2008 (Trans Thane Waste Management Association, Ranjangaon-Pune, Butibori-Nagpur) and have increased the competition in the business of collection, treatment, storage and disposal of HZW. In 2008, MPCB issued an area allocation order to the 4 TSDFs in Maharashtra which has compounded the problem of under-utilisation. As per this MPCB order, MWML has jurisdiction to collect HZW from specified areas of Maharashtra.

MWML has challenged this MPCB order on area allocation in the High Court but its petition was turned down. The court, however, has given relief to the waste generators (industrial units) to choose their TSDF in case of any grievance with the designated operator subject to MPCB approval.

F.5. Shivalik Solid Waste Management Limited in Himachal Pradesh

The state of Himachal Pradesh is experiencing rapid industrial growth for nearly two decades. The state government has developed industrial corridors in various areas, significantly in district Solan, Sirmour, Una, Kangra, Bilaspur & Kullu. This industrial growth has led to continuous increase in generation of Hazardous Waste. The ability to manage and control the disposal of industrial waste needs to keep pace with the expansion of the industries. Hazardous waste & its related environmental problems have been recognized by Himachal Pradesh State Pollution Control Board (HPSPCB). In the year 2000, HPSPCB took the initiative of identifying a site for developing common Hazardous Waste "Treatment, storage & disposal facility" Government of Himachal Pradesh & HP State Pollution Control Board persuaded Baddi Barotiwala Nalagarh Industries Association for setting up the " Treatment, Storage & Disposal Facility". The Association formed a Special Purpose Vehicle (Shivalik Solid Waste Management Ltd.) to set up and operate treatment storage & disposal facility (TSDF). An MOU with United Phosphorus Ltd (UPL) with Baddi

Barotiwala Nalagarh Industries Association (BBNIA) has been signed with 51% Equity ratio of UPL and 49% by the Member Industries for setting up the facility.

HP State Pollution Control Board identified three sites and assessed their feasibility for development of Hazardous Waste Treatment, Storage & Disposal Facility (TSDF). The Environmental Impact assessment study of these selected sites was conducted with financial & technical support of AUSAID. Based on the EIA study, the site at Village Majra was identified and finalized to set up this facility. M/s Tetra Tech. Ltd was appointed Consultants for carrying out detailed inventorization studies & as per their report the industries in Himachal Pradesh generate around 50,000 MT Hazardous Waste per annum. The Project site at village Majra is situated about 10km from Nalagarh on the Nalagarh- Bharatgarh Road. State Govt. & HP State Pollution Control Board made concerted efforts for land allotment and a 35 acre land was allocated to Shivalik Solid Waste Management Limited in Nov 18, 2006 on nominal lease by the State Govt. for developing the Project. The Project was finally developed with capacity of 10 Lakh MT Hazardous waste disposal for 50 years – 20 years for operation and 30 years for maintenance of the project.

F.6. Jawaharlal Nehru National Urban Renewal Mission

Table 15: JNNURM Details

S. No.	Particulars	Details
1.	Name of the agency	Ministry of Urban Development
2.	Details of the agency	This is a ministry under the Central Government
3.	Start date for funding	Dec 2005
4.	Name of programme/ fund	Jawaharlal Nehru National Urban Renewal Mission (JNNURM)
5.	Details of programmes funded	The Mission funds projects for urban development. Examples of projects include that for water and sanitation, solid waste management, urban transport, buses, etc. The Mission also funds administrative costs to the States and has a window for capacity building grants too.
6.	Source of funding	Funding is done in a predetermined ratio, based on the size of the city, by the Central Government, State Government and ULBs.
7.	Eligibility for financing projects	All major cities, state capitals and certain cities with historical and religious importance have been selected under the Mission. The total number of cities is 65. Projects in the urban sector, based on prioritisation by the ULB and State, are funded under the Mission.
8.	Institutional structure	The Mission is anchored in the Ministry of Urban Development and a Joint Secretary level officer is designated as the Mission Director. The various Directors and Sections work as the Mission Directorate. At the State level, a State Level Nodal Agency (SLNA) has been identified to co-ordinate the activities at the State level. A Project Management Unit (PMU) at the State level and

		Project Implementation Unit (PIU) at the ULB level has also been appointed.
9.	Structuring and mode of financing	The source of funding is as additional central assistance from the Central Government for its share. The portion of State Government and ULBs is also through budgetary support. The state has the flexibility to pass on its share to the ULB as a loan and not grant. ULB also has the option to partner with private sector and do the project on PPP. In some states, since ULBs are financially weak, the ULB's contribution is also being given by the State Government.
10.	% of financing of project costs	Based on category of city, central assistance varies from 35% of project cost to 90%
11.	Payback arrangements, if any	The contribution from State Government to the ULB may transfer as a loan, in which case it has to be repaid
12.	Details of bidding arrangements, if any	All projects are procured based on the procurement guidelines of the implementing agency
13.	Fund flow mechanism	Flow of funds from the Central Government is to the State Government. The State Government then passes on the funds along with its contribution to the ULB/ Implementing agency
14.	Projects funded till date	There have been more than 500 projects funded till date
15.	Monitoring of projects	Monitoring of projects is done by an independent third party
16.	Roles & responsibilities of each party	The roles and responsibility of each parties are well documented in the Mission guidelines
17.	Measures of success for projects funded	There are post completion visits done by independent agencies to measure the success for projects funded
18.	Learning's/ Key success factors, if any	An appraisal of the Mission was carried out to understand the learning's/ key success factors. Various points came out but the key learning was that reform based schemes do work in the country but there has to be different barometers for different states.

F.7. National Rural Health Mission

Table 16: NRHM Details

S. No.	Particulars	Details
1.	Name of the agency	Ministry of Health and Family Welfare, Government of India

2.	Start date for funding	2005
3.	Name of programme/ fund	National Rural Health Mission
4.	Details of programmes funded	<p>Government of India under this programme aimed to do necessary corrections in the existing health care system throughout India particularly in the field of nutrition, sanitation, hygiene and safe drinking water and also for mainstreaming the prevailing systems of medicine to facilitate health care <u>with a special focus on rural people and 18 states of India.</u></p> <p>The action plans decided were as follows:</p> <ul style="list-style-type: none"> • Increasing public expenditure on health that has declined considerably to 0.9% of GDP in the existing system. Although the Budgetary allocation for health were 1.3% and 5.5% for UTs and states respectively. • Creating a resource pool and optimization of health manpower, • Effective integration of health concerns with determinants like sanitation & hygiene, nutrition, and safe drinking water, • Induction of management and financial personnel into district health system, • Reducing regional imbalance in health infrastructure, • Decentralization and district management of health programmes, • Community participation and ownership of assets, • Operationalising community health centres into functional hospitals. <p>Programmes and Strategies: The mission followed some strategies like:</p> <ul style="list-style-type: none"> • Integrating vertical Health and Family Welfare programmes at National, State, Block, and District levels. • Technical Support to National, State and District Health Missions • Preparation and Implementation of an inter-sectoral District Health Plan prepared by the District Health Mission • Strengthening capacities for data collection, assessment and review for evidence based planning, monitoring and supervision. • Promoting one female health activist (ASHA - ACCREDITED SOCIAL HEALTH ACTIVISTS) • Strengthening existing health centres • Promotion of Public Private Partnerships for achieving public health goals, including regulation of private sector – development of regulation, guidelines, and also Management plan for PPP initiatives at District/State and National levels.

5.	Source of funding	Public Funding by Government of India
6.	Eligibility for financing projects	States which have weak public health indicators and/or weak health care infrastructure - special focus on 18 states of India The rural population.
7.	Institutional structure required	<p>The institutional Mechanism structured under NRHM</p> <p>Village Level institutions</p> <ul style="list-style-type: none"> • <u>Village Health & Sanitation Samiti</u> (at village level consisting of Panchayat Representative/s, ANM/MPW, Anganwadi worker, teacher, ASHA, community health volunteers) • <u>Rogi Kalyan Samiti</u> (or equivalent) for community management of public hospitals <p>District Level institutions</p> <ul style="list-style-type: none"> • District Health Mission, under the leadership of Zila Parishad with District Health Head as Convener and all relevant departments, NGOs, private professionals etc represented on it <p>State Level institutions</p> <ul style="list-style-type: none"> • State Health Mission, Chaired by Chief Minister and co-chaired by Health Minister and with the State Health Secretary as Convener- representation of related departments, NGOs, private professionals etc <p>Institutions at National level</p> <ul style="list-style-type: none"> • Integration of Departments of Health and Family Welfare, at National and State level • National Mission Steering Group (MSG) chaired by Union Minister for Health & Family Welfare with Deputy Chairman Planning Commission, Ministers of Panchayat Raj, Rural Development and Human Resource Development and public health professionals as members, to provide policy support and guidance to the Mission. All the HFW Secretaries of the 18 focus states will be nominated as the members of the MSG. MSG meets at least twice a year • Empowered Programme Committee (EPC) chaired by Secretary HFW, is the Executive Body of the Mission. The EPC will implement the mission and recommend programmes to the MSG. EPC will operate the budget of the Ministry to attain the NRHM objectives. • Standing Mentoring Group shall guide and oversee the implementation of ASHA initiative • Task Groups for Selected Tasks (time-bound)
8.	Structuring and mode of financing	<p>There is a concept of 'funnelling' funds to districts for better integration of the programmes under the mission.</p> <p>Financing structure:</p> <ul style="list-style-type: none"> • The District Health Missions would pay hospitals for services by way of reimbursement, on the principle of "<u>money follows the patient.</u>" • All recurrent costs of CHCs will also be reimbursed from District

		<p>Health Fund.</p> <ul style="list-style-type: none"> Community Based Health Insurance Schemes (CBHI) will also be encouraged as part of the Mission. Central government will provide subsidies to cover a part of the premiums for the poor, and monitor the schemes Standardization of services was also suggested e.g. outpatient, in-patient, laboratory, surgical interventions
9.	Funding arrangements	<ul style="list-style-type: none"> The Mission is conceived as an umbrella programme subsuming the existing programmes of health and family welfare. The Budget Head For NRHM were be created at National and State levels. NRHM <u>would prioritize</u> funding for addressing inter-state and intra-district disparities in terms of health infrastructure and indicators An additionality of 30% over existing Annual Budgetary Outlays, every year, was envisaged, to raise the Public Expenditure on Health from 0.9% of GDP to 2-3% of GDP. Funds are released to States through Standing Committee of Voluntary Agencies largely in the form of Financial Envelopes, with weightage to 18 high focus States. In the first year the Outlay of the NRHM was in the range of INR6700 crore.
10.	% of financing of project costs	<p>Under this NRHM a part of the total project cost i.e. for some components like training, incentives were borne by Central government; all other costs for various interventions like strengthening health centres, promoting community health centres etc. were borne by the state government. Please find some elaborations as follows:</p> <p>ASHA - ACCREDITED SOCIAL HEALTH ACTIVISTS</p> <p>Financing:</p> <p>Government of India will bear the cost of training, incentives and medical kits for these people.</p> <p>The remaining components will be funded by the states under Financial Envelope (under the programme) given to them.</p> <p>Strengthening existing health centres</p> <p>Financing:</p> <p>State Governments would provide funding of INR 10,000 per annum for each sub centre. The fund will be deposited in a joint bank account.</p>
11.	Payback arrangements, if any	None
12.	Details of bidding arrangements, if any	None
13.	Fund flow	GoI would provide funding for key components in the 18 high focus

mechanism	States. Other States would fund interventions in district and village level like ASHA upgradation of SC/PHC/CHC through District funds under the Integrated Financial Envelope.
14. Monitoring of projects	<p>District health accounting system – to monitor the District Health Fund Management, and take corrective action.</p> <p>All the costs of services would be calculated periodically by a committee of experts in each state.</p> <p>Also there would be A National Expert Group to monitor the correctness of the cost allocated for various services and give suitable advice and guidance on protocols and cost comparisons.</p> <p>Other than the above mentioned systems</p> <ul style="list-style-type: none"> • There would be a reporting system to monitor the performance of the project under that ‘Sub-centres’ would report on performance to Panchayats District Health Mission to Zila Parishad etc. • Annual District Reports on People’s Health (to be prepared by Govt/NGO collaboration) • Health MIS to be developed. • State and National Reports on People’s Health to be tabled in • Assemblies, Parliament • External evaluation/social audit through professional bodies /NGOs • There would also be a provision for Mid Course reviews
15. Roles & responsibilities of each party	<p><u>Role of the Central Government</u></p> <p>Government of India would provide funding for key components in these 18 high focus States.</p> <p><u>Role of state government</u></p> <p>States would fund interventions like ASHA, health centre strengthening.</p> <p>States would sign MoU with Government of India, indicating their commitment to increase contribution to Public Health Budget (preferably by 10% each year), increased devolution to Panchayati Raj Institutions as and performance benchmarks for release of funds.</p> <p><u>Roles of Institutions like Panchayats</u></p> <p>Panchayats would be involved implementing certain measures under the mission such as preparing Village Health Plan, and promote intersectoral integration, for good hospital management in Rogi Kalyan Samitis etc.</p> <p><u>Roles of NGO</u></p> <p>NGO are also an important component of this mission. They can be member of task group, Included in institutional arrangements in national, state and district level.</p> <p>NGO has other roles in facilitating training, technical support</p>

to district and village level health missions, delivering health services, in monitoring, evaluation and social audit. NGOs can also help the mission as Health Resource Organization.

F.8. National River Conservation Plan

Table 17: NRCP Details

S. No.	Particulars	Details
1.	Name of the agency	Implementing agency is National River Conservation Authority (NRCA) under National River Conservation Directorate in Ministry of Environment and Forests.
2.	Details of the agency	NRCA was set up in MoEF in 1996 with an aim to conserve and to conduct the pollution abatement works in all the major rivers of the country by promote and approve appropriate policies and programmes, review and approve the priorities of the National River Conservation Plan, mobilize necessary funds, also to review the progress and give necessary directions to the Steering Committee and to take actions as necessary.
3.	Start date for funding	1996 (under NCRP)
4.	Name of programme/ fund	National River Conservation Plan (NRCP)
5.	Details of programmes funded	<p>This programmes was launched to reduce the of pollution load of major rivers through various schemes. The schemes are as follows:</p> <ul style="list-style-type: none"> • Interception & diversion of wastewater flowing into the river. • Sewage treatment • Crematoria (electric & improved wood) • Low cost sanitation • River front development • Afforestation • Management of solid waste • Schemes to check pollution of rivers cattle wallowing, dhobi ghats and washing of motor vehicles • Public participation and other schemes related to pollution abatement programme
6.	Source of funding	Government funding
7.	Eligibility for financing projects	<p>The towns on the polluted stretches of the river where water quality for bathing is worse than the prescribed limits were selected on a priority basis.</p> <p>The schemes that are eligible for funding are</p> <ul style="list-style-type: none"> • Sewage treatment schemes • Non-sewage treatment schemes • Other pollution abatement schemes

8.	Institutional structure	<p>Three types institutions are involved in the project implementation and management. These are:</p> <ul style="list-style-type: none"> • State Project Management Units (SPMU), • SPMU may appoint a State Implementing Agency to coordinate, the programme and projects. • Project Management Unit at the District / Town / City Level to coordinate in local level.
9.	Structuring and mode of financing	<p>This was a shared financing system between centre and states</p> <ul style="list-style-type: none"> • Projects are funded on 70:30 cost sharing basis between MoEF and State Government or local body concerned. • Of the 30% share of state share at least 10% should come from public participation - This is to promote the sense of ownership among beneficiaries. • Operation and maintenance (O&M) of assets created is the responsibility of the State Government/ULB • The Local Bodies may raise loans from financial institutions such as HUDCO to contribute their share.
10.	% of financing of project costs	<p>Sanctioned cost is INR 7638.47 crore, Fund released INR 3769.26 crore i.e. 49% of total project cost.</p> <p>Expenditure (including State Govt. Share): INR 4302.43 crore.</p>
11.	Details of bidding arrangements, if any	<p>Proposals or DPRs will be prepared by the concerned state government implementing agencies.</p> <p>Some important aspects the DPRs should have:</p> <ul style="list-style-type: none"> • Capital cost, technology, cost of O&M. • In DPR the bidder should quote for more than one options keeping in mind innovation and flexibility. • Social and environmental consequences must be considered while selecting the most appropriate option. <p>The suggested requirements/structure of feasibility report for solid waste management:</p> <ul style="list-style-type: none"> • First the FR should be prepared by ULBs and after that with its approval DPR may be prepared for SWM of the town. • During the preparation of the report, stakeholders should be involved to spread the awareness of the problem and to generate interest. • The report must have planning process, designing process and • Design period: Design life of land fill area should be typically for the range of 10 to 25 years. (among these 3 periods – short term (2-5 years), medium years (5-15

	<p>years), long term 15-25 years)</p> <ul style="list-style-type: none"> • Composition and characteristics of wastes need to be determined after testing for DPR. • System design of solid waste management i.e. from sorting to treatment to disposal. • Involvement of the public and the private sector in collection, transportation, processing and the disposal should be explored. • Resource recovery from solid waste must be described as a part of the proposal. • After that the cost estimates is to be provided in the DPR. The costs must be estimated under various heads as follows: <ul style="list-style-type: none"> • Estimation of cost for staffs required. • Cost estimate of solid waste management – <ul style="list-style-type: none"> ✓ Collection and Storage System ✓ Transfer Station (with proper fencing) ✓ Composting ✓ Waste Disposal site ✓ Incinerator ✓ Miscellaneous works and Miscellaneous Equipments including tackles and tools etc. ✓ Environmental monitoring equipment ✓ Training of personals for segregation of waste and working on plastic recycling machine ✓ Contingency ✓ Operation and Maintenance for 5 years 																		
12. Fund flow mechanism	<p>The funds for various components under the sewage, on-sewage and other schemes will come from different agencies, like:</p> <table border="1"> <thead> <tr> <th>Name of Scheme</th> <th>Likely Funding Agency</th> </tr> </thead> <tbody> <tr> <td>Interception and diversion of waste water</td> <td>NRCD</td> </tr> <tr> <td>Sewage treatment</td> <td>NRCD</td> </tr> <tr> <td>Community toilet complexes</td> <td>NRCD</td> </tr> <tr> <td>Crematoria</td> <td>NRCD</td> </tr> <tr> <td>Municipal solid waste directly polluting river water</td> <td>NRCD</td> </tr> <tr> <td>Other municipal solid waste management</td> <td>MOUD</td> </tr> <tr> <td>Dairies</td> <td>MOUD and MNRE (energy generation)</td> </tr> <tr> <td>Other non-point sources e.g., washing vehicles, dhobi ghats etc.</td> <td>MOUD</td> </tr> </tbody> </table>	Name of Scheme	Likely Funding Agency	Interception and diversion of waste water	NRCD	Sewage treatment	NRCD	Community toilet complexes	NRCD	Crematoria	NRCD	Municipal solid waste directly polluting river water	NRCD	Other municipal solid waste management	MOUD	Dairies	MOUD and MNRE (energy generation)	Other non-point sources e.g., washing vehicles, dhobi ghats etc.	MOUD
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		River front development	NRCD
13.	Projects funded till date	Schemes Sanctioned 1151 Schemes Completed 865	
14.	Monitoring of projects	<p>There will be monitoring agencies for the schemes' performances at state level.</p> <p>Progress of implementation is monitored by both the State Implementing Agencies and the Ministry through a multi-tier monitoring mechanism.</p> <p><u>State</u></p> <ul style="list-style-type: none"> • There will be periodical (day-to-day/monthly) monitoring mechanism by the state nodal implementing agencies. • Provision of periodical review by Periodical review by the Divisional Project Monitoring Cells, by a State Steering Committee chaired by the concerned Chief Secretaries and by a High Powered Committee under the Chairmanship of Chief Minister. <p><u>Central</u></p> <ul style="list-style-type: none"> • Regular site review by NRCD officials and also by NRCD Project Director. • Quarterly review of progress by a Steering Committee of Chief Secretaries of the states and public health experts. There will also be a Monitoring Committee headed by Members Environment, Planning Commission. • Periodical review by a Standing Committee of NRCA headed by the Union Minister of Environment & Forests, by the National River Conservation Authority headed by Prime Minister. <p>There must be system in place to monitor the</p> <ul style="list-style-type: none"> • Performance of STPs • Pumping stations and • their impact on water quality of the river. <p>It is advised to have these monitoring by an independent agency appointed by the project implementing agency.</p>	
15.	Project implementation procedure or Roles & responsibilities of each party	<ul style="list-style-type: none"> • The programmes will be undertaken by centre and then will be delegated to state governments. • The State Government may employ a number of project executing agencies for different types of projects. • The possibility of promoting joint ventures in Public Private Partnership (PPP) and/or setting up SPVs 	

(special purpose vehicle) to implement these projects must be explored by the state nodal agencies

- **Roles of states**
 - ✓ **State Project Management Units (SPMU)**- These units at state level will take all measures related to matters of policy, programme, project formulation, implementation, regulation, operation and maintenance and management, in States where a number of river stretches are polluted and many projects have to be prepared.
 - ✓ SPMU may appoint a **State Implementing Agency** to coordinate, supervise, guide and manage the programme and projects. The Core Schemes will be directly handles by this agencies while the Non Core Schemes will be handled by ULB, Irrigation Department and others as decided by the SPMU.
 - ✓ **State Implementing agencies** with approval of SPMUs will **examine the feasibility of SPV/JV/PPP** and decide on the mode to be adopted for a specific project and working out the necessary details of the mode chosen.
 - ✓ **State implementing agencies** will **prepare DPRs** of component schemes of projects and for that may engage reputed professional consultants for DPR preparation.
- **Roles of districts/cities**
 - ✓ **Project Management Unit will be set up at the District / Town / City Level** to coordinate the various pollution abatement schemes by various agencies in local level.
 - ✓ **These PMUs under the guidance of State implementing agencies** will
 - ✓ **Prepare DPRs** of component schemes of projects and for that may engage external consultants.
 - ✓ Monitor the progress of implementation of the schemes.

The **roles of 5 bodies are very crucial** in the programme. They are as follows:

1. **Municipality** which is responsible for sanitation in the city,
2. **City Development Authority** which regulates the new colonies
3. **State Pollution Control Board**, which is responsible for ensuring compliance by industry of the standards, prescribed under the Environmental Protection Act for effluent, solid waste and air emissions.
4. **State Agencies** - performing functions of municipal bodies relating to water and waste water.
5. **District administration**

16.	Measures of success for projects funded	The success of the programme would be established if the benchmark water quality is achieved.
17.	Learning's/ Key success factors, if any	<p>Some shortcomings of the programmes are as follows:</p> <ul style="list-style-type: none"> • Implementation slow • Town centric • sub sub- -optimal utilization of assets • Lack of enforcement by State Pollution Control Boards
18.	Challenges	<ul style="list-style-type: none"> • There was deficit of treatment capacity of huge sewage amount. • Technical, managerial & financial constraints of ULBs and implementing organizations. • Strengthening capacity of SPCBs to address weak areas like compliance & enforcement • Lack of public support • Major problem with small scale industries - lack of common effluent facilities treatment facilities • Major industrial hotspots near the selected sites. • Tackling non- -point sources like agricultural cattle runoff, solid wastes, cattle- -wallowing, idol immersions, etc.

International Practices

G.1. Elements of the US EPA

Table 18: State and central level organizations involved in contaminated site remediation in US

Within the EPA			
1	National	Office of Superfund Remediation and Technology Innovation (OSRTI) within EPA's Office of Solid Waste and Emergency Response (OSWER)	Overall management of the CERCLA
2	National	Office of Emergency Management, EPA	This OSWER office is responsible for short term responses under Superfund, as well as emergency responses to and preparedness for releases of hazardous substances.
3	National	Office of Site Remediation and Enforcement (OSRE), EPA	This office is responsible for the enforcement component of Superfund. It resides within EPA's Office of Enforcement and Compliance Assurance.
4	National	Federal Facilities Enforcement Office (FFEO), EPA	This office is responsible for ensuring that federal facilities take all necessary actions to prevent, control and abate environmental pollution.
5	National	Federal Facilities Restoration and Reuse (FFRRO), EPA	This office resides in OSWER and is the interface between EPA and federal agencies, such as the Department of Energy and Department of Defense, as they conduct cleanups of their own facilities.
6	National	Brownfields office, EPA	This office resides in OSWER and is responsible for implementing the Brownfields program, established by an amendment to Superfund's authorizing legislation, CERCLA. This program promotes the evaluation and development of less contaminated properties.
7	National	Office of Research and Development (ORD), EPA	This office conducts research on contaminants and technologies to aid in cleanup decisions.
Other federal government agencies			
8	National	Agency for Toxic Substances and Disease Registry (ATSDR)	ATSDR is responsible for conducting health assessments of Superfund sites. It also maintains toxicological profiles of many contaminants.
9	National	National Institute of Environmental Health Sciences	This agency conducts research on health effects of hazardous substances that aid in Superfund assessment and cleanup decisions.
10	National	US Army Corps of Engineers	This construction-oriented agency conducts much of the construction and oversight of Superfund cleanups for which EPA is responsible.

State level agencies				
11	State		Office of Regional Operations	Each of the EPA's 10 regional office, partners with numerous state, local, and tribal governments, businesses, non-governmental organizations, communities, academic institutions, and individuals in order to implement the Agency's programs and protect human health and the environment.
12.	State		EPA's regional offices	EPA has ten Regional offices, each of which is responsible for the execution of our programs within several states and territories
13.	Illinois region5)	(EPA	Bureau of Land, Division of Remedial Management, Environmental Protection Agency	Key program office in the state
14.	Indiana region5)	(EPA	Office of Land Quality, Remediation Services Branch , Department of Environmental Management	Key program office in the state
15.	Michigan region5)	(EPA	Environmental Response Division , Department of Environmental Quality	Key program office in the state
16.	Minnesota region5)	(EPA	Remediation Section, Metro District, Pollution Control Agency	Key program office in the state
17.	Ohio (EPA region5)		Division of Emergency and Remedial Response , Environmental Protection Agency	Key program office in the state
18.	Wisconsin region5)	(EPA	Bureau for Remediation and Redevelopment, Department of Natural Resources	Key program office in the state

G.2. Super Fund and RCRA

Table 19 - Comprehensive Environmental Response, Compensation and Liability Act, 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA), 1986

Sl. No.	Feature	Details
1.	What is Super Fund?	<p>Superfund is the federal government's program to clean up the nation's uncontrolled hazardous waste sites</p> <p>Superfund is the name given to the environmental program established to address abandoned hazardous waste sites. It is also the name of the fund established by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA statute, CERCLA overview). This law was enacted in the wake of the discovery of toxic waste dumps such as Love Canal and Times Beach in the 1970s. It allows the EPA to clean up such sites and to compel responsible parties to perform cleanups or reimburse the government for EPA-lead cleanups.</p>
2.	Cleanup process	<ul style="list-style-type: none"> • site discovery or notification to EPA of possible releases of hazardous substances • sites are entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), EPA's computerized inventory of potential hazardous substance release sites (search CERCLIS for hazardous waste sites) • EPA then evaluates the potential for a release of hazardous substances from the site through these steps in the Superfund cleanup process • The law authorized the Environmental Protection Agency (EPA) to identify parties responsible for contamination of sites and compel the parties to clean up the sites. Where responsible parties cannot be found, the Agency is authorized to clean up sites itself, using a special trust fund.
3.	Enforcement	<ul style="list-style-type: none"> • The EPA has generally used an “enforcement first” approach, which emphasizes the coercive tools at its disposal. The two primary tenets of this approach are: (1) the legal doctrine of strict joint and several liability; and (2) the EPA's authority to tender unilateral administrative orders to compel cleanup using the threat of treble damages • Under joint and several liability, a regulator may pursue an obligation against any one defendant party as if it were jointly liable and it becomes the responsibility of the defendants to sort out their respective proportions of liability and payment • Liability under CERCLA is also retroactive, meaning that it can attach to conduct that occurred before the passage of CERCLA in 1980. This gives CERCLA real teeth in terms of environmental protection
4.	Settlements	<ul style="list-style-type: none"> • Financial assurance helps ensure that responsible parties, and not public funding sources, bear the financial burden of completing Superfund cleanups. • EPA negotiates financial assurance requirements in its Superfund settlements and orders. The settlements and orders generally require potentially responsible parties (PRPs) to demonstrate adequate financial ability to complete the cleanup work that they are obligated to perform. • More specifically, the financial assurance mechanisms supplied by PRPs typically provide EPA with a source of funds that the Agency can use to ensure funding for cleanup work in the event EPA ever needs to “take over” the work under the relevant settlement or order.

- Permissible Superfund financial assurance mechanisms consist of:
 - Trust Funds,
 - Letters of Credit,
 - Surety Bonds,
 - Insurance Policies,
 - Corporate Financial Tests, and
 - Corporate Guarantees.
- Other mechanisms that may be used in specific circumstances include deposit accounts, escrow accounts, certificates of deposit, and liens against real property.

<http://www.epa.gov/oecaerth/cleanup/superfund/negotiate-fa.html>

Table 20: Resource Conservation and Recovery Act (RCRA)

Sl. No.	Feature	Details
1.	History of RCRA	<p>RCRA was enacted to address the increasing problems the nation faced from its growing volume of municipal and industrial waste. RCRA amended the Solid Waste Disposal Act of 1965.</p> <p>In 1984 Congress expanded the scope of RCRA with the enactment of Hazardous and Solid Waste Amendments (HSWA). The amendments strengthened the law by covering small quantity generators of hazardous waste and establishing requirements for hazardous waste incinerators, and the closing of substandard landfills.</p>
2.	"Cradle to Grave" requirements	<p>While RCRA handles many regulatory functions of hazardous and non-hazardous waste, arguably its most notable provisions regard the Subtitle C program which tracks the progress of hazardous wastes from their point of generation, their transport, and their treatment and/or disposal. Due to the extensive tracking elements at all points of the life of the hazardous waste, the overall process has become known as the "cradle to grave" system. The program exacts stringent bookkeeping and reporting requirements on generators, transporters, and operators of treatment, storage and disposal facilities handling hazardous waste.</p>
3.	Mechanism of Trust Fund	<p>A trust fund serves as a way to set aside monies specifically earmarked for closure and post-closure costs. Owners and operators pay money into the trust fund during a specified period. By the time a facility closes, the money accumulated in the fund should be adequate to cover the necessary closure costs. The pay-in period for interim status facilities is 20 years from the effective date of the regulations (July 6, 1982), or the remaining operating life of the facility, whichever period is shorter.</p> <p>For permitted facilities, the owner and operator must make payments into the trust fund for the term of the initial permit or the remaining operating life of the entire facility (as estimated in the closure plan), whichever period is shorter.</p> <p>The annual payment for the duration of the pay-in period may be calculated using the following equation, where the annual payment (AP) equals the current cost estimate (CE) minus the current value of the trust fund (CV) divided by the number of years remaining in the pay-in period (Y):</p> $AP = (CE - CV)/Y.$

G.3. Canada- Federal Contaminated Sites Action Plan (FCSAP)

Table 21: Details of FCSAP

Sl. No.	Heading	Contents
Source: (http://www.federalcontaminatedsites.gc.ca/index-eng.aspx)		
1.	Project expenditure	<ul style="list-style-type: none"> Project expenditures include site assessments, remediation activities, and care and maintenance work to prevent catastrophic failures on higher-risk sites while developing remediation plans
2.	Number of estimated sites	<ul style="list-style-type: none"> By March 2011, the government had identified around 22,000 sites of suspected or actual contamination Without enough dedicated funding, many federal contaminated sites may not be assessed, remediated, or risk managed
3.	Applicants	<ul style="list-style-type: none"> Individual custodians that seek FCSAP program funding must prepare, every year, a three-year contaminated sites management plan for their participation in the FCSAP program. These plans, which are submitted to the Treasury Board of Canada Secretariat, variously set out activity targets, annual expenditures, remaining challenges, and mitigation strategies

(<http://www.ec.gc.ca/edf-fde/>)

Table 22: Environmental Damages Fund

Sl. No.	Heading	Contents
1.	Funding to the Fund	A mechanism for directing funds received as a result of fines, court orders, and voluntary payments to priority projects that will benefit our natural environment.
2.	Funding the projects	<p>Priority funding is given to projects that restore the natural environment and conserve wildlife in the geographic region where the original incident occurred. To be eligible, projects must be delivered in a cost-effective, technically feasible and scientifically sound manner, and must address one or more of the following EDF categories:</p> <ol style="list-style-type: none"> 1. Restoration (highest funding priority) 2. Environmental Quality Improvement 3. Research and Development 4. Education and Awareness <p>Funding is restricted region-wise.</p>
3.	Applicants to the Fund	<p>Eligible groups include:</p> <ul style="list-style-type: none"> Non-governmental organizations Universities and academic institutions Aboriginal groups Provincial, territorial and municipal governments <p>Ineligible groups are encouraged to partner with eligible groups to apply for funding. Ineligible groups include:</p> <ul style="list-style-type: none"> Individuals Businesses Federal governments and agencies <p>Offenders are not eligible to apply directly, or to partner with eligible groups, for fines</p>

		or monetary payments they have made that were directed to the EDF.
4.	Ineligible activities	<p>Ineligible projects and activities include:</p> <ul style="list-style-type: none"> • Activities required by law and/or mandated by other levels of government; • Containment and clean-up of environmental spills; • Restoration of contaminated sites; • Infrastructure, particularly related to municipal, provincial, and federal government program areas; • Lobbying or advocacy activities; • Recreation and tourism projects or beautification initiatives; • Preparation of formal curriculum materials; • Core organization functions and activities such as meetings, maintenance, and administration (however, project specific administrative support is eligible); • Annual or regular organization events/campaigns; • Expenses to attend general conferences and workshops; • Projects outside of Canada

Table 23: Other important points for Canada

Sl. No.	Particulars	Details
1.	Penalties under CEPA (http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=E00B5BD8-1&offset=14&toc=show)	<ul style="list-style-type: none"> • The maximum penalties include fines of up to \$1 million a day for each day an offence continues, • Imprisonment for up to three years or both • The Act includes mandatory sentencing criteria for consideration by the courts such as the cost to remedy the damage done to the environment • Violators may also have to pay for clean-up costs or forfeit any profits earned as a result of an offence.
2.	Soil Protection and Contaminated Sites Rehabilitation Quebec, Canada	<ul style="list-style-type: none"> • Ensure that financial resources are deposited by industrial establishments carrying out activities likely to contaminate soils and groundwater with a view, where appropriate • The following four principles underlie the Policy: <ul style="list-style-type: none"> ○ The Prevention Principle ○ Rehabilitation-reclamation principle; ○ Polluter-pays principle; ○ Fairness principle. • Three of these principles, prevention, polluter pays and fairness, are among the 12 general principles of sustainable development identified by the MEF. The

	rehabilitation-reclamation principle is specific to the problem of contaminated sites
3. Urban Contaminated Sites Rehabilitation Program	<ul style="list-style-type: none"> • Spur the revitalization of Montréal and Québec City through the rehabilitation of contaminated sites with strong potential for economic development • Provided for total financial assistance of \$40 granted between 1998 and 2003 for the revitalization of contaminated sites in the territories of Montréal and Québec City • MEF plans to establish a national fund that could be constituted from fees collected on the disposal of contaminated wastes and soils in the various landfills in operation on the territory of Québec (sanitary landfills, contaminated soil landfills, final disposal sites for hazardous materials, etc.) • In the future, this fund would make it possible to finance, when necessary, various courses of action (characterization and rehabilitation) involving orphan landfills.

Development of National Program for Rehabilitation of Polluted Sites

Output of Task 3- “Identification of
Options for Legal and Institutional
Strengthening”

A report summarizing the options considered
and recommendations for an effective policy
and legal framework along with institutional
and financing mechanisms for the NPRPS

September 2013

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Development of National Program for Rehabilitation of Polluted Sites

Task 3 A report summarizing the options considered and recommendations for an effective policy and legal framework along with institutional and financing mechanisms for the NPRPS

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Acronyms

CBIPMP	Capacity Building and Industrial Pollution Management
CEPI	Comprehensive Environmental Pollution Index
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CPCB	Central Pollution Control Board
DPR	Detailed Project Report
E(P) Act	Environmental (Protection) Act, 1986 (as amended 1991)
ETP	Effluent Treatment Plant
GIS	Geographic information system
GOI	Government of India
GPS	Global positioning system
HW	Hazardous Waste
MoEF	Ministry of Environment and Forests
MSME	Micro Small and Medium Enterprises
NABL	National Accreditation Board for Testing and Calibration Laboratories
NCEF	National Clean Energy Fund
NGO	Non-Governmental Organization
NGRBA	National Ganga River Basin Authority
NPRPS	National Programme for Rehabilitation of Polluted Sites
PWD	Public Works Department
SGRCA	State Ganga River Conservation Agencies
SPCB	State Pollution Control Board
SWAp	Sector Wide Approach
TSDF	Treatment, Storage and Disposal Facilities
Assignment 1	Inventory and Mapping of Probably Contaminated Sites in India
Assignment 2	Development of Methodologies for National Programme for Rehabilitation of Polluted Sites in India
Assignment 3	Development of National Programme for Rehabilitation of Polluted Sites in India

1 Introduction

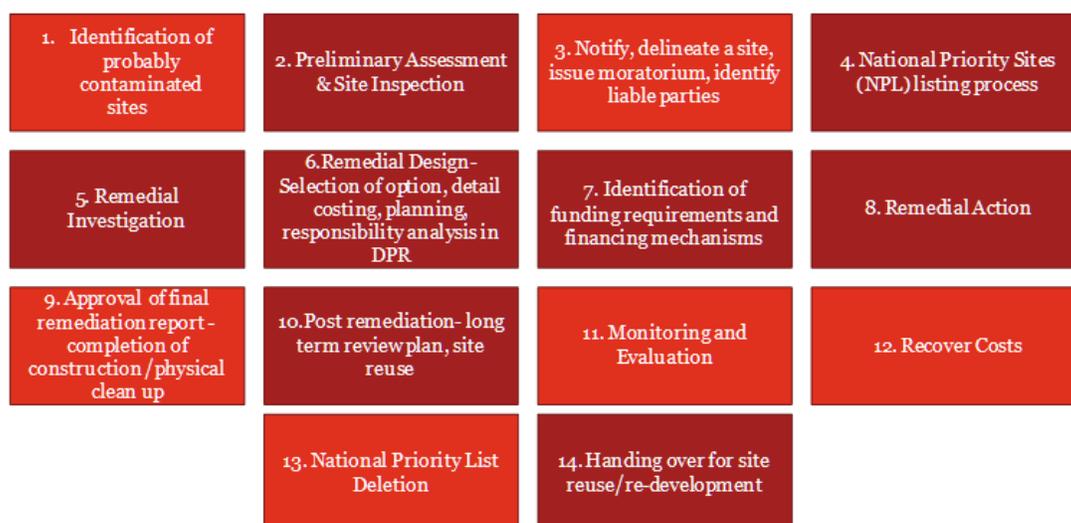
The Government of India, through the Ministry of Environment and Forests (MoEF) is implementing a project on Capacity Building and Industrial Pollution Management (CBIPMP) with financial assistance from the World Bank. The two-fold purpose of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites; and to support the development of a National Programme for Rehabilitation of Polluted Sites (NPRPS). The current assignment is a sub-part of CBIPMP that aims at strengthening of legal, institutional and financial framework of the country to deal with rehabilitation of polluted sites.

The NPRPS poses a particular set of complexities that arise out of the fact that India is a vast country with multiple levels of government. There continues to be an element of central planning alongside powers to the state for multiple aspects of governance that include the regulation of industry, waste management and pollution abatement.

In Task 1 of this assignment, a comprehensive study of Indian practices in the area of managing polluted sites has been conducted. The report provided a broad overview on the issues in India in terms of dealing with remediation of polluted sites including review of existing legal, institutional and financial frameworks and their strengths and weaknesses. In parallel, a study on the international practices in several developed countries has been carried out as Task 2. This report provided information on how problems of similar nature have been addressed in the select countries and the legal, institutional and financial frameworks used in remediation. Task 3 report builds from the Task 1 and Task 2 combined report, specifically on the analysis of strengths and weaknesses of Indian legal, institutional frameworks and the international practices to implement NPRPS.

For Task 3 we continue to follow the 14-step framework (presented in Figure 1 below) developed for rehabilitation of polluted sites.

Figure 1: 14-step remediation framework



1.1 Approach to Task 3

For each step in the 14 step framework we have identified the activities that need to be carried out. We have identified these activities based on our review of international best practices in Task 2, consultations carried out in Task 1 and expert inputs. The list of activities has been presented in Table 1.

Against each activity, three aspects have been examined. The first relates to legal provisions – whether carrying out a particular activity will require building on existing procedures or establishing new procedures (changes or new Rules) or require a substantive provision (change to the Act). The second aspect examines the logical entity that can be expected to perform the function and in some cases, options of entities. The final aspect considers sections/departments of the entity that will need to be involved in performing the activity. In some cases, multiple sections/departments may need to be involved. This assessment has been done on the premise that no (or minimal) new institutional structure should be created and existing institutional mechanism should be strengthened to deliver NPRPS.

This is followed by listing out the options that are may be considered to address the identified gaps and to support the activities under each step. Chapter 2 presents the options for legal and institutional framework. This is followed by proposed changes to the legal and institutional framework.

While developing the options for a new framework we have consulted legal and institutional experts and State Pollution Control Boards of Andhra Pradesh and West Bengal to understand the issues they are facing in the four pilot sites under CBIPMP. We have made certain key assumptions in undertaking this task 3:

- The gap assessment has been done with reference to Environment (Protection) Act, 1986 (as amended in 1991), the Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act, 1981, the National Green Tribunal Act, 2010 and the Public Liability Insurance Act, 1991 in context of the contaminants covered under Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008. We have also considered guidelines and standards prepared by CPCB including guidelines for Conducting Environment Impact Assessment, guidelines Site Selection for Common Hazardous Waste Management Facility, guidelines for Proper functioning and Upkeep of Disposal Sites, guidelines for the Selection of site for Land-filling, guidelines for Transportation of Hazardous Wastes, guidelines For Evaluation And Recognition Of Environmental Laboratories (Revised and Updated Version), inventory of Hazardous Waste Generating Units and CPCB Publication – Hazardous Waste Management Series (HAZWAMS).
- NPRPS will cover sites that are contaminated with hazardous wastes defined as per Hazardous Wastes (Management Handling and Transboundary Movement) Rules 2008 and will define procedures for exit from NPRPS for sites that are contaminated with radioactive wastes, mining wastes, bio-medical wastes. Bio-medical wastes under Bio-Medical Waste (Management and Handling) Rules, 1998, mining wastes under the Mineral Conservation and Development Rules, 1988 and radioactive wastes under Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 have not been considered as these are dealt separately under the relevant Acts.
- The provision of claims and compensation for loss of life, loss of health, loss of property, loss of livelihood and employment, etc. have been excluded from NPRPS scope as these matters are more appropriately covered under the National Green Tribunal Act, 2010.

-
- The aspect of fines, penalties, civil and criminal liabilities has been examined from three perspectives in the context of NPRPS – the sufficiency and appropriateness of the types of fines and liabilities, the quantum of fines and liabilities and the mechanism of levying fines and penalties. In particular, the aspect of introducing civil administrative adjudication may be explored.
 - Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 Section 25 provides for remediation of sites and Section 26 provides for levy of penalty. The provisions have been used by some of the State Pollution Control Boards to remediate sites where the polluter has been easily traced, the polluter agreed to remediate the site and where the site ownership is with the industry / under industrial estates. There have been very few instances where remediation of orphan sites or non-industrial sites.
 - The applicability of liability regime including identification and allocation of liability under NPRPS can cover only point sources of contamination. Non-point source contamination arises from diffused sources and does not have a specific source like a factory. Examples are polluted runoff from agricultural areas draining into a river, or wind-borne debris blowing out to a river. Identifying and allocating liability from non-point sources will need to be done on a case-by-case basis.
 - Orphan sites (where the polluter cannot be traced) or where the polluter cannot partly or fully pay for remediation will require remediation through use of public funds. It is possible that the presence of contamination on site impacts the valuation of the site, restrictions on use of site and activities that can be conducted. Remediation may improve the valuation of the site and lower restrictions on site usage and activity. In such cases, part (or full) increase in value of site may be clawed back by the public authorities and replenish the public funds that have been used in remediation. The site owner may be provided with an option to transfer the land to competent authority at the value of the contaminated land less the estimated cost of remediation.
 - While the Assignment 1 has identified a number of potentially contaminated sites, it is expected that more sites may be discovered in future based on the experience of developed countries. The aspect of identifying potentially contaminated sites is therefore an integral part of NPRPS and requires that a mechanism should be developed to proactively identify contaminated sites.
 - Voluntary remediation program may be encouraged where site owner and a party (both not being liable parties) approach the competent authority to pay for remediation based on agreed land use post remediation. The competent authority will still need to identify the liable party for payment of damages and penalties but excluding cost of remediation. Safeguard may be built so that the voluntary party or the site owner honors the commitment made and do not renege once a liable party has been identified. Provision can be made where the voluntary party or site owner can seek recovery of remediation cost from the liable party. Safeguard will also be required so that a liable party is prevented from using the voluntary route.

Table 1: Activity wise assessment of legal and institutional framework for implementation of 14 step remediation framework

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
1. Identification of probably contaminated sites	Receive and review complaints of contamination at sites from public and preliminary assessment reports from notified entities	Procedural aspect	SPCB	Information and technical section
	Allow voluntary disclosure of contamination by liable parties	Procedural aspect	SPCB	Information, legal and technical section
	Schedule the site for preliminary assessment, based on the complaint	Substantive provision - use of precautionary principle; mandatory for SPCB to take action	SPCB	Technical section
	Maintain computerized, GPS compatible database	Procedural aspect	CPCB in consultation with SPCBs	Information section
2. Preliminary assessment, site investigation	Establish accreditation procedure for third parties to carry out preliminary assessment	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Select and appoint third party agency, if required	Procedural aspect	SPCB or liable party	Administrative/establishment section; Technical section
	Issue notice to site owner / occupier for site access to take samples and conduct preliminary assessment	Substantive provision - for sites that are non-industrial land	SPCB	Legal section
	Establish Preliminary Assessment Guidelines and Soil Standards	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 1 and 2
	Carry out preliminary assessment with reference to Preliminary Assessment Guidelines and Soil Standards	Procedural aspect	SPCB or third party (appointed by SPCB or liable party)	Field officers, Laboratory
	Notify certain categories of land owners under certain circumstances to submit preliminary assessment reports	Substantive provision - new requirement for compliance	Competent authority: delegate to SPCB in consultation with state government	Technical section, legal section; land revenue department of state government
	Receive and review preliminary assessment reports	Procedural aspect	SPCB	Technical section
Conduct independent checks and laboratory analysis for cross checking values, if required	Procedural aspect	SPCB	Field officers, Laboratory	

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
	Archive preliminary assessment report, third party appointments, lab checks	Procedural aspect	SPCB with a copy to CPCB	Information section
	Transfer cases that do not contain hazardous waste but contain radio-active waste, mining waste or bio-medical waste to relevant departments	Procedural aspect	SPCB with a copy to CPCB	Legal section
	Collaborate and consult with health department, land and land revenue department, industries and commerce department, environment department	Procedural aspect	SPCB and state government	Technical Section; various departments of state government
	Confirm that site requires remediation of hazardous waste	Procedural aspect	SPCB and state government	Technical section; land revenue department state government
3. Notify, delineate contaminated sites, identify liable parties	Issue notification to restrict site access and activities, as required	Substantive provision - for sites other than industries regulated under the Air / Water / E(P) Act	Competent authority: (a) Centre driven - separate Regulatory Authority at the centre; (b) State driven - delegate to SPCB in consultation with state government	Legal section, technical section; land revenue department of state government
	Initiate process of identification of liable parties (for levy of fine for contaminating site and for recovery of remediation expenses) and allocating liability	Substantive provision - principles of liability allocation	SPCB and state government	Legal section, technical section; land revenue department of state government
	Initiate process of identifying owners and occupiers of orphan site or sites requiring public funding (for the purpose of claw-back of gains of land value)	Substantive provision - sharing of economic gains from remediation	SPCB and state government	Legal section, technical section; land revenue department of state government
	Conduct valuation of orphan sites pre-remediation including diminution in value on account of contamination through approved valuers	Procedural aspect	SPCB and state government	Administrative/establishment section, accounts section; land revenue department of state government

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
	Levy fine and liability for remediation on liable parties for having caused contamination at site	Substantive provision - modify amount of fine and introduction of the civil administrative adjudication mechanism for levy of fine	Courts and/or competent authority: (a) Centre driven - separate Regulatory Authority responsible for all civil administrative adjudications (b) State driven - delegate to officers appointed by state government or to SPCB (in consultation with state government)	Adjudicating officers or new cell created under SPCB
	Initiate process of enforcement if liable parties do not pay fine for having contaminated the site	Procedural aspect	SPCB (to approach court)	Legal section
	Allow voluntary party (not a liable party) to pay for remediation of the site	Procedural aspect	SPCB	Technical section, Accounts section, Legal section
	Archive notices, proceedings, valuation reports	Procedural aspect	SPCB with a copy to CPCB	Information section
4. National Priority Site Listing	Develop risk ranking criteria	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 1
	Apply risk ranking criteria based on available results from preliminary assessment report as per ranking criteria for contaminated land	Procedural aspect	SPCB in consultation with CPCB	Technical section
	Consultation with relevant stakeholders for prioritization	Substantive provision - ranking of sites to see which ones need to be taken up first	Competent authority: SPCB and state government	Legal section, technical section; various departments of state government
	Update computerized database with results of prioritization	Procedural aspect	SPCB with a copy to CPCB	Information section
5. Remedial investigation	Establish accreditation procedure for third party conducting remedial investigation	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Select and appoint third party for remedial investigation, if required	Procedural aspect	SPCB or liable party	Administrative/establishment section; Technical section

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
	Issue notice to site owner / occupier for site access to conduct remedial investigation	Substantive provision - may require to conduct survey and investigation	Competent authority: SPCB	Legal section
	Establish Remediation Investigation Guidelines	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Conduct remedial investigation with reference to Remediation Investigation Guidelines	Procedural aspect	Third party appointed by SPCB or liable party	Technical section
	Review third party remedial investigation report	Procedural aspect	SPCB	Technical section
	Conduct independent checks and laboratory analysis for cross checking values, if required	Procedural aspect	SPCB	Field officers, Laboratory
	Develop and design remedial options (or review options if prepared by third party)	Procedural aspect	Third party appointed by SPCB or liable party (review by SPCB)	Administrative/establishment section; Technical section
	Archive notices, third party appointments, remedial investigation reports, lab checks	Procedural aspect	SPCB with a copy to CPCB	Information section
6. Remedial Design	Consult with relevant stakeholders on the remediation options	Procedural aspect	SPCB and state government	Legal section, technical section; various departments of state government
	Approve remediation option	Procedural aspect	SPCB and state government	Legal section, technical section; land revenue department of state government
	Establish DPR preparation guidelines	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Establish accreditation procedure for third parties to prepare DPR	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Select and appoint third party, if required	Procedural aspect	SPCB or liable party	Administrative/establishment section; Technical section
	Issue notice to site owner / occupier for site access to conduct survey and investigation required for preparing DPR	Substantive provision - may require to conduct survey and investigation	SPCB	Legal section

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
	Prepare Detailed Project Report (DPR) with detailed project planning, costing for the selected option with reference to DPR preparation guidelines	Procedural aspect	Third party appointed by SPCB or liable party	Technical section, Accounts section
	Archive notices, third party appointments, DPR	Procedural aspect	SPCB with a copy to CPCB	Information section
7. Funding Requirement identification: availability and generation of fund, financing mechanisms	Approve DPR and remediation plan	Procedural aspect	SPCB and state government	Technical section, Legal section, Accounts section
	Enter into cash out/cost recovery agreements (through orders) with liable parties including the amounts to be paid.	Substantive provision - explicit authorisation for entering into agreements (through orders)	Competent authority: (a) Centre driven - separate Regulatory Authority at the centre; (b) State driven - delegate to SPCB in consultation with State	Legal section, accounts section
	Arrange public financing for orphan sites or balance public financing for shortfall	Substantive provision - for cleaning up orphan sites	Competent authority : (a) SPCB and (b) state government and (c) central government	Accounts section
	Enter into agreement (through orders) with site owner (if not liable party) for claw-back of gain in land value post remediation	Substantive provision - sharing of economic gains from remediation	Competent authority: (a) Centre driven - separate Regulatory Authority at the centre; (b) State driven - delegate to SPCB in consultation with state government	Legal section, accounts section
	Obtain financial securities (guarantees and deposits) from liable parties	Substantive provision - explicit provision of financial securities and deposits	Competent authority: (a) Centre driven - separate Regulatory Authority at the centre; (b) State driven - delegate to SPCB in consultation with State	Legal section, accounts section
	Set up project accounts and disbursement process	Procedural aspect	SPCB and state government	Accounts section

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
	Archive agreements, orders	Procedural aspect	SPCB with a copy to CPCB	Information section
8. Remedial Action	Establish accreditation procedure for third parties to carry out remediation	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Establish guidelines for carrying out remediation	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Select and appoint third party agency to carry out remediation	Procedural aspect	SPCB or liable party	Administrative/establishment section; Technical section
	Enter into cleanup agreement (through orders) with the liable party that describes the roles and responsibilities of the liable party, third party appointed for on-site work and the competent authority during remediation.	Substantive provision - explicit authorisation for entering into agreements (through orders)	Competent authority: (a) Centre driven - separate Regulatory Authority at the centre; (b) State driven - delegate to SPCB in consultation with State	Technical section, Accounts section, Legal section
	Grant license and permits including license to take temporary custody and control of site till completion of remediation (if site owner does not agree)	Substantive provision - taking temporary custody and control of site	Competent Authority-state government	Technical section, Legal section
	Settle dispute if land owner / occupier does not allow access or use of site	Substantive provision - settlement of dispute	Competent Authority-state government	Legal section
	Agency to plan and execute remediation work	Procedural aspect	Third party appointed by SPCB or liable party	Technical section, Accounts section
	Monitor progress of remediation work	Procedural aspect	SPCB	Technical section, field officers
	Conduct independent checks and laboratory analysis for cross checking values, if required	Procedural aspect	SPCB	Field officers, Laboratory
	Establish mechanism for approving variations depending on outcome of progress monitoring	Procedural aspect	SPCB and state government	Technical section, Accounts section
	Disbursement funds based on agreed milestones	Procedural aspect	SPCB and state government	Technical section, accounts section
	Archive consents, permits, agreements, orders, dispute resolution, progress reports, lab checks	Procedural aspect	SPCB with a copy to CPCB	Information section

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
9. Construction completion	Review and approve completion of remediation work	Procedural aspect	SPCB and state government	Technical section, accounts section
10. Post construction completion	Establish post remediation guidelines	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
11. Monitoring and evaluation	Establish accreditation procedure for third party to conduct monitoring and evaluation post remediation	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Establish monitoring and evaluation guidelines post monitoring	Procedural aspect - technical guidelines	CPCB in consultation with SPCBs	Covered as part of Assignment 2
	Select and appoint third party, if required	Procedural aspect	SPCB or third party (appointed by SPCB or liable party)	Administrative/establishment section; Technical section
	Review post remediation work with reference to monitoring and evaluation guidelines	Procedural aspect	SPCB	Technical section
	Conduct independent checks and laboratory analysis for cross checking values, if required	Procedural aspect	SPCB	Field officers, Laboratory
	Archive progress reports, third party appointments, lab checks	Procedural aspect	SPCB with a copy to CPCB	Information section
12. Recover costs	Recover balance costs from liable parties	Procedural aspect	SPCB and state government	Legal section
	Levy fines and penalties if a party does not comply with an order, directive, agreement	Substantive provision - modify amount of fine and introduction of the civil administrative adjudication mechanism for levy of fine	Competent authority: (a) courts (b) Centre driven - separate Regulatory Authority responsible for all civil administrative adjudications (c) State driven - delegate to officers appointed by state government or to SPCB (in consultation with state government)	Adjudicating officers or new cell created under SPCB
	Initiate process of recovery of costs if liable parties do not comply	Procedural aspect	State government	Land revenue department of state government

Steps	Activities	Legal provisions required	Entity that may be responsible	Section that may be involved
	Conduct valuation of orphan sites (or sites requiring public funds) post-remediation including increase in value attributable to remediation through approved valuers	Substantive provision - sharing of economic gains from remediation	Competent Authority – Delegate to SPCB in consultation with the state government	Administrative/establishment section, accounts section
	Recover agreed amount of increase in value from site owner or occupier, in case of orphan sites or sites requiring public funding	Substantive provision - sharing of economic gains from remediation	Competent Authority – Delegate to (a) SPCB in consultation with the state government/ (b) state government	Legal section of SPCB / Land revenue department of state government
	Initiate process of recovery of costs if site owner does not pay (in case where public funds are used for remediation and there is an increase in value of land on account of remediation)	Procedural aspect	State government	Land revenue department of state government
	Archive notices, proceedings, valuation reports	Procedural aspect	SPCB with a copy to CPCB	Information section
13. National Priority List Deletion	Consult relevant stakeholders on completion of remediation and recovery of costs	Procedural aspect	SPCB and state government	Technical section, Legal section; various departments of state government
	Mark a site in the computerized database as “remediation completed”	Procedural aspect	SPCB in consultation with CPCB	Information section
14. Site reuse/redevelopment	De-notify the site	Substantive provision - removing restrictions imposed on site use and activity	Competent authority: (a) Centre driven - separate Regulatory Authority at the centre; (b) State driven - delegate to SPCB in consultation with state government	Legal section
	Consult with stakeholders- state government, interested parties, local community etc, awareness generation on reuse of sites	Procedural aspect	SPCB and state government	Technical section, Legal section; various departments of state government

2 Step wise detailed analysis of legal, institutional and financial provisions

2.1 Step 1- Identification of probably contaminated sites

2.1.1 Key activities under the step

Based on petitions or preliminary assessment reports received, a site is identified as a probably contaminated site. A desktop review of information in the petitions and preliminary assessment reports is carried out and cross checked with previously received petitions from an existing computerized database to ensure that it is a valid new case of a probably contaminated site. The new case is inserted into the computerized database.

2.1.2 The legal provisions

The following legal provisions will be required to support the activities under this step:

- i) Delegate powers to receive petitions from general public and NGOs. Petitions from general public and NGOs need to be as per prescribed format which should be widely available (on website) so that it is easily accessible by the general public and they can provide sufficient information to proceed for step 2.
- ii) Delegate powers to be the custodian of the petitions, preliminary assessment reports and a computerized database containing all valid new cases of probable contaminations received.
- iii) Obligate SPCBs to periodically assess or cause parties to assess (as per a prescribed preliminary assessment guideline described under step 2) the area within its jurisdiction to determine if there are additional probably contaminated sites to be reported to the competent authority. This may be done through a combination of the following:
 - a. Online, GIS based tracking of movement of hazardous waste transport from source to disposal facility¹.
 - b. Periodic review of Hazardous Waste register (as per section 3 of rule 5 of Hazardous Waste Management, Handling & Transboundary Movement Rules, 2008) to find discrepancies between hazardous waste generated, incinerated and being transported to the nearest disposal facility.
 - c. During renewal of consent to operate for hazardous waste generating facilities, review of plant records of hazardous waste generation, incineration and transportation to the disposal facility. The review may be conducted as per the “Protocol for Performance Evaluation and Monitoring of the Common Hazardous Waste Treatment Storage and Disposal Facilities including Common Hazardous Waste Incinerators” to check if the amount of non-recyclable, non-incinerable hazardous wastes generated annually reach the disposal facility as per rule 4 of Hazardous Waste Management, Handling & Transboundary Movement Rules, 2008 and if the storage period for hazardous wastes does not exceed the period of 90 days as stipulated by rule 7 Hazardous Waste Management, Handling & Transboundary Movement Rules, 2008.

¹ Current examples are like how it is being done by Gujarat Pollution Control Board (GPCB). Andhra Pradesh Pollution Control Board (APPCB) is also planning to have a similar system in place.

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- iv) Obligate municipalities, urban local bodies etc. to assess and report any suspected case of contamination in Municipal Solid Waste dumps and other public areas within their jurisdiction and report to the competent authority.
 - v) Obligate government agencies like National Highways Authority of India, Airport Authority of India, Railways, forest departments, industries departments, port authorities, etc. to periodically and report any suspected case of contamination.
 - vi) Obligate urban planning and industries departments under the state government carrying out regional/ development plans to periodically assess and report any suspected case of contamination.
 - vii) Obligate any entity (e.g. an industry) who intends to abandon a site, any entity applying for change the land use of a site and any change of ownership covering industrial units in potentially contaminated areas to prepare and submit a preliminary assessment report² to the competent authority.
 - viii) Allow any person who reasonably believes a site to be probably contaminated site to submit a petition (in a pre-prescribed downloadable petition format) to the competent authority for further investigation³
 - ix) Obligate the competent authority to submit/archive all preliminary assessment reports and petitions to a central database

The legal provisions may be effected through:

- Defining *contaminated site* and *probably contaminated sites* through amendment to E(P) Act;
- Establishing a new set of rules (e.g. NPRPS rules) under the amended E(P) Act to include these provisions;
- Adding provision to Hazardous Waste Management Rules for periodic preliminary assessment of contamination;
- Amending Municipal Solid Waste Rules to bring in the additional feature of mandatory reporting of hazardous waste contamination and illegal dumps within their jurisdiction.

For all the site assessment suggested in this section, various entities may conduct the same using prescribed preliminary assessment guideline described under step 2 of the remediation framework.

2.1.3 The institutional provisions

Since this step involves procedures like review of hazardous waste registers, petitions, applications for renewal of consent to operate, SPCBs may be the natural choice for conducting these activities for identification of contaminated sites. CPCB may continue with its supervisory role of coordinating amongst the SPCBs and be the custodian of the comprehensive GIS based inventory of all probably contaminated sites identified through this process. This will require capacity building at both SPCB and CPCB.

² Reference: “duty to report contamination in Australia’s Contaminated Land Management Act

³ Reference: CERCLA, USA

2.2 Step 2- Preliminary Assessment/ Site Inspection- Investigations

2.2.1 Key activities under the step

A preliminary assessment of the site shall be conducted for valid new cases of *probably contaminated sites* to assess if the site poses no/some threat to human health and environment. This can be achieved through the following sub-steps:

Sub-step 1 - Desk top review:

Desktop review of all new probably contaminated sites (preliminary assessment reports and petitions) would be carried out as follows:

- i) Review of the preliminary assessment reports to check:
 - If the report is prepared by third party agencies accredited⁴ for carrying out preliminary investigations under NPRPS. If yes, then no further preliminary assessment will be carried out for the sites and it will be considered for further processing. If no, the respondent will be instructed to carry out preliminary assessment by the accredited third party.
 - Understand a tentative boundary⁵ of the site considered for preliminary assessment with types of land ownerships.
 - The screening and response level⁶ of contaminants to determine if the site has no/some/high threat.
 - Determine the urgency of remediation based on land use, pathways of contamination, threat to human health and environment as reported in the preliminary assessment report⁷
- ii) Review of petitions to understand types of contaminants, type of current land use and ownership, presence of water bodies and possible pathways of contamination, threat to human health and environment to determine if a preliminary assessment will be required to determine the screening and response level of contaminants to understand if the site has no/some/high threat
- iii) NPRPS will cover contamination caused by *hazardous wastes* as defined under the Hazardous Wastes (Management Handling and Transboundary Movement) Rules 2008. If the type of contaminants mentioned in the petitions or preliminary assessment reports are biomedical wastes, radioactive wastes or mining waste, the information will be passed on to respective regulatory bodies dealing with bio-medical wastes, radioactive wastes or mining wastes and will not be part of NPRPS for further processing.

Sub-step 2 - Preliminary assessments:

Following the desk review, preliminary assessments would be conducted to determine the screening and response level of contaminants, pollution pathways through air, soil, water, threat to human health and environment etc. Based on the outcome of the assessment, the site would be categorized as *no/some/high threat* and whether it requires urgent remediation.

⁴ Guidelines for accreditation of third parties to come from Assignment 2

⁵ Guidelines to determine a tentative boundary would come from assignment 2

⁶ Guidelines to determine the screening and response level values would come from assignment 1

⁷ Template to be a part of preliminary assessment guideline that would come from assignment 2

Sub-step 3- Categorization of sites for further steps:

Sites that have *no threat* will exit from NPRPS and marked as “no threat” in the computerized database. Sites that have *some threat* will be considered for periodic preliminary assessment (e.g. annually) and marked as *some threat* in the computerized database. Sites that have *high threat* will be scheduled for remediation.

2.2.2 The legal provisions

The following legal provisions will be required to support the activities under this step:

- i) Delegate powers to competent authority to conduct desktop review as per sub-step 1 and take decisions on sites to be scheduled for preliminary assessments, sites that may require re-assessment, etc.
- ii) Delegate powers to the competent authority to enter a *probably contaminated site* to take air, water and soil samples for analysis as per sub-step 2. This can be achieved through amendment of section 3 (2), 6, 10 and 11 of the E(P) Act and making new NPRPS rules under the amended E(P) Act, or adding a new chapter on “remediation of contaminated sites” to the existing Hazardous Waste Rules for entry, inspection and other tests required drawing upon section 10 and 11 of the E(P) Act.
- iii) Develop and include “Preliminary assessment and site inspection guidelines”⁸ under the new NPRPS rules using the provisions of developing new guidelines by the central government under chapter 3(2) of the E(P) Act. The guideline may be added as a “schedule” to the new rules or the competent authority (for example, CPCB in consultation with SPCB) will notify guidelines and keep them updated.
- iv) Develop an accreditation procedure⁹ for third parties to carry out the assessments on behalf of the competent authority or notified parties.
- v) Delegate power to the competent authority to be the custodian of the computerized national list of sites with sites marked as *no threat*, *some threat* and *high threat*.

2.2.3 The institutional provisions

A third party institution may be hired by the competent authority to carry out the preliminary assessments and site inspections. The third party may be chosen from a list of accredited third parties. The competent authority (for example, CPCB in consultation with SPCB) shall be the custodian of the guidelines for carrying out the preliminary assessment and also responsible for its regular updation. The guidelines shall also include the structure and content of the assessment report to be submitted. The third party shall conduct the assessments and provide its report to the competent authority. Adequate staffing of the competent authority with requisite qualifications to review the preliminary assessment report and screen petitions and conduct independent checks will be required. Adequate number of National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited laboratories will be required for all the parameters under schedule II of the Hazardous Waste Management Rules to enable the competent authority to cross check results of preliminary assessment reports. Qualified manpower will be required at the competent authority for maintenance of the computerized database of sites and highlighting the sites as *no threat*, *some threat* and *high threat* with GIS applications.

⁸ As prepared under Assignment 2

⁹ As prepared under Assignment 2

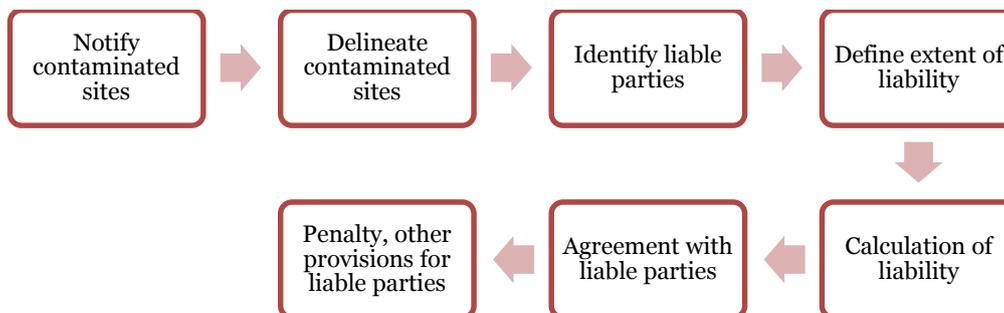
2.2.4 The financial provisions

Any cost incurred to conduct the activities under this step shall be sourced from public funds until liable party has been identified or paid by liable party if already identified. In case cost recovery is possible, these costs shall be recovered from the liable party once the party is identified and is able to pay for remediation. Based on the initial list of probably contaminated sites and average estimated cost per preliminary assessment, a budgetary provision should be made for the year by the competent authority.

2.3 Step 3- Notify, delineate the contaminated sites, and identify the liable parties

2.3.1 Key activities under the step

Once a site is confirmed as contaminated (*high threat* or *some threat*, as the case may be), the site will be notified by the competent authority as *contaminated site* under the land register of the state land and land revenue department, restricting land use change, restricting ownership change, restricting on-going and future activities on the site depending upon the category of contamination, etc. The step will cover the following 7 sub-steps.



2.3.2 Legal Provisions

The following legal provisions will be required to support the activities under this step:

2.3.2.1 Notify contaminated sites

1. Delegate power to the competent authority to notify a site with *some threat* or *high threat* as a *contaminated site* in the land register. For notifications there are three options:
 - i. For large number of sites (e.g. more than 750 sites), follow the model of The Coastal Regulated Zones Notifications, 2001 where types of restrictions will be imposed according to the category of contamination as *some threat* or *high threat*
 - Define restricted activities for sites with high threat –vacate land, stop all on-going activities, demolish an existing structure, no agricultural/farming activities etc.
 - Define restricted activities for sites with some threat-e.g., no more construction activities in future, restriction on certain on-going activities or land use (e.g. agriculture, real estate development) etc.
 - ii. For fewer number of sites (when restricted only to the size of the inventory from assignment 1 e.g. number of sites between 550 to 750), follow the model of enforcement of Section 2 of the Forest (Conservation) Act, 1980. Revenue authorities acting on a directive will add a remark in the land record that the particular land is *contaminated site* and

permission of the competent authority will be required to change the land use or the occupier needs to inform the competent authority for approval to continue carrying on of such activities.

- iii. Case to case assessment of permissible activity on a site/ land notified / declared as contaminate by a specially constituted authority. Reference to be used here are specialized or specially constituted authorities are appointed under Section 3 (3) of the E(P) Act to deal with peculiar environmental issues like protection of eco-fragile areas, coastal zones, Taj Trapezium Authority. Such authorities have been constituted under a notification passed by the Ministry. These Authorities are manned by high ranking government officials, experts and representatives of concerned groups/ stakeholders. For example, the Taj Trapezium authority has members of the State and Central Pollution Control Board, Agra Development Authority, representatives of the Ministries of Environment and Forest and Petroleum and Gas and the Archaeological Survey of India. These Authorities have powers under Section 5 of the E(P) Act and passes specific directions on each issue referred to them. Such an Authority is also constituted by the state government of West Bengal for the protection and preservation of the Kolkata Wetlands.
- iv. For bringing in the provisions of restricting activities or vacating a contaminated land and taking temporary custody and control of a contaminated site until remediation, section 5 of the E(P) Act will need amendment.

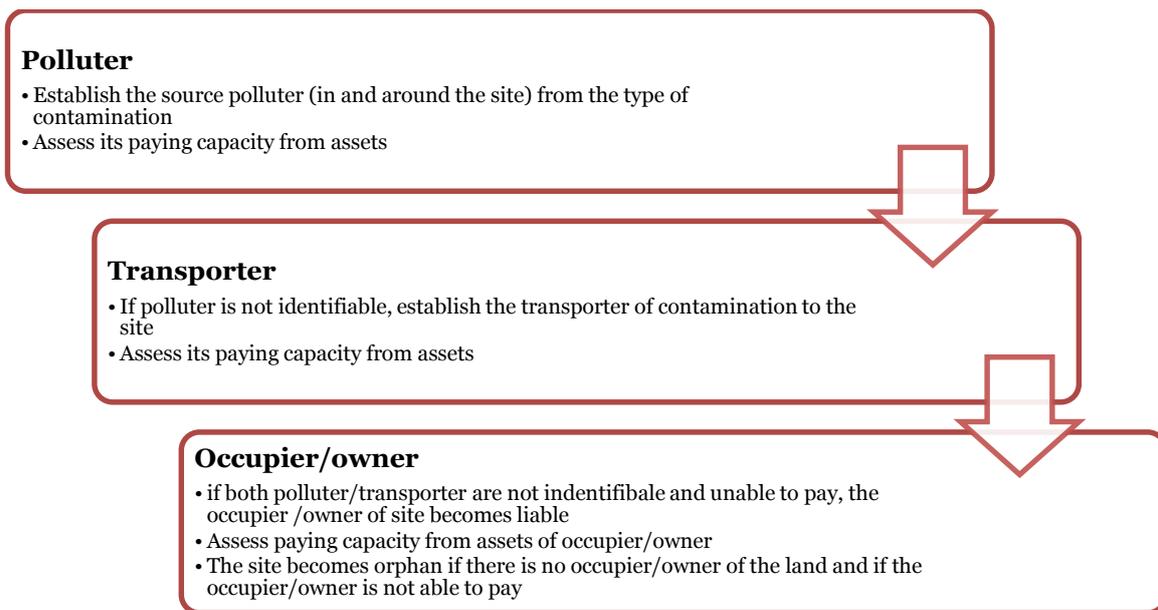
2.3.2.2 Delineate contaminated sites

The new NPRPS Rules/ or the amendments to the Hazardous Waste Rules will provide the format/content of the notification of *contaminated site*. Content of such a notification include description of the land, tentative boundary of the site with GPS locations, the name and address of the of the owner (s) of the land, the name of the municipality in which the land is situated, type of existing land use, findings of the preliminary assessment study, restricting on land use and site activities, timeline up to which the restrictions will apply, etc. The legislation will mandate the revenue authorities, department of industries, planning department/ authorities or special area development authorities to reflect the notification and place consequent restrictions in all revenue records and future master plans respectively.

2.3.2.3 Identification of liable parties

Figure 2 below defines the flow diagram for identifying liable parties.

Figure 2: Hierarchy of liable parties



A hierarchy of liable parties is proposed to ensure that the polluter (if he has the ability to pay) should pay for the cost of remediation and if the polluter is unable to pay, the next level of liable party (transporter) should pay for all / balance of cost of remediation, etc. The hierarchy could take the following form:

- i) The polluter /importer (owner / occupier of the facility or its owners or the entity exercising management control) – the facility that has generated (or imported) the hazardous waste and not treated it properly and has let contamination take place by means of illegal dumping or illegal transport of the wastes
- ii) The transporter of hazardous waste to the contaminated site- Entity that has arranged for the hazardous substances to be transported to the contaminated site from the source site
- iii) The land occupier/operator/owner (at the time contamination occurred) of the contaminated site (who may have permitted the illegal dumping or negligent in preventing illegal dumping) or when polluter and/or transporter is not identifiable or not able to pay for remediation
- iv) The current land owner of the contaminated site (who may have permitted the illegal dumping or negligent in preventing illegal dumping) when polluter, transporter, land occupier/operator/owner (at the time contamination occurred) is not identifiable or not able to pay for remediation

International experience in USA, Canada, Australia, etc. shows that the current land occupier or operator is included as a potentially liable party. It is the responsibility of site-owners to make all reasonable enquiries (such as carrying out preliminary assessment) before purchasing a site and adequately monitor the site. There are exceptions to land owners being liable (for example, innocent land-owner defence), provision that the non-polluting land owner can sue the polluter for recovery of costs, limitation of the amount for which a non-polluting land-owner can be liable, etc. Consideration may be given to include land owners / occupiers as potentially liable parties after a cut-off date and/or based on establishing that they were allowed illegal dumping.

Section 25 of the Hazardous Waste Management Rules identifies the occupier, transporter and operator of a facility as liable parties for damages caused to the environment resulting due to

improper handling and disposal of hazardous waste. The term facility is defined as *any establishment wherein the processes incidental to the handling, collection, reception, treatment, storage, recycling, recovery, reuse and disposal of hazardous wastes are carried out*. The Section 25 of Hazardous Waste Management Rules can be strengthened to detail the process of identification of liable parties. However, substantive provisions through amendment of section 3(2) of the E(P) Act to include assignment of liability based on polluter pays and precautionary principles, use of absolute liability principle, etc. will be required. Instead of retaining Section 25 in Hazardous Waste Management Rules, the entire section may be moved to the new set of NPRPS Rules.

2.3.2.4 Defining types of liabilities for different applicable situations:

The liabilities are of two types,

(a) **Criminal Liability** that leads to payment of penalty and imprisonment and

(b) **Civil Liability** that may be of the following sub-types:

- i) **Absolute Liability**- If an entity handles an “inherently dangerous” substance then liability arises out of tort. In this case the responsible party cannot simply say that it was diligent or that it was operating according to industry standards or that there was no existing law or disposal facility or the contamination occurred due to Act of God.
- ii) **Strict Liability**- An entity is responsible in all cases as mentioned under absolute liability other than cases of act of God where otherwise the entity was diligently following all that needed to ensure there was no contamination.
- iii) **Retroactive Liability**- Parties may be held liable for acts that happened before enactment of any legal provision under absolute or strict liability.
- iv) **Joint Liability**- Any one responsible party may be held liable for the entire cleanup of a site when the harm caused by multiple parties cannot be separated.
- v) **Extended Liability/Vicarious Liability/ In law vicarious liability** is when a person is held liable to the action or inaction of another person in view of the fact that such persons share a special relationship and one person has carried out such unlawful actions on behalf of the other. Thus vicarious liability is a strict and secondary liability, imposed on a superior principal for the action/ inaction of his subordinate /agent. In case of entities who are carrying out polluting activities on behalf of others to fulfil contractual obligations (e.g. large industrial units who would outsource the polluting activities to smaller units) then liability goes to the large industry units with whom the smaller entities have a contract. This is applicable in case of unregistered Micro Small and Medium Enterprises (MSME). As per Micro, Small & Medium Enterprises Development Act, 2006, for manufacturing sector the following categories are defined. In this report we follow this definition while categorizing MSMEs and larger manufacturing units.

Category	Investment in plant and machinery
Micro	Does not exceed twenty five lakh rupees
Small	More than twenty five lakh rupees but does not exceed five crore rupees
Medium	More than five crore rupees but does not exceed ten crore rupees

Introducing the principles of civil liability and its various forms will require amendment to section 3(2) of the E(P) Act. References may be taken from the following existing provisions and regulations:

- Constitutional provisions in Article 14, 21, 47, 48A that holds up citizens rights to health and environmental safeguard
- Section 20 of the National Green Tribunal Act that introduces “polluter pays” principle in the space of environmental remediation
- Concept of “Extended Producer Responsibility” under E-Waste (Management and handling) Rules, 2011
- Legal provision for remediation under the Mineral Conservation and Development Rules, 1988
- Concept of liabilities to the producers, dealers, recyclers, importers and consumers of batteries as in the Batteries Rules, 2001
- Personal liability of directors as under Australian law
- Extended liability of parent companies, group companies, or consumer particularly in cases of evidence of association.

2.3.2.5 Defining the extent of liability

Here we describe the extent of liability that would be assigned to a liable party. The extent may be determined based on the cost of actual remediation incurred or to be incurred as per the remediation option selected in step 6, compensation claimed by the affected party for loss of health, injury, death, loss of livelihood, damage to property, etc.

1. **Payment of the cost of remediation** - Here the liability party pays the cost of remediation that is incurred to clean up the land to a level where the land may be reused, or to the baseline level as determined under step 6. This will cover all costs (including that of assessment, investigation, remediation, financing, administration, recovery of costs, rehabilitation and resettlement, etc.) and will need to be explicitly provided in the E(P) Act.
2. **Payment of compensation, relief, restitution** - Upon receiving claims from the affected parties, compensation will need to be provided for (i) personal injuries such as impact on health (e.g. acute health impacts, disfigurement of body parts), (ii) monetary loss or loss to property (e.g. reduced crop yield, discoloured water etc.), (iii) loss to the environment and ecology irrespective of the fact there is no loss to persons or property. This is sufficiently covered under the National Green Tribunal Act.
3. **Payment of exemplary damages** - An assessment/ award of exemplary damages is to set an example and has a deterring effect. Powers to grant exemplary damages are most useful when the loss to property and person are difficult to quantify, or in cases when irreplaceable loss is caused to the environment or society. Example if there is an irreversible damage to a heritage monument or a sacred grove then rather than compensate loss caused it is important to deter illegalities resulting in such damages in the future. A court like National Green Tribunal is well placed to determine exemplary damages.
4. **Liability linked to economic gains from contravention** – It is likely that the polluter would have gained economically from contravening laws and regulations governing the management, transportation or disposal of hazardous waste. The liability in such cases may be

set at multiple times (say three to six times) the potential gain that the liable party may have made to be a sufficiently deterrent. This will need to be explicitly provided in the E(P) Act.

5. **Limitation on liability:** Consideration may be given to apply the liability for remediation irrespective of the types or timing of events causing contamination or detection of harm on account of contamination provided no action by a public authority has been initiated so far or action has been taken and is continuing. The only exception from being covered under NPRPS liability should be where action by public authority or court has been completed.

2.3.2.6 Agreements with voluntary parties

If a party voluntarily comes forward and agrees to remediate / finance the remediation, the competent authority may consider entering into an agreement with the party. A voluntary party is likely to be interested in the development of the site. International experience (e.g., in CERCLA) show that such voluntary agreements are made on the basis that there is no admission of liability on part of the party entering into the agreement.

Depending on the stage in the remediation cycle when the voluntary party approaches the competent authority and proposes to pay for remediation and / or undertake remediation, the agreement may contain the following:

- Site details, nature of contamination, extent of contamination
- Remediation scope
- Roles and responsibilities of liable party, competent authority, third parties
- Temporary custody and control of site
- Rehabilitation and resettlement of current occupier (if different from owner)
- Access to site, site use restrictions, risk management and safeguards
- Monitoring and reporting requirements
- Timeline for remediation
- Payment details
- Financial arrangements, securities, deposits

To allow competent authority to enter into an agreement with the voluntary party, amendments may be required in section 3(2) and 5 of the E(P) Act. Further, consideration should be given whether the voluntary party may need to meet certain pre-requisites including – (a) demonstration of adequate financial capacity to pay for remediation, (b) agreement with the site owner for intent of purchase of site or joint development or temporary custody and control of site, (c) declaration on the absence of linkage with a liable party (to prevent a liable party using this route to avoid penalties)

2.3.2.7 Penalty for liable parties

The penal provisions of the E(P) Act or National Green Tribunal Act need to be sufficient deterrent for parties to not contravene the provisions of the law or orders, directives and notices of competent authority. The need to review the penal provisions arises in the view of potentially significant cost of clean-up and extended time period for carrying out remediation.

2.3.2.8 Assessing capacity to pay

While identifying the liable parties it is important to assess the capacity of the liable parties to pay the cost of remediation and/or claims relating to health and environmental damages. The assessment of capacity to pay is likely to involve an assessment of the assets and liabilities, sources of income, etc. through examination of accounts, financial statements, income tax returns, etc.

Some of the measures that can potentially address lack of capacity to pay include:

- a) Units handling Hazardous Waste prior to setting up their operation or during renewal of their operation are required to take an insurance policy /financial security to cover its liability. References may be drawn from Section 8 of the Civil Liability of Nuclear Damages Act. 2010.
- b) Any units prior to setting up their operation or during renewal of their operation are required take disclose if their activity is related to hazardous wastes management, transportation, handling and disposal is outsourced to any other unit including un-registered units.
- c) Consideration may be given to gradually extending the provision of registration, obtaining permits and consents and mandatory insurance to current exempt units (e.g., SMEs) that involve hazardous processes under Schedule I or involves contaminants as listed under Schedule II or otherwise handle use import dispose of substances within the purview of the Hazardous Material (Management, Handling and Transboundary Movement) Rules, 2008. A SME cluster-approach may be adopted based on the risk assessment of potential contamination in a particular geography.

2.3.3 Institutional Provisions

In the event of multiple stakeholder involvement, particularly residential land, social and communication experts may need to be present at the local level to conduct stakeholder consultation. Close co-ordination between the technical, accounts and legal sections of competent authority, state government departments, etc. will be required to notify the site, identify liable party, establish capacity to pay and allocate liability. Levy of liability and fines may require civil administrative adjudication and involvement of state government along with instituting appropriate process will be required.

2.3.4 Financial Provisions

The agreements, orders, directives discussed under legal provisions would lead to cash payment or cost recovery from the liable parties or payment of penalty in case of contravention of an order/agreement. For detailed discussions on financial mechanisms please refer to step 7.

Case Study 1: Liability Issues of Hooghly Dump Site, West Bengal

Involvement of Multiple Parties

- Source Industries- Chromium wastes were transported several years back from industries of neighbouring districts at a cheaper cost when there was no law restricting them to do this, no nearby disposal facility. Most of the source industries are now closed.
- User Industries- Industries in Hooghly used the chromium waste to build access roads to their premises
- Public Works Department (PWD) - Access road was built on their land. Initial responsibility to build approach road was with PWD.
- Municipality- Local access road, tea shops, private building wall were built on municipal land using the transported chromium waste.
- Individual private parties- they built walls, approach road within industry premises, private building walls with chromium waste.

How to assign liability going by the hierarchy?

- a) Polluter, the source industries as described above, the liability arises out of “Tort” as the industries were handling trivalent chromium that may transform into “inherently dangerous” hexa-valent chromium under long exposure to certain temperature and pressure.
Again as defined in joint liability any one responsible party may be held liable for the entire cleanup of a site when the harm caused by multiple parties cannot be separated. Hence the source industries that are still operating might have to bear the entire liability.
- b) There may be the following situations while assessing liability:
 - If a contract with the Contractor building the access road exists and if it mentions or alludes to a cheaper material to be used for constructing the road i.e. an inference that chromium waste will be used can be made) then it is a case of joint liability of the Source Industry , the User Industry and such a contractor.
 - If the User Industry can prove that it did not know or permit the use of chromium waste/ or cheaper option then the liability is with the Source Industry and the contractor.
 - In case the User Industry continued use of the material after the hazardous effects manifested, the User Industry will be liable in tort.
 - Land occupier/owner – the public works department/municipality/transporting industry/general public – As a third level of hierarchy, since structures are built on their land and PWD was supposed to build the access road for the industry, the liability might be borne by PWD and to some extent by the municipality depending of the share of land ownership of the contaminated land or might be only by PWD as per joint liability.

Extent of Liability:

Chromium leads to chronic diseases like cancer hence till date there has been no acute health outbreak or environmental damage reported other than visible discoloration of built structures. Hence it might not be possible to derive a direct cause and effect relationship between contamination and the damage caused. Hence in this case the cost of remediation might be the extent of liability. Please refer to Appendix C for cost recovery under different scenarios

2.4 Step 4- National Priority Site Listing Process

2.4.1 Key activities under the step

Based on the results of the preliminary assessment, the competent authority shall finalize the list of contaminated sites and apply prioritization criteria to the list to determine the order in which sites are to be rehabilitated. A computerized database of priority sites with in-built ranking features will be maintained and updated by the competent authority.

2.4.2 Legal provisions:

The following legal provisions will be required to support the activities under this step:

- Reference to a ranking system¹⁰ that needs to be applied to score a site based on ground water, surface water, soil exposure and air pollution pathway values of a contaminated site obtained from the preliminary assessment report and prioritize a site for remediation based on a cut off score.
- Delegation of power to the competent authority to apply the ranking criteria and be the custodian of the prioritized list for the country.
- During the listing, the competent authority should consult state departments including health, environment and agriculture departments to decide on site prioritisation

The legal provisions may be made by developing a new set of rules under the amended E(P) Act or by developing a similar system like CEPI (that has been successfully implemented by CPCB for identifying and listing critically polluted industrial sites) for all contaminated sites in general. Assignment 1 is developing a new ranking criteria based on CEPI and Hazard Ranking System used by United States Environmental Protection Agency which will be utilised for NPRPS.

2.4.3 Institutional Provisions

Capacity building in terms of adequate manpower and training and development for updating and maintaining a computerized database for prioritization of sites will be required. A collaborative approach would be required among state health departments, state environment departments and other relevant state agencies to have continuous flow information on acute health outbreaks, environmental damages due to contamination.

2.4.4 Financial Provisions

There is no financial implication of this step for updating the priority list. However, initial fund will be required for institutional capacity building, designing a computerised database, etc.

2.5 Step 5- Remedial Investigation

2.5.1 Key activities under the step

A remedial investigation for the rehabilitation of the site shall be commissioned to establish options for remediation, nature of intervention, cost and time for rehabilitation, stakeholder involvement, post remediation site use, monitoring requirements, etc. The remedial investigation may be carried out by an accredited third party who would submit the report to competent authority for review and decision making.

¹⁰ Ranking Criteria from Assignment 1

2.5.2 Legal Provisions

Legal provisions required to facilitate activities under this step will be similar to provisions mentioned under step 2. This would imply delegation of powers to a competent authority or its contracted entity to enter a *notified contaminated site* and take samples for analysis irrespective of the ownership of the land. This can be achieved through developing new NPRPS rules under amended section 10 and 11 of the E(P) Act where under the definition, *any place* will include both public and private *probably contaminated site* and *contaminated site* and will have specific reference to power of entry, inspection and a license to remain, use, take possession and continue to remain in possession of a notified site for the purpose of remediation. Separate Remediation Investigation Guidelines¹¹ will need to be developed and an accreditation procedure¹² to carry out the remedial investigation will be required.

2.5.3 The Institutional Provisions

The institutional provisions are similar to the provisions described under step 2.

2.5.4 The Financial Provisions

Any cost incurred to conduct the activities under this step shall be sourced from public funds or liable parties. If a liable party has not been identified at this stage, these costs shall be recovered later. Based on the list of contaminated sites and average estimated cost per remedial investigation, a budgetary provision should be made for the year by the competent authority.

2.6 Step 6-Remedial Design- Detailed costing, planning and responsibility analysis

2.6.1 Key activities under the step

Each remediation option identified under step 5 will have impacts on costs, time, social issues and land use related issues. The competent authority will review the options and consult the local agencies, the local government authorities such as the district collector, municipal body or the district magistrate, affected parties such as the owners, occupiers and those facing downstream impacts to determine the appropriate option to be taken forward. A detailed project report (DPR) will be prepared for the selected option.

2.6.2 Legal Provisions

Selection of the appropriate remediation option will require the following aspects to be considered:

1. the level to which the land is to be remediated, (i) for the purpose of feasible reuse of the land, or (ii) to its baseline standards, or (iii) till it abates health and environment risks
2. the local social and economic context
3. the amount of funding available to execute the appropriate option and the requirement of public funds
4. the likelihood of identifying liable parties and the capacity of liable parties to pay

Delegation of powers to the competent authority may be required to review the options from step 5 and select the appropriate remediation option based on the criteria identified above. The competent

¹¹ Reference: as developed under assignment 2

¹² Reference: as developed under assignment 2

authority would be required to consult the local government (e.g. district magistrate), other relevant state agencies and community, owner/occupier of the land while deciding upon the appropriate remediation option.

2.6.3 Institutional Provisions

Institutional roles and responsibilities in this stage will follow delegation of power from legal provisions.

2.6.4 Financial Provisions

Financial provisions are not significant at this stage.

2.7 Step 7- Funding requirement, financing mechanisms

2.7.1 Key activities under the step

Prior to commencing remediation, it is necessary to allocate/raise fund for the remediation work. The competent authority will need to ensure that sufficient funding is available to carry out the remediation and the process of raising, managing, disbursing and monitoring funds for remediation activities is in place.

2.7.2 Legal Provisions

The following legal provisions will be required to support the activities under this step:

1. Create structure of the public fund: The public fund will be utilized in cases where liable parties are not identifiable until commencement of remediation activities or where identified liable parties are bankrupt or unable to pay. There are two options here:
 - Creation of National Environment Restoration Fund is mentioned in the National Environment Policy, 2006. The policy states that a fund will be created using the economic resources from the net proceeds of economic instruments, user fees for access to specified natural resources and voluntary contributions. The fund would be non lapsable in nature. This could be similar to the fund structure of National Clean Energy Fund as has been created by collection of cess from coal production and coal imports. The NCEF has been used to fund the DPR preparation of 12 priority contaminated sites with clear delineation of percentage share of central government, state governments and possibilities of Public-Private-Partnerships.
 - Creation of a Mission Mode funding mechanism similar to that used in case of similar programmes like Jawaharlal Nehru National Urban Renewal Mission where funds are made available in a predetermined ratio, the mission contributions are based on categorization by location. Thus areas lagging in development get a higher percentage of funding. Similar provisions may be considered for orphaned sites in the country where there is an urgency of remediation.
2. Delegate powers to competent authority to manage the fund
3. In cases where liable parties are identifiable and they have capacity to pay, delegate powers to the competent authority to get into administrative agreement (through orders) with the liable parties for cash out (before remediation has taken place) and cost recovery (after remediation has taken place). The legal provisions to get into an agreement are described under step 3.
4. Creation of a “special account” within the dedicated fund for remediation of polluted sites.

5. Provision to compensate affected community for resettlement and rehabilitation displaced during remediation may be made.
6. In cases where liable parties do not have capacity to pay, developing provisions of insurance coverage of liability in line with section 8 of the Civil Liability of Nuclear Damages Act, 2010, during setting up operations or renewal of consent of operation.
7. Develop a new set of rules under the amended E(P) Act to bring in the provisions described above. Amendments may be brought in to section 3(2) of the Act to have enabling provisions for creation of a remediation fund, collection of cess as a percentage of excise duty obtained from the hazardous waste generating units etc.

2.7.3 Institutional Provisions

Institutional provisions with respect to defining roles and responsibilities and capacity building of the dedicated team of the competent authority to manage the fund for remediation activities are important. Experts with technical, finance and accounting background and with programme management experience may be required to carry out the following activities for fund management:

- Review and approval of the costs for the recommended remediation option in the DPR;
- Monitoring and approval of disbursement of fund as per project milestone;
- Establishing project and programme related manuals and guidance on fund management, disbursement and monitoring.

2.7.4 Financial Provisions

Some of the implementation related aspects concerning financial provisions are set out below:

1. Sector Wide Approach (SWAp) – Consideration may be given to follow SWAp for NPRPS. SWAp represents a shared approach by the development partners to support country led programs whose scale is greater than that of traditional projects. Under SWAp, systems are reviewed and designed to avoid multiple accounting systems and procedures being followed by the implementing agencies commensurate with the requirements of the funding agencies. Therefore, under SWAp reliance is placed on the Government/ department systems and procedures with suggestions to enhance/ strengthen these systems where required. Emphasis is placed on using and strengthening government institutions, procedures and staff rather than establishing parallel systems. The aim is to have a single reporting and auditing system for all the activities in the sector. It is proposed that all the future schemes/ projects shall be under SWAp. All the programme/ schemes under SWAp basket shall follow the common set of systems and procedures and funding arrangements. Inflows that could be linked to this fund are:
 - Funding from central government
 - Funding from special taxes/ cesses (like the Water Cess, Coal Cess)
 - Funding from state governments
 - Funding from local bodies
 - Payments by liable parties
 - Payments by voluntary parties
 - Penalties and fines

- Earnings from rehabilitated sites (claw-back of gains in land value), etc.
 - Funding from multilateral and bilateral agencies
 - Grants and donations
2. **Sub funds within the main fund** – There can be an option of creating small sub-funds within the overall fund with linked inflows and outflows based on specific site/ location/ industry/ product of polluter. For example, all collections from the chemical industry shall be utilised for remediation of sites that have been affected by chemical waste or all collections from a particular state shall be utilised primarily or shall be given preference for remediation of sites that have been affected in that particular state or all collections from fines and penalties shall be paid for compensation of that specific site only.
 3. **New Cess for environment protection and cleaning** – The government can evaluate the option of levying a new cess for environment protection and remediation in India especially orphan sites. This can be on the lines of the Water Cess under the Water (Prevention and Control of Pollution) Cess Act, 1977 or the Cess on Coal under the National Clean Energy Fund. The purpose behind this new cess is to create a dedicated fund and remediate the contaminated site in case where the polluter is not identifiable or incapable of paying the remediation cost. A feasibility of implementing a new cess on the lines of The Water (Prevention and Control of Pollution) Cess Act, 1977 is in Appendix B.
 4. **Creation of an Escrow Account** – When a group of industries or in a cluster who are prone to discharge of hazardous materials are based in one geographical area, the mechanism of escrow account can be utilised to fund any probable future costs of remediation. An escrow account can be opened with contribution of industries located within a cluster where the contamination has been detected. This may be feasible in locations that have industrial parks or industrial complexes.
 5. **Corporate Guarantees, Bank Guarantees, Insurance Policies, etc.** – In order to ensure payment during remediation of the pollution, suitable corporate guarantees, bank guarantees, deposits, insurance policies, etc. can be taken as financial security.
 6. **Encouraging private investments/ incentive schemes for private sector for promotion of treatment facilities** – It is very important that private sector investments are encouraged in ensuring that hazardous waste reaches the treatment facilities. Some of the measures that can be taken for inviting private sector participation in treatment facilities are as follows:
 - a. **Viability Gap Funding for TSDF** – Government of India has a programme for financing up to Rs. 2 crore as grant for setting up of TSDF. This is a welcome step and some private players have already availed this amount to co-fund their projects. This may be however linked to as a % of the total project cost and not a fixed amount. The cost components that will be funded maybe defined at the beginning. Consideration may be given to providing interest subsidy / subvention for setting up treatment facilities.
 - b. **Rebate in cess based on investments in TSDF/ Hazardous waste management** – Cess, if any, levied on the hazardous waste polluting industries may be waived or rebate may be provided to those industries that make an investment in their own or common treatment plants. The waiver or rebate may also be provided if the polluting units have set-up their own or common TSDF.

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- c. **Subsidy for MSME** – In case the cost of disposal of hazardous waste or the cost of transportation of hazardous waste to TSDF is significant, particularly in the case of MSME, this may act as a deterrent. A suitable subsidy may be provided to the MSME so as to bring down the costs of disposing hazardous waste.
7. **Cost recovery mechanism** – Cost recovery mechanism may include recovery through arrears of public demand or land revenue as contained in section 9 of the E(P) Act. Alternatively, provisions similar to takeover of assets under the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 may be provided.
8. **Funding options** – Funding for projects from the Fund can be strictly followed based on these three scenarios. Within these three broad scenarios, there can be various situations. Some illustrative situations are as follows:
- a. **Remediated without Polluter Pays Principle (100% grant, probability of recovery of costs is low)** – The scenario of paying up 100% of the remediation cost from the Fund will be more often done in case of orphan sites. In this situation, the polluter will not be identifiable and the Government because of judicial pronouncement, public outcry or just because it cannot be left like that because it is highly polluting, will need to spend from the Fund. Some illustrative situations are as follows:
- **Highly critical** – The pollution can be very critical and be dangerous to human or other life if not immediately cleaned. The pollution may spread to nearby water bodies, agricultural land or near a habitation.
 - **Orphan sites** – The polluter may not be identifiable at all or may not have capacity to pay. The pollution may have historical reasons, the polluting industries may have closed down or just the **pollution** may have been dumped without anyone's notice, especially on public land.
 - **Judicial pronouncements** – The Government may have to undertake urgent remediation because of a judicial pronouncement. This may need to be done from the Fund.
 - **Public outcry/ extensive media reports** – In case of serious pollution that may be polluting nearby water bodies or areas; there may be public outcry or extensive media reports which might need to be remediated urgently. These funds may need to be spent out of the Fund.
- b. **Remediated only with Polluter Pays Principle (0% grant, probability of recovery is high)** – In such cases where the polluter is identified and he is in a position to pay up, the polluter would have to take care of remediation and spend from his pockets. In some cases remediation may have to be carried out from the Fund first and then recovered from the polluters.
- c. **Remediated only with Polluter Pays Principle (Part grant, probability of recovery is medium)** - In such cases even when the polluter is identified, he may not be in a position to pay up fully even with secured assets or the chances of recovery might be low. In such cases the Government might have to take care of remediation and spend from the Fund to extent money from the polluter is non recoverable. It may be noted that funding can be linked to the ownership pattern of the land or the usage of land post remediation. However these may be decided on a case to case basis.

9. **Separate fund for Research & Innovation** – A separate grant fund for promoting research and innovation in remediation can be set-up. This can be a grant based fund given to individuals, research organisations, industry associations, etc. for undertaking various studies, research and innovation in the sector. The fund would drive and catalyse the creation of an ecosystem of research, innovation, enterprise, entrepreneurship, and venture capital, targeted at innovative solutions for remediation. Projects that are funded out of the Research and Innovation Fund and have achieved success during pilot/ trial stages may be taken up for commercial usage after thorough examination and ensuring commercial viability. The project may be given seed money/ initial investment assistance so that the product can achieve scale and can be used by the industry in general.
10. **Financial Management Framework** – Financial Management framework is dependent on the institutional system that will be selected and put in place. The competent authority that will manage the fund needs to be adequately staffed to keep a track on the progress of remediation projects and accordingly disburse fund.
11. **Accounting Policies and Procedures** – Government accounting system will be followed and accounting practices will be in line with consistently applied national Accounting Standards, in each of the accounting centers. Funds released to the projects shall be treated as Grant in Aid. The advances shall be monitored separately through advance control ledgers. Assets both acquired and constructed will be valued at their full cost.
12. **Internal Control Mechanism** – Some of the key control parameters are (i) timely release of the programme funds by MoF to the competent authority, (ii) control of funds released to the projects, (iii) internal audit at the competent authority to ensure compliance with the laid down systems and procedures and effective utilization of the programme funds, (iv) adequate authorization and approval of the program expenditure, (v) monthly Bank reconciliation of project bank account, (vi) quarterly Management Information System to ensure regular reporting on program expenditure and funding, (vii) concurrent audit of the tranche request as a basis for release of installments to projects to ensure efficient fund utilization prior to next tranche release, (viii) at project level, access to financial information and accounting records for all stakeholders and social audit procedures to ensure transparency and oversight functions.
13. **Statutory Audit (Annual):** The Comptroller and Auditor General of India (CAG) through its offices in India will be the statutory auditor for NPRPS and remediation funded under NPRPS. The CAG's office will conduct an annual audit of the operations of the Project. The audit report will be submitted to the Government within six months of the close of each financial year.
14. **Internal Audit:** The competent authority shall be subject to internal auditing. The audit will be conducted on a quarterly basis, with the quarterly reviews focusing on key internal control functions and would cover aspects of: (i) ascertaining whether the systems of internal checks and controls operating are effective; (ii) ascertaining reliability of accounting financial reports; (iii) ascertaining the extent to which the systems in place prevent misuse of program assets; and, (iv) ascertaining that the financial rules and procedures as laid down in the rules and regulations are followed. The auditor will be required to provide a quarterly and annual management letter/Inspection Report to the competent authority, highlighting findings during the audit.

2.8 Step 8- Remedial Action

2.8.1 Key activities under the step

Based on the decision on remediation option finalized in step 6, the competent authority or the liable party shall hire an accredited third party to carry out remediation. The competent authority shall periodically review the progress of work and address issues if any.

2.8.2 Legal Provisions

The following legal provisions will be required to support the activities under this step:

- Delegate power to the competent authority to hire an accredited third party to carry out remediation and periodically monitor the progress of work of the third party
- Develop accreditation procedure for third parties to carry out the remediation work
- Allow performance related guarantees and securities to be collected from third parties

Further, through the legal provision, the competent authority shall be empowered to direct the owner and occupier of the site (whether or not a liable party) to transfer temporary custody and control of contaminated site until the remediation is completed. Taking over temporary custody and control of contaminated site where the site owner / occupier is not a liable party will require an appropriate process to be followed. The competent authority should consider, *inter alia*, the following aspects:

- The ranking of contaminated site (e.g. *high threat* as assessed in step 3);
- The urgency of action required (e.g., possibility of imminent or visible threat to public health, environmental damage, etc);
- The proximity of site to places of public importance, pilgrimages, heritage monuments, etc.;
- Potential of contamination spreading to other sites;
- The nature and extent of resettlement and rehabilitation required for current site occupiers.

2.8.3 Institutional Provisions

The competent authority will need to develop the administrative/establishment section to select a third party for remediation. The third party may be chosen from a list of accredited third parties for the job. The third party will carry out the remediation activities on site and provide progress reports (including reporting on contamination levels) to the competent authority. NABL accredited laboratory at the competent authority will be required for cross checking the parameters reported by the third party. Adequate staffing will be required at competent authority with required qualifications to review the periodic reports from the accredited third party.

2.8.4 Financial provisions

Financial provisions are covered under step 7.

2.9 Step 9- Construction Completion/Complete Physical Clean Up

2.9.1 Key activities under the step

Upon completion of remediation activities, the executing agency i.e. the accredited third party shall submit a final clean up report to the competent authority clearly mentioning the post remediation

standards achieved vis-à-vis the estimation in the DPR and the post remediation uses possible with the clean up standard achieved and requirements of post remediation monitoring. The competent authority shall review the report and release payments / to the accredited third parties.

2.9.2 Legal Provisions

Since this is a continuation of activities from step 8, no further legal provisions are envisaged for this step.

2.9.3 Institutional Provisions

Since this is a continuation of activities from step 8, no further institutional provisions are envisaged for this step.

2.9.4 Financial Provisions

Financial provisions are covered under step 7.

2.10 Post Construction Completion - Long term review plan, post remedial use

2.10.1 Key activities under the step

Based on the final remediation report, the competent authority shall define the periodic monitoring requirements for the site for future. This shall include a monitoring plan and format and frequency for submitting a monitoring report. The competent authority shall initiate talks with local government, private developers, local community and other relevant local agencies for reuse of the land as per the remediation level achieved at the site.

2.10.2 Legal Provisions

The following legal provisions will be required to support the activities under this step:

1. Delegation of powers to competent authority to develop a strategy to manage post construction completion activities. The strategy shall cover the following:
 - A long term plan (e.g. 10 years) for monitoring of ground and surface water restoration
 - Operation and Maintenance activities required to maintain the effectiveness and integrity of the remedy.
 - Periodic reviews (e.g. every 5 years) to check the levels of hazardous substances on a site that allow for unlimited use and unrestricted exposures.
 - Continuation of land use controls and restrictions till a certain period to minimize the risk of destruction of the remedy.
 - Working with the stakeholders seeking to redevelop the remediated sites to ensure that their activities do not adversely affect the implemented remedy.
2. Developing a new set of rules under the amended E(P) Act establishing procedures to support the implementation of strategy. Details of land use restrictions and control are discussed under step 3 and 6 respectively.

2.10.3 Institutional Provisions

Delegation of power will flow from the legal provisions. Capacity of the competent authority needs to be enhanced in terms of manpower, skill set development, laboratory infrastructure as described under steps 8.

2.10.4 Financial Provisions

Financial provisions are covered under step 7.

2.11 Step 11- Monitoring and Evaluation

On the basis of the monitoring plan developed under step 10, a remediated site shall be monitored periodically to ensure pollution limits are within the values as determined by the end goals in the final clean up report in step 9.

2.11.1 Key activities under the step

On the basis of the monitoring requirements outlined under step 10, an accredited third party monitoring agency shall undertake periodic (e.g. annual) monitoring of the site for such terms as may be considered appropriate. The accredited third party that conducts the monitoring shall submit periodic monitoring reports to the competent authority for review and approval.

2.11.2 Legal Provisions

The legal provision required to facilitate activities under this step cover delegation of power to the competent authority to periodically conduct monitoring and evaluation of the remediated sites. There are two options for bringing in the provision - amendment of Schedule III of Hazardous Waste Management Rules that delegate powers to CPCB and SPCBs for monitoring of industry compliance to include periodic monitoring of remediated sites, or developing new rules as NPRPS runs under the amended E(P) Act.

2.11.3 Institutional Provisions

A third party institution will be hired by the competent authority to carry out the periodic monitoring. The third party may be chosen from a list of accredited third parties for the job. Capacity enhancement of the competent authority in terms of having NABL accredited laboratory, staffing, and skill set development with respect to required qualification as described in above steps.

2.11.4 Financial Provisions

Financial provisions are covered under step 7.

2.12 Step 12- Recover Costs

2.12.1 Key activities under the step

Where sites have been rehabilitated using public funds, fully or partially, an attempt has to be made by the competent authority in the post remediation period to recover the costs from the liable party and from the gains in land value (in case the site owner is not a liable party).

2.12.2 Legal Provisions

In case a liable party does not respond to an order from the competent authority, a penalty of up to three times of the cost of remediation may be levied. The cost and penalty may be recovered from the liable party either as arrears of land revenue or public demand or as per process similar to that

contained in the Securitisation And Reconstruction Of Financial Assets And Enforcement Of Security Interest Act, 2002. For this, amendments may be required in section 3, 5, 6, 9 of the E(P) Act to enable rules to be formed under the Act to this effect.

A provision allowing the competent authority to seek a significant percentage of increase in land value due to remediation up to the limit of public funds used may need to be provided in the E(P) Act.

2.12.3 Institutional Provisions

Since this is a continuation of step 3 and 7, no further institutional provisions are envisaged in this step.

2.12.4 Financial Provisions

Financial provisions will follow legal provisions on debt recovery.

2.13 Step 13- National Priority List Deletion

2.13.1 Key activities under the step

Upon completion of step 11, the competent authority shall update the status of the national priority list and mark the remediated site as *completed* in the computerized database.

2.13.2 Legal Provisions

The legal provisions will follow from step 4, i.e. the custodian of the national priority list, the competent authority shall update the list regularly to mark a remediated site as *completed*.

2.13.3 Institutional Provisions

The requirements under this step follow from step 4.

2.13.4 Financial Provisions

This step does not have any financial implications.

2.14 Step 14- Site reuse/redevelopment

2.14.1 Key activities under the step

Upon completion of all post remediation activities as per steps 10 and 11 and based on the post remediation monitoring plan, the site will be de-notified. Control and custody of land will be handed over to the site owner with an obligation to observe any site use restrictions if required.

In the event that the site owner (not being a liable party) exercises its right to transfer the land to the competent authority at the estimated value of land less the estimated remediation cost, the competent authority may engage with the state government, local community and the other interested parties and land developers to promote the development of the site.

2.14.2 Legal Provisions

Delegation of power to the competent authority will be required to issue a directive to de-notify a site as per the final clean up report and the last monitoring report. Further, procedural aspect of the owner exercising its right to transfer the land to the competent authority may need to be provided.

2.14.3 Institutional Provisions

Where the competent authority is responsible for reuse/redevelopment of the site, it shall undertake the following responsibilities:

1. Develop an action plan to remove barriers for reuse of a remediated site. The following barriers should be considered – lack of information about the site, stigma of being a contaminated site, residual liability concerns, site ownership issues, lack of clear information regarding what uses might be appropriate for the site, etc.
2. In order to remove the barriers and appropriately reuse the site, the competent authority needs to provide the public with site reuse profiles, information sheets and assessments, work with local communities to establish processes for determining appropriate reuses, supply information to potential purchasers and determine technical needs to properly design and reuse the site.

To carry out the institutional requirements, experts in environmental law, social and communication experts at the competent authority may be required.

2.14.4 Financial Provisions

If there is a change in ownership of land, purchase/hand-over agreements may need to be signed between the current owner of the land and the re-user of the land. The financial onus of reuse of redevelopment of a remediated site shall be passed on to the re-user or redeveloper of the site who will take control of the land.

3 Development of Options for NPRPS

Based on the gap assessment and the legal, financial and institutional provisions examined in the previous section, we have examined the legal options followed by options for institutional framework. We have also examined the financing mechanisms that may be considered for NPRPS.

3.1 Options for Legal Framework

There are two broad options possible to address the gaps in the legal framework – one that reflect an incremental approach to the existing legal and regulatory framework and two that reflects a substantial and comprehensive overhaul of the legal and regulatory framework. An incremental approach is reflective of the nature of environment legislation (delegated legislation) and thus would mean establishing a new set of rules and/or amending Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008. This approach has been followed for the Batteries (Management & Handling) Rules, 2001 and E-Waste (Management & Handling) Rules, 2011. The options for the legal framework are set out in Table 2 below.

Table 2: Options for Legal Framework

Options	Observations
Option 1. Amendment of delegated legislation Strengthen Hazardous Wastes (Management Handling and Transboundary Movement) Rules 2008 to bring in the remediation specific aspects	Hazardous Wastes (Management Handling and Transboundary Movement) Rules 2008 have a wide coverage of industry specific compliance requirements for hazardous waste generation, handling and disposal. The rules are primarily aimed at pollution prevention. The rules contain provisions to allocate liability (to occupier, owner, operator and transporter of a facility) for damages caused to third party or environment and payment of fines for violating the provisions of the rules. Soil standards and thresholds, rules and procedures for identifying sites and remediation plan and execution can be established through guidelines issued by competent authority under the existing provisions of E(P) Act. However, the issue of payment for remediation (being different from liability for damages and payment of fines), entry into site for remediation, principles of liability determination and allocation to cover all situations including orphan sites, sufficiency of penal provisions, establishing financing mechanism for orphan sites, recovery of costs, managing the remediation in case of multiparty site ownership, etc. will require change in the primary legislation. If the primary legislation is not amended, such remediation may have to be routed through courts that may not be optimal.
Option 2. Amend an existing act of Parliament (and consequent changes to delegated legislation and/or new delegated legislation under the amended act) Amend E(P) Act and other relevant primary legislation along with amended (or new) delegation legislation	E(P) Act is the central legislation that may be amended to incorporate the issues that cannot be dealt by delegated legislation. If required, amendments may need to be made to National Green Tribunal Act, 2010 if there are any conflicts between the amended E(P) Act and the National Green Tribunal Act. The aspects of the 14-step remediation framework can be covered through amendments to the E(P) Act. Separate Rules will be required to detail procedural aspects, allocate responsibility and remove ambiguity in implementation.

Options	Observations
Option 3. New Act of Parliament	Countries like USA, Australia, etc have separate acts and regulations that specifically deal with remediation of contaminated sites. MoEF has been contemplating ¹³ amending the E(P) Act for effective environment governance by enhancing the level of penalties, introducing civil liability regime, incorporating greater role of economic instruments, introducing civil administrative adjudication framework, etc. The implementation of NPRPS would also require similar changes to the above-mentioned provisions and an amendment to the E(P) Act (compared to a new act) can optimally address both the requirements.

3.1.1 Option 1: Suggested Strengthening of Hazardous Waste Management Rules

Table 3 below describes the aspects for the HW Rules that are (i) already covered; (ii) are missing and (iii) for which the rules need strengthening:

Table 3: Coverage and gaps in Hazardous Waste Management Rules, 2008

Aspects covered under Hazardous Waste Rules	Aspects that are currently not covered under Hazardous Waste Rules
<p>As per chapter II, rule 5, section 4, SPCBs are authorized to review appropriate facilities, technical capabilities and equipment details for safe handling of hazardous waste before granting “authorization for handling hazardous wastes” to industries. The same is reviewed during renewal of authorization.</p> <p>As per chapter II, rule 5, section 6, SPCBs are authorized to periodically review industrial records of hazardous waste generation, transportation and disposal.</p> <p>Since Hazardous Waste Rules are notified under the E(P) Act, drawing upon section 10 and 11 of the Act, any authorized entity has the right to enter any place (industrial premises or other), to take air, water and soil samples.</p>	<ul style="list-style-type: none"> • Review of plant records of hazardous waste generation, incineration and transportation to the disposal facility by SPCBs during renewal of “Consent to Operate” for hazardous waste generating facilities. • Periodic monitoring of land contamination, illegal dumping of hazardous wastes due to non-compliance to the rules, or from before the rules. • Specific reference to power of entry, inspection of a “probably contaminated site” irrespective of ownership i.e., public, private, industrial, domestic. • Provision to notify a land as “contaminated” and restrict activities on a notified site. • Licenses to remain, use, take possession and continue to remain in possession of a “notified contaminated site” for the purpose of remediation.
<p>Schedule I provides exhaustive list of all hazardous processes and schedule II provides comprehensive list of contaminants with its concentration limit.</p> <p>Section 25 identifies the occupier, importer, transporter and operator of the facility as liable for all damages caused to the environment or third party due to improper handling of the hazardous wastes or disposal of the hazardous wastes. The occupier and the operator of the facility remain liable to pay financial penalties as levied for any violation of the provisions under these rules.</p>	<ul style="list-style-type: none"> • Procedure for risk ranking of contaminated sites. • Definition of hierarchy of liable parties – e.g., polluter, owner, occupier, transporter. • Definition of types of liabilities such as absolute, strict, joint, vicarious that may be applicable under different scenarios. • Definition of extent of liability – e.g., till cost of remediation, a fixed amount as payment for damages etc. • Provision for calculation of liability –e.g., to put an economic value for damage to the

¹³ Report of the Steering Committee for the Twelfth Five Year Plan (2012-2017) on Environment, Forests, Wildlife & Climate Change

Aspects covered under Hazardous Waste Rules	Aspects that are currently not covered under Hazardous Waste Rules
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- environment or natural resources.
- Provision for attachment of land/asset to recover cost of remediation from liable parties.

3.1.2 Option 2: Amendments to Acts and New NPRPS Rules

3.1.2.1 Suggested Amendments to the Environment (Protection) Act

Strengthening of rules or developing new set of rules for NPRPS might not be sufficient if the Act under which those are notified does not have the enabling provisions for conducting remediation of a contaminated site. Some of the enabling provisions required under the E(P) Act are set out below.

I. Amendment in “Definitions” under Section 2

Definitions of probably contaminated site and contaminated site are required in Section 2(h). Currently, there is no definition of contaminated site or probably contaminated site in any Act or Rule. The definition may be taken from Assignment 1.

II. Amendments in Section 3(2)

Table 4: Suggested amendments to Section 3(2) of E(P) Act

Suggested Amendments	Justification
Add new sub-section (xv): <i>for laying down standards, procedures, safeguards, restrictions and all necessary measure to be adopted for remediation of contamination where contamination may occur due to hazardous substances from before the Act and rules under the Act</i>	Currently section 3(2) does not talk of laying down procedures for remediation of contamination that may occur due to any kind of use of “hazardous substances” as defined under the Act. The scope should cover all eventualities and not just due to mishandling, accidents or any other unforeseen events
Amendment of sub-section (x) <i>for inspection of any premises such as public land, private land like factory premises, residential, non-residential complexes or any other place for prevention, control, abatement of environmental pollution and remediation of contamination</i>	The Act specifically mentions plant premises for entry and inspection but is silent on other types of sites (e.g., non-industrial land). For the purpose of remediation, the competent authority will require jurisdiction over any type of site including non-industrial land. Hence examples of “any premises” may be included in this section.
Add new sub-section (xvi) <i>for appointing adjudicating officers to:</i> a) <i>Impose penalty in case of non-compliance to any directions, orders, agreements under the Act.</i> b) <i>Provide for a system of graded fine / penalty depending upon the type of contravention or non-compliance</i> c) <i>Provide for civil liability that is a multiple of the potential economic gain by a defaulting party</i>	In the Real Estate (Regulation and Development) Bill 2013, ‘Real Estate Regulatory Authority’ to be situated in each state/union territory has specific powers, and responsibilities to exercise oversight of real estate transactions, to appoint adjudicating officers to settle disputes between parties, and to impose penalty and interest. The bill mentions that the power to appoint adjudicating officers is meant for expediting the judiciary process. The Electricity (Act) 2003 and the Petroleum and Natural Gas Regulatory Board Act, 2006 provide for civil administrative adjudication. Civil administrative adjudication is also found in Information Technology Act, 2000, SEBI Act, 1992 and the Food Safety and Standards Act (FSSA), 2006. Civil administrative adjudication may be adopted in NPRPS and the competent authority may be given specific power to appoint adjudicating officers to expedite the process.

Suggested Amendments	Justification
<p>Add new sub-section (xvii) <i>to assign liability based on “polluter pays” and “precautionary” principle</i></p>	<p>“Polluter Pays” principle : The liability provisions in the regulatory framework of countries like USA, Canada, Australia, Germany, and Netherlands are based on the polluter pays principle. In India, section 20 of National Green Tribunal Act upholds polluter pays principle as the basis for claiming environmental restitution from a party In India this principle has been repeatedly referred to by various court orders relating to restoration of environment damages¹⁴. “Precautionary” principle : In the National Environment Policy 2006, Precautionary Principle is defined as “Where there are credible threats of serious or irreversible damage to key environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation” As per European Commission, Precautionary Principle may be invoked when the following three conditions are met: Identification of potentially adverse effects¹⁵ evaluation of the scientific data available¹⁶ the extent of scientific uncertainty¹⁷ The principle if comes under amended Act helps NPRPS in: Defining “absolute liability” where a party becomes liable under tort when it handles an “inherently dangerous material” (irrespective of act of god, accidents) Developing risk ranking criteria to designate sites as “contaminated” where there are credible threats of serious or irreversible damage to environment even if no direct, scientific correlation is found between contamination and impacts on health/environment through preliminary investigations (i.e. when there are chronic, long term impact) Notifying a land as a contaminated land even if no direct, scientific correlation is found between contamination and impacts on health/environment through preliminary investigations (i.e. when there are chronic, long term impact) Imposing liability (e.g. payment of remediation cost) on the identified liable party even if the preliminary investigation does not indicate any direct, scientific correlation between contamination and impacts on health/environment through preliminary investigations (i.e. when there are chronic, long term impact) This principle has been repeatedly referred to by various court orders relating to restoration of environment damages as an</p>

¹⁴ Some examples are (i) Tirupur Dyeing Factory Owners Association vs .Noyyal River Ayacutdars Protection Association and Ors AIR 2010 SC 3645; (ii) Vellore Citizens’ Welfare Forum v. Union of India AIR 1996 SC 2715; (iii) Research Foundation for Science, Technology and Natural Resource Policy v. Union of India (UOI) and Ors (2005) 13 SCC 186; (iv) Ramgopal Estates Pvt .Ltd., rep .by Managing Director K. S. Hemanth Kumar vs. The State of Tamil Nadu, rep. by Commissioner and Secretary to Govt., Industries Department 2007(2) CTC369; and (v) Om Prakash Bhatt and Others v. State Of U.P. And Others.

¹⁵ NPRPS related example: visible discoloration of water due to presence of contaminants, presence of contaminants in soil exceeding the threshold value

¹⁶ NPRPS related example: Preliminary investigations

¹⁷ NPRPS related example :Chronic health diseases where there is a degree of uncertainty to correlate the disease with contamination

Suggested Amendments	Justification
	<p>integral part of "sustainable development" along with the "polluter pays" principle¹⁸. Section 20 of NGT Act upholds precautionary principle along with polluter pays principle Precautionary principle has emerged as a norm of international environmental laws, treaties, conventions such as Environmental laws in Canada, Australia, UK and Protocol for Substances that Deplete the Ozone Layer (1987); Bamako Convention on Hazardous Wastes within Africa (1991); the Rio Declaration on Environment and Development (1992); and the Framework Convention on Climate Change, (1992)</p>
<p>Add new sub-section (xviii) <i>to employ absolute (or strict), retroactive, joint and extended liability while assessing and assigning liability relating to hazardous substances</i></p>	<p>The principles of assessing and assigning liability should be part of the primary legislation based on which the delegated legislations can be made.</p> <ul style="list-style-type: none"> • Absolute Liability- If an entity handles an “inherently dangerous” substance then liability arises out of tort. • Strict Liability- An entity is responsible in all cases as mentioned under absolute liability other than cases of Act of God where otherwise the entity was diligent • Retroactive Liability- Parties may be held liable for acts that happened before enactment of any legal provision under absolute or strict liability. • Joint Liability- Any one responsible party may be held liable for the entire cleanup of a site when the harm caused by multiple parties cannot be separated. • Extended Liability/Vicarious Liability - a person is held liable to the action or inaction of another person in view of the fact that such persons share a special relationship and one person has carried out such unlawful actions on behalf of the other
<p>Add new sub-section (xix) <i>a) Supervision over activities to complete a remediation cycle</i> <i>b) Estimation of costs of investigations for remediation, actual remediation, rehabilitation and restitution for the purpose of remediation.</i></p>	<p>The activities of completing a remediation cycle are different from that of regular environmental compliance monitoring hence insertion of additional points specific to the case of remediation will help reduce ambiguity and empower appropriate authority formed for NPRPS to enforce these provisions.</p>
<p>Add new sub-section (xx) <i>a) provision of fees, levies, bank guarantees, penalties, etc. for the purpose of protecting and improving the quality of the environment, preventing controlling and abating environmental pollution, rehabilitating contaminated sites and persons impacted;</i> <i>b) establishing fund(s) for the rehabilitation of contaminated sites and persons impacted;</i></p>	<p>This would enable creation of a fund for remediation of sites under the Act and remove ambiguity on the provision of levy of fees, penalties, bank guarantees, etc.</p>

¹⁸ Some examples are (i) A.P. Pollution Control Board vs Prof. M. V. Nayudu (Retd.) & Others on 27 January, 1999 (Supreme Court); (ii) Karnataka Industrial Areas ... vs Sri C. Kenchappa & Ors on 12 May, 2006 (CASE NO.: Appeal (civil) 7405 of 2000 in Supreme Court of India); (iii) Sujatha vs Prema on 20 June, 2005 (Kerala High Court); and (iv) M/S. Ramgopal Estates Pvt. Ltd vs The State Of Tamil Nadu on 2 March, 2007 (Madras High Court)

III. Amendments in Section 5

Add new sub-section (c) as follows:

Power for imposing restrictions, prohibitions, and other issuing necessary directions to control, manage, take as security, use on (a temporary or permanent basis), dispose and appropriate the proceeds of any property for the purposes of remediation/ restoration of property

This will enable the competent authority to do the following:

- Give directions to the owner / occupier to hand over temporary custody and control of contaminated site till remediation is complete
- Enter into a license agreement and take temporary custody of control of a contaminated site till remediation is complete
- Enter into agreement (through orders) with the liable party for assigning roles and responsibilities of the liable party and cost recovery and/or cash out by the liable party for remediation of a contaminated site

Access to a site will be required for emergency measures, for prevention of further contamination and for remediation. When the owner is the liable party, it has to take responsibility of remediation. An agreement (through an order) between the owner / occupier and the competent authority is necessary because in case of remediation, roles and responsibilities vary from one site to another¹⁹. This agreement will be binding in nature and will be the basis for any action that the competent authority can take against the liable party for any non-compliance with the terms and conditions of the agreement. The order formalizing the agreement may need to cover at least the following:

- Site details, nature of contamination, extent of contamination
- Remediation scope
- Roles and responsibilities of liable party, competent authority, third parties
- Temporary custody and control of site
- Rehabilitation and resettlement of current occupier (if different from owner)
- Access to site, site use restrictions, risk management and safeguards
- Monitoring and reporting requirements
- Timeline for remediation
- Payment details
- Financial arrangements, securities, deposits

Where the owner of the land is not the liable party, the competent authority will have to direct the owner / occupier of the contaminated site to vacate the land till remediation is complete. Adequate provision has to be made for the owner and occupier's rehabilitation and resettlement till the remediation is complete and the site's custody and control is returned. In this case, the order will be

¹⁹ Examples are (i) cost of remediation varies from site to site depending on nature of contamination, type of technology to be used etc.; (ii) In some cases it is cost recovery from liable party; (iii) In some it is cash out by liable party; and (iv) In some other cases liable party takes the responsibility of executing the work

in two parts – one relating to the temporary custody and control of site with the site owner (not a liable party) and the other relating to remediation (with liable party).

IV. Amendments in Section 6

This section of the Act will require provisions for laying down procedures and safeguards for remediation of contaminated sites. It is also important to have provisions to make rules under this section for recovery of costs of remediation. The following provisions are suggested:

- **Add new sub-section (g)**

for laying down standards, procedures, safeguards for restrictions and all necessary measure to be adopted for remediation of contamination where contamination may occur due to “hazardous substances” from before the Act and rules under the Act

- **Add sub-section (h)**

for laying down standards, procedures, safeguards for imposing restrictions, prohibitions, and other issuing necessary directions to control, manage, take as security, use on (a temporary or permanent basis), dispose and appropriate the proceeds of any property for the purposes of remediation/ restoration of property

V. Amendments in Section 9

Section (9) currently addresses only those cases where environmental pollution and contamination occurs due to accidents. The suggested amendment of section (9) is to include

“...discharge of any pollutant or any contaminant inherently dangerous in nature in excess of prescribed standards, from before the Act, due to non-compliance to the Act or any rules under the Act or any accidents or any other unforeseen events shall be bound to prevent, mitigate, remediate environmental pollution and damages caused as a result of the discharge...”

Further, the mechanism of cost recovery proposed in Section 9(3) relies on the mechanism of recovery through arrears of land revenue or public demand. Consideration may be given to provide for procedures to recover costs similar to the provisions contained in Securitisation And Reconstruction Of Financial Assets And Enforcement Of Security Interest Act, 2002, where the competent authority gets into an agreement (through orders) with the liable party where liable party keeps its assets as mortgage by depositing title deeds to the authority. If the liable party is unable to pay for remediation then the authority can recover its assets through anyone/more of the following measures:

- taking possession of the secured assets of the liable party including the right to transfer by way of lease, assignment or sale for realizing the secured asset,
- taking over the management of the business of the liable party including the right to transfer by way of lease, assignment or sale for realizing the secured asset,
- settlement of dues payable by the liable party through rescheduling dates of payment

VII. Amendments in Sections 10 and 11

The competent authority shall have the right to enter and remain in possession of the site for the purpose of taking air, water, soil sample or any other substance or for the purpose of remediation of contamination in all factory premises, public land, and private land such as residential complex, buildings, abandoned land and any other place as deemed necessary.

Other than amending section 5, another option to bring in the provision of taking possession of a contaminated land in the E(P) Act may be through amendment of section 10 and 11 of the Act.

Currently, section 10 and 11 of the Act authorizes any authority empowered by the central government to enter *any place* for the purpose of compliance monitoring and taking air, water and soil samples respectively. This may be further qualified by inserting the suggested text as follows:

The central government or any authority, officer empowered by the central government shall have the right to enter and remain in possession of any place such as in all factory premises, public land or private land like residential, non-residential complex, buildings, abandoned land or any other place as deemed necessary for the purpose of taking air, water, soil sample or any other substance or for the purpose of remediation of contamination

VIII. Amendments in Section 15

Section 15 covers the penal provisions, which will need to be strengthened and aligned to the nature and magnitude of contravention. The penal provisions will need to be in addition and not in derogation of any liability, compensation, restitution, administrative action, etc. Penal provisions and thresholds will need to be set at different levels for different types of contravention of law.

In India, there has been precedence where different levels of penalties are assigned for different categories of violations. The Electricity (Act) 2003, Petroleum and Natural Gas Regulatory Board Act, 2006, the Income Tax Act, 1961, the Factories Act, 1948 etc., provide for a differentiated penal provision. These also cover attaching civil liabilities linked to the amount of gain made by contravening the law.

Similarly, the Indian Penal Code (IPC) has also identified different categories of offences and defined level of punishment for each category of offence. Some violations under section 15 of the E(P) Act may be categorized in line with IPC chapter XIV “OF OFFENCES AFFECTING THE PUBLIC HEALTH, SAFETY, CONVENIENCE, DECENCY AND MORALS”.

Our Task 2 review of international practices reveals that unlike India where we have an all encompassing statute like the E(P) Act to deal with all environment related regulations in the country, in countries like USA, Australia, Canada they have Acts that specifically deal with remediation of contamination. So the penal provisions in the Act relate only to non-compliance to pay for remediation or to take responsibility for remediation. For example in CERCLA, if a liable party fails to pay for remediation, the penalty imposed on the party is 3 times the cost of remediation.

Some of the considerations for penalties for remediation (and more broadly for other types of contravention under the E(P) Act are as follows:

- **Providing incomplete or wrong information:** In order to strengthen the monitoring of ongoing hazardous waste management, treatment and disposal activities, and penal provisions should distinguish instances where incomplete or wrong information can lead to competent authority being misinformed about the presence, nature or level of contamination.
- **Civil liability based on economic gain and gravity of offence:** The liability should be based on the amount of economic gain made by the liable party in contravening the law and the gravity of offence. In the context of illegal hazardous waste dumping, the economic cost of management, treatment or disposal may be used as the basis for calculating penalty. Civil liability can be multiple times (say 3 to 6 times). The gravity of offence can be related to the amount of contaminant dumped, the threat to human and environment, history of offence (whether repeat offender), etc. The penal provisions can be graded to reflect the economic gain and the gravity of offence.

- **Contravention of an order, notice or agreement disrupting the remediation process:** When a party does not follow an order, notice or comply with conditions in an agreement in a manner that can delay or impact the remediation process, the penal provision should provide sufficient deterrence for the party to comply or avoid possibility of collusion between liable parties and site owners (where site owner is not a liable party).
- **Contravention of an order, notice or agreement where costs have been ascertained:** When the cost of remediation, compensation, restitution, etc. has been ascertained, the penalty for contravention should be multiple times the liability to ensure compliance.

3.1.2.2 Suggested Amendments to National Green Tribunal Act

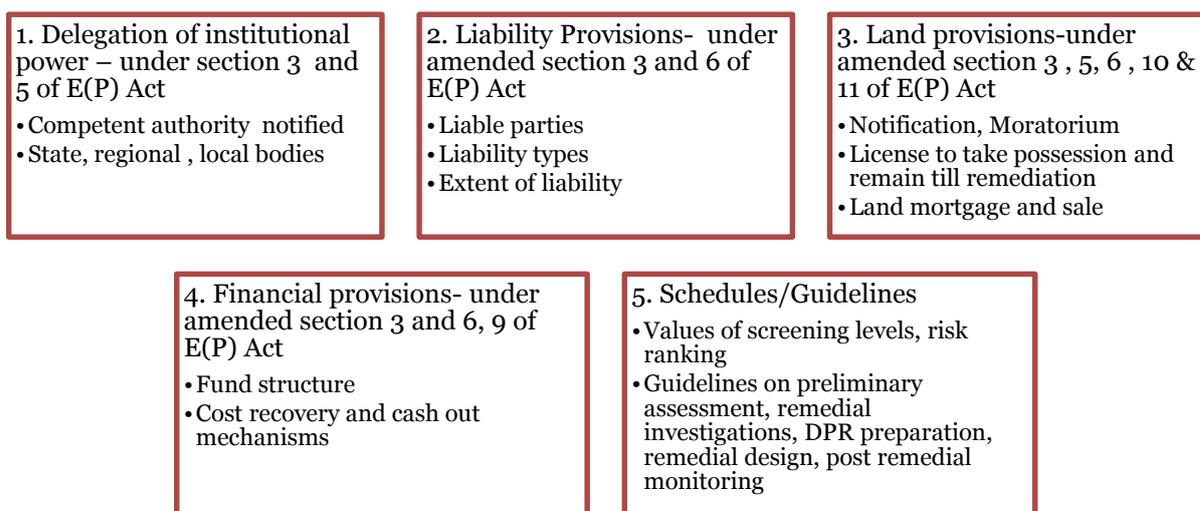
As in case of E(P) Act, the penal provisions of the National Green Tribunal Act may need to be strengthened to enforce an order passed under the National Green Tribunal Act. The following are the options for amending of section 26 of National Green Tribunal Act:

- **Monetary penalty** – Cost of remediation of contaminated sites and possible claims involving public health, personal injury, damage to property, impact on livelihood, etc. on account of contamination may be quite significant. The amount of penalty contained in the National Green Tribunal Act should act as sufficient deterrent and this may require a review of the threshold of Rs. 10 crores currently provided in the National Green Tribunal Act.
- **Imprisonment**- All offences may be punishable as under the Indian Penal Code. For example, in case of death due to contamination, that should be considered as a “murder” and imprisonment should be adjudged as per the provisions of Indian Penal Code and not be limited by the current provisions of imprisonment.

3.1.2.3 Suggested Structure of the NPRPS Rules

Once the amendments to E(P) Act are in place, a new set of NPRPS rules may be notified under the Act. The key aspects that would be covered under the rules are presented in Figure 3 below:

Figure 3: Proposed structure of NPRPS Rules



3.2 Options for Institutional Framework

The approach for an institutional framework begins by identifying activities under the 14-step framework and identifying the competent authority for undertaking the activity. In the first instance, all activities are allocated to existing institutions that are best placed to undertake such activities. If it is a new and unrelated activity, then an assessment is made whether an existing institution can be provided the role and responsibility or whether a new entity may be required. The approach is to minimize creation of new institutions and authorities for two reasons – (a) co-ordination between new and existing institutions may be inefficient, (b) creating new institution and authorities will need to incur extra administrative and establishment costs.

Remediation program will be significantly different from enforcement, particular in the context of orphan sites (site owner is not a liable party) or sites involving multiple parties as that will require significant co-ordination and co-operation between different entities. SPCBs have been the enforcing agencies under other Acts and some SPCBs have caused polluters to clean-up contamination thereby gaining supervision experience. Currently SPCBs are actively involved in remediation in the two pilot states. SPCBs can be supported through program management units if a particular skill or number of people required is on a temporary basis. The choice of developing or hiring capabilities for execution will depend upon the number of contaminated sites (current or in future). Further, SPCBs will certainly require support from the state governments, particularly in matters related to site access, site use, cost recovery, etc.

The central government can delegate specific powers to existing entities supported by appropriate institutional capacity to carry out the tasks. This has been used by the central government under Section 23 of the E(P) Act to delegate specific powers (for example, delegation of power under Section 5 to state governments). On the other hand, there are instances in India where section 3(3) authority has been set up to run specific programs (some of them national), e.g. Central Ground Water Authority, the Loss of Ecology (Prevention and Payments of Compensation) Authority, the Dahanu Taluka Environment Protection Authority, etc. For having multiple section 3(3) authorities in the states, there is a precedence in Ganga Action Plan where at the centre National Ganga River Basin Authority (NGRBA) has been notified under section 3 (3) of E(P) Act as the planning, financing and coordinating body of the centre and states. In the five NGRBA programme states, under section 3(3) of E(P) Act, State Ganga River Conservation Agencies (SGRCA) are notified as the apex decision making body in the states.

An examination of the activities and the likely entities that may be made responsible (Table 1) shows that there are certain activities that may require consideration of whether powers should be delegated to existing institution or setting up a new section 3(3) authority. The activities are:

- a) Notify certain categories of land owners under certain circumstances to submit preliminary assessment reports;
- b) Issue notification restricting site access and activities, as required; de-notify the site when remediation is completed;
- c) Levy fine on liable parties for having caused contamination at site, for not complying with orders or directions; and
- d) Approval of remediation option and remediation costs to be funded through central / state funds (for orphan sites and where the liable party is unable to pay).

Section 20 of E(P) Act allows central government to require any person to submit report, return, statistics, accounts and other information. This power may be used (and delegated as appropriate) to require certain category of land owners under certain circumstances to submit preliminary

assessment reports. Receiving and reviewing additional information as envisaged in point (a) above may not require a new institution / authority. Considering that remediation of contamination of site will have strong local context, the issue of site access and regulating land owners should fall in state's jurisdiction (any other authority will also have to work through state departments) and SPCBs are already engaged in activities restricting access, point (b) above is unlikely to require a separate authority and can be dealt with strengthening the legal provisions, institutional framework and closer monitoring of activities. However, since land is a state subject hence the state land and land revenue department may have to be involved while notifying a site. Consequently, SPCBs may be delegated as a competent authority for carrying out (a) and (b) in consultation with the state government.

The issue of having a civil administrative adjudication system for levying fines, assessing liability parties, assessing cost of remediation, etc. that addresses point (c) above goes beyond fines relating to remediation as it relates to all types of fines and penalties for contravening the law and not following orders, directions, etc. This is certainly needed to shorten the time for levy of penalty which otherwise has to be routed through courts. The only exception is a provision under Hazardous Waste Management Rules in Section 25 where SPCB in consultation with CPCB can levy fine. CPCB at the centre and SPCB in the states are logical choice for being entrusted with civil administrative adjudication powers for levy of fine and penalty with appropriate institutional strengthening, rules and procedures and under the supervision of central / state government as required. The other option would be to appoint an appropriate person in each state environment department and in MoEF as adjudicating officers for all matters relating to fines and penalties under the E(P) Act. Creating a separate national level and state level regulatory authority only for the purpose of levy of fine may not be appropriate.

Approval of the remediation option will require a balancing of the cost of remediation with the choice of restoring the site to its pre-contamination level (and relatively less site use restriction and monitoring post remediation) or restoring the site to appropriate land use level (and potentially more site use restriction and monitoring post remediation). It is a matter of policy (and regulation) that balances use of public funds, achieving public health and environment objectives and increasing utilization of a scarce resource like land. Further the policy choices will need to be exercised in each case of remediation of contaminated site as the situation and circumstances can vary significantly. The matter of policy will need to be carried out by the central government / CPCB and state governments / SPCBs.

3.2.1 Building capacity in institutions:

SPCBs are currently carrying out several responsibilities under E(P) Act, Air and Water Act and rules under these Acts and hence there is a possibility of over burdening the SPCBs. Further, most of the work carried out by SPCBs involve compliance monitoring, sampling, testing etc and does not involve identification of contaminated sites, maintaining computerized database of sites, notification of land, identification of liable parties, recovery of cost from liable parties, actual site remediation, etc. These activities will need new skills and capabilities. Our Task 1 review reveals with respect to infrastructural capacity, almost all the SPCBs reviewed have i) inadequate laboratory infrastructure – all the regional offices do not have regional laboratories (refer the first two rows) ii) current staff numbers below (sometimes significantly below) the sanctioned staff strength. Table 5 below provides the manpower and lab infrastructure details of some of the SPCBs.

Table 5: Institutional capacity of SPCBs

SPCB Infrastructure ²⁰	Regional Offices	Regional Labs	Sanctioned staff	Staff strength
Karnataka	34	8	710	294
West Bengal	10	5	330	246
Andhra Pradesh	24	10	NA	278
Madhya Pradesh	25	12	NA	NA
Punjab	12	2	546	406
Meghalaya	0	0	103	57
Tamil Nadu	31	14	NA	697
Kerala	3	1	NA	NA
Rajasthan	13	12	363	193
Gujarat	22	7		440
Maharashtra	12	6	739	657

NA: not available

Adequate institutional capacity including project management support will need to be provided to the SPCBs. Technically competent staff in engineering, hydrogeology, computer database management, project management finance and accounts, etc. will be required. The requirement will vary from state to state depending on the nature and number of contaminated sites.

3.2.2 Technical capabilities for handling remediation:

The competent authority should have the required skill set mix and manpower strength to supervise/execute a remediation project. The required skill sets and manpower strength can also be supplemented through the accreditation guidelines of third parties for preliminary assessment, remedial investigation, DPR preparation, remediation works, monitoring and evaluation, etc.

Table 6 below maps the skill set requirement for the 14 steps remediation framework. The assessment is based on our review of national and international practices in Task 1 and 2 and inputs from volume 1 of “Guidance document for assessment and remediation of contaminated sites in India” prepared as a part of assignment 2.

Table 6: Mapping of skill set requirement for the 14 steps of remediation cycle

Step	Activities	Skill set required to carry out the step	Experience Required
Identification of probably contaminated sites	Screening of petitions, review preliminary assessment reports	Post graduation in environmental science, environmental toxicology, hydro-geology, chemistry, microbiology, laboratory set up to cross check values, laboratory technicians	Experience in Hazardous Waste production associated with industrial processes, environmental fate, transport and degradation characteristics of contaminants (e.g. mobility, biodegradability), assessment of risks to human health and the environment from land affected by contamination.
	Archiving data in	Graduation in	Large data base

²⁰ From Annual Reports and Websites of SPCBs

Step	Activities	Skill set required to carry out the step	Experience Required
	computerized database with GIS interface	computer science or technology, post graduation in GIS, remote sensing	management, interpretation of topographic and geological maps and reports.
Preliminary assessment, site investigation	Hire third party, review of third party reports	Post graduation in environmental science, environmental toxicology, hydro-geology, chemistry, microbiology, GIS and remote sensing laboratory set up to cross check values, laboratory technicians	Assessment of contaminated sites and interpretation of information obtained from reports and maps on the topography and geology of a site.
Notify, delineate contaminated sites, identify liable parties	Issue directives, notifications, identification of liable parties, communication and negotiation with liable parties, entering into agreements with liable parties, taking over temporary custody and control land in cases	Post graduation in environmental law, social science, communication experts	Dealing with cases involving collection of evidence, tracing pollution sources, establishing capacity to pay of liable parties, etc.; cases on imposing site restrictions under different legislations such as Costal Regulatory Zone notifications, Kolkata Wetland Management Act etc.
National Priority Site Listing	Ranking sites as per ranking criteria	Post graduation in environmental science, environmental toxicology, hydro-geology	The characteristics of contaminations (e.g. mobility, biodegradability) and its potential effects on humans and the environment.
	Maintain computerized database of ranked sites as per set priority	Graduation in computer science or technology	Large database management.
Remedial Investigation	Hire third party, monitoring third party work, review third party reports	Post graduation in environmental science, environmental toxicology, hydro-geology, chemistry, microbiology, laboratory set up to cross check values, laboratory technicians	Assessment of contaminated sites, risk assessment and interpretation of exploratory results in relation to information obtained from reports and maps on the topography and geology of a site.
Remedial Design	Decision making on site specific best remediation option, preparation of detailed project planning for the selected option	Post graduation in remediation technology, civil engineering, finance, law	The characteristics of contaminations (e.g. mobility, biodegradability), performance and cost of remediation techniques, the physical, hydrological and social impact of the techniques.
Funding Requirement identification: availability and	Getting into cash out/cost recovery agreements with liable parties	Post graduation in environmental law, management degree in finance	Legal contract management.
	Management and	Post graduate	Financial evaluation, fund

Step	Activities	Skill set required to carry out the step	Experience Required
generation of fund, financing mechanisms	disbursement of fund	management degree in finance / accounting	management of large projects
Remedial Action	Hire third party, review third party work, manage and monitor disbursement of fund	Post graduation in remediation technology, civil engineering, finance, accounting	Preparation and execution of legal notices/orders for site access. The characteristics of contaminations, civil constructions and excavations, the physical, hydrological and social impacts of the techniques.
Construction completion	Approval of third party work, manage and monitor disbursement of fund	Post graduation in remediation technology, civil engineering, finance, accounting	The characteristics of contaminations, performance of remediation techniques and the physical, hydrological and social impact of techniques.
Post construction completion	Developing long term review plan	Post graduation in environmental science, environmental toxicology, hydrogeology, remediation technology, civil engineering	The characteristics of contaminations, performance of remediation techniques and the physical, hydrological and social impact of techniques.
	Initiating negotiations for post remediation reuse	Post graduation in environmental law, social science, communication experts	Stakeholder engagements, contract management, dealing with cases on imposing site restrictions under different legislations.
Monitoring and evaluation	Hire third party, monitor third party work, review third party report	Post graduation in environmental science, environmental toxicology, hydrogeology, remediation technology, remediation technology, civil engineering	The characteristics of contaminations, performance of remediation techniques and the physical, hydrological and social impact of techniques.
Recover costs	Recovery of costs, levy fines and penalties,	Post graduation in environmental law, finance	Dealing with cases on recovery including debt recovery, arrears of land revenue or public demand
National Priority List Deletion	Marking a site in the computerized database as "remediation completed"	Graduation in computer science or technology	Large database management.
Site reuse/redevelopment	Consultation with stakeholders-state government, interested parties, local community etc.	Post graduation in environmental law, social science, communication experts.	Stakeholder engagements, contract management.

So far as the manpower strength is concerned, review of international practices reveal that on an average, about 20 qualified remediation experts of different level of experience (junior, senior and support staff) are required per site per day for a small site of area less than 1000 m², about 140 experts per day per site for a medium site of area in between 1000 to 100,000 m² and about 400 experts for sites with area greater than 100,000 m². Amongst the experts 60% are engineers- civil, chemical etc, around 20% are geologists and the rest 20% are mix of biologists, chemists, geographers, hydro-geologists, microbiologists, and industrial technicians or technologists²¹. The requirements of capacity enhancement would depend on factors like the size of the inventory, size of the sites in the inventory, number of sites requiring urgent remediation etc. Based on these factors, it may be decided if the competent authority should have all these skill sets in-house, be supported by a long term project management unit or outsource specific work to accredited third parties.

3.3 Options for Financial Mechanisms

Remediation involves significant fund requirement. Based on preliminary estimates (refer Appendix A), the cost of the NPRPS is estimated to be approximately Rs 23,000 crores over the next 10 years. At this stage, it is difficult to determine the extent to which the liable parties can be identified or have the ability to pay. International experience shows primarily public funded remediation programmes at one end to primarily private financed remediation programmes at another end.

Insurance market may develop to offer products that cover liability of remediation. Insurance market may also develop for orphan site owners and occupiers, i.e., where the site owner or occupier has not contaminated the site.

The other potential source of funding could be potential increase in the value of contaminated land post remediation. In case of orphan sites or sites where liable party cannot pay necessitating use of public funds, the potential increase in the value of land may be captured by a voluntary party (potential a developer) who can potentially enter into agreement with non-liable owner of site, pay for remediation and put the remediated site to appropriate use. In the absence of a voluntary party, the competent authority can offer to buy the land from the non-liable owner at the estimated value of land less the cost of remediation. In case that is not feasible, the competent authority can raise a demand on the land owner post-remediation based on a valuation of the increase in land value, subject to a maximum of the amount of public fund used.

Identification of liable parties and making them pay for remediation might be time consuming hence to address these situations it is necessary to allocated a separate fund for specific use in case of urgent remediation. The key sources of public funds are – (i) appropriation from existing fund like the National Clean Energy Fund (ii) levy of new cess (iii) central and state budgetary support (v) fines and penalties collected by SPCBs (vi) grants.

Funding from National Clean Energy Fund has been obtained to the extent of Rs 60 crores for preparing DPR for 12 sites. Further financing may be approved where public funding required does not exceed 40% of the project cost and provided no other public funding sources are used, based on the requirement of funding projects under the National Clean Energy Fund.

At this stage, there are no estimates available on the cost of remediation program or the amount of money that can be recovered from liable parties. On the assumption that public funding will be required for half of the cost of remediation program but in the initial years (first 5 – 6 years), public

²¹ Canadian labour requirements for remediation and reclamation of contaminated site 2006-2009

funding will be required for full cost of remediation before recovery of cost becomes significant. On this basis, 75% of the remediation program cost will need to be funded or approximately Rs. 1,700 crores per annum for next ten years. The amount may be increased or decreased depending on the outcome of the NPRPS.

For reference, the collection of education cess, cess administered by revenue authorities, central excise collections made by industry category and state electricity duty in the last 2 years is set out in Table 7 below²².

Table 7: Types of cess and amounts collected in last 2 years

Cess	Applied through	Collection in 2010-11 (INR Crores)	Collection in 2011-12 (INR Crores)
Education Cess	Corporation tax	8627.57	9661.30
	Income Tax	5125.05	4803.40
	Customs	3130.76	3459.31
	Union Excise Duties	3072.70	3273.22
	Service Tax	1378.95	1873.17
Clean Energy Cess	Union Excise Duties	1066.46	2579.55
State Electricity Duty	Consumption on electricity consumption	8,136	9,128

Levy of new cess can take three forms (or a combination of these):

- Cess on income tax and corporate tax (similar to education cess): At the current levels, the amount of cess for remediation can be set at 10% of the education cess. The underlying premise is that contaminated sites cause public health issues and damage to environment. The activities that can potentially cause contaminated sites produced goods and services that are utilized throughout the economy. Both point to levy of cess across the spectrum of economic activities.
- Central Excise cess on hazardous waste generating industries (similar to Clean Energy cess): At the current levels, the cess for remediation will need to be set at 75% of the clean energy cess to gather sufficient resources. Cess can also be levied on identified activities that generate hazardous waste or handle hazardous substance. International experience (e.g., CERCLA) point to cess levied on chemical and petroleum industries. An examination of the excise collection by categories of hazardous waste generating industries will need to be made to assess the level of cess.
- State cess on turnover, electricity consumption, etc. (similar to the Green Cess levied in Gujarat): State level cess is based on the premise that land (state subject) is a scarce resource and needs to be put into productive use, in addition to addressing public health issues and environment damage concerns. Cess or tax on sale or consumption may be levied based on legislation enacted by the state legislature. At the current levels, the amount of cess for remediation can be set at 20% of the state electricity duty. This is an overall average figure and may vary from state to state as it is possible that states which collect significant electricity duty may not have contaminated sites (in proportion) or vice versa.

²² Tax Revenue: Actual collection figures available for 2011-12, 2012-13

Appendix A. - Programme budget

The National Programme is being developed in three components. These are as follows:

- **Component A – Program Management**
- **Component B – Capacity Building Support**
- **Component C – Remediation of contaminated sites**

Description and costs of these components are as follows:

Basic assumptions:

Particulars	Qty	units
Program period	10	years
Number of potentially contaminated sites identified in <i>Assignment 1 (approximately 600 potentially contaminated sites out of which 100 sites will have completed preliminary investigation under Assignment 1)</i>	600	nos.
Number of sites that will be added per year (for 10 years)	20	nos.
Percentage of contaminated sites requiring remediation to total number of potentially contaminated site	40%	
Total number of sites requiring preliminary investigation (600 + 200 – 150)	700	nos.
Number of sites requiring remediation	280	nos.

The following costs have been budgeted for Component A:

Activity	Assumption	₹ million
Creation and management of a computerised database	Lump sum	150
Creation of online tracking facility	Lump sum	200
Online checking of probably contaminated sites	₹0.1 per site for 700 sites	70
Preliminary assessment by the accredited third party	₹0.5 million per site for 700 sites	350
Remedial investigation for contaminated site requiring remediation	₹1 million per site for 280 sites	280
Preparation of DPR for contaminated site requiring remediation	₹50 million per site based on NCEF funding proposal	14,000
Final clean up report by accredited third party	₹0.25 million per site for 280 sites	70
Periodic (multi-year) monitoring of the remediated site	₹1 million per site for 280 sites	280
Programme management cost	10%	1,540
Total for Component A		16,940

The following costs have been budgeted for Component B:

Activity	Assumption	₹ million
NABL accredited laboratory	20 labs at ₹ 100 million per lab	2,000
Training and other capacity building costs	10 states @ ₹ 20 million per state	200
Total for Component B		₹ 2,200

The following costs have been budgeted for Component C:

Activity	Assumption	INR Million
Remediation of the contaminated site	₹750 million per site for 280 sites	₹ 210,000
Total for Component C		₹ 210,000

Programme Finance and Fund Flow Arrangements

The cost of NPRPS under the SWAp basket, for the completion of identified sites and sites that may come up in future and for other investments in the sector are summarised below:

Particulars	₹ million
Component A: Programme Management	16,940
Component B: Capacity Building Support	2,200
Component C: Remediation of contaminated sites	210,000
Overall requirement of funds	229,140

Appendix B. - Additional details on financial mechanism

Provisions in the Water (Prevention and Control of Pollution) Cess Act, 1977

Sl. No.	Provision	Remarks	Feasibility of replicable provisions for Hazardous waste
1.	The Water (Prevention and Control of Pollution) Cess Act, 1977 recognises the fact that water is getting polluted and that there is a need for a dedicated cess to cover-up for the costs of environmental damage caused by water pollution	This is an Act that works on the assumption that all consumers of water are also polluting the same through generation of wastewater and have to pay for the clean-up.	Hazardous waste also has detrimental effect on the environment, but there is no such specific cess/ specific levy to create a corpus in case of remediation, although a cess of about Rs. 50/tonne is levied for the Clean Energy Fund administered through the Clean Energy Cess Rules, 2010
2.	Cess on water consumed/ supplied by persons carrying on certain industries and by local authorities	The water cess is levied on water consumed by industries/ local authorities	Cess can be levied on all/ specific industries that import/ generate hazardous waste
3.	Basis of calculation - Water consumed/ supplied by such person or local authority at such rates may be specified	Cess is levied based on the consumption and rate as specified	Cess can be levied on the quantity of hazardous chemicals imported or hazardous waste generated
4.	Fixing of meters	Fixing of meters is compulsory to record the quantity consumed	The actual quantity of hazardous waste generated needs to be linked either with import, production or consumption
5.	Rebate - Installs any plant for the treatment of sewage or trade effluent, be entitled to a rebate of twenty five per cent of the cess payable by such person	25% Rebate in case STP/ ETP is installed	In case hazardous waste generators install their own ETP/ facility for disposal of hazardous waste, rebates can be given. This will be an incentive for the industries to set-up their own facilities
6.	Credit proceeds of the Fund go to the Consolidated Fund of India	No separate SPV/ Fund has been created for depositing the cess that is collected	Proceeds should ideally be credited to a non lapsable fund that should be used for remediation/ clean-up/ similar activities
7.	Utilisation of proceeds from the Fund - Central Board and every State Board, from time to time, from out of such proceeds, after deducting the expenses on collection, such sums of money as it may think fit for being utilised under the Water (Prevention and	Activities that are fulfilling the objectives under the Water (Prevention and Control of Pollution) Act, 1974	There should be provisions in which proceeds could be utilised by various agencies

Sl. No.	Provision	Remarks	Feasibility of provisions for replicable Hazardous waste
	Control of Pollution) Act, 1974		
8.	Interest and penalty – Interest \$ 2% p.m. is levied on the arrears. Penalty up to the total arrears of cess can be levied for non-payment	Interest and penalty provisions are available	Interest and penalty provisions need to be incorporated. There is scope for increasing the penalty provisions.
9.	State Acts	<p>The central government has transferred its powers under specific sections to the following states - Andhra Pradesh, Bihar, Gujarat, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh and West Bengal</p> <p>Union list of the Constitution 1. Entry 56 - Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest.</p> <p>State list of the Constitution: Entry 17 - Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I.</p>	Environment is a residual central subject with both the central and state government responsible for regulation and enforcement.

Structure of the Research and Innovation Fund

Sl. No.	Heading	Contents
1.	Introduction	Introduction to the Fund
2.	Background of the India Environment Fund (IEF)	<ul style="list-style-type: none"> • Background of the sector • Reason for setting up • Learning's from past • Learning's from good practices e.g. Super Fund can be documented
3.	Objectives and Salient Features of IEF	<ul style="list-style-type: none"> • Objectives • Essential characteristics of proposals for IEF • Statutory structure • Life of the fund – Start-up phase, Growth phase, Sustenance phase • Inflows to the fund • Components of the fund • Beneficiaries • Project targets • Success and sustainability
4.	Programme Approach and	<ul style="list-style-type: none"> • Details of themes and sub themes for projects to be funded

Sl. No.	Heading	Contents
	Themes	
5.	Applications to the IEF	<ul style="list-style-type: none"> • Applicants • Project funding • Project duration • Selection criteria • Procedure for selection
6.	Funding and disbursement	Details of funding and disbursement for projects
7.	Management structure	<ul style="list-style-type: none"> • Advisory and Project Selection Committee • Fund Managers • Development and maintenance of an Operations Manual
8.	Reach-out and communication	Activities involved under communication for the Fund
9.	Activities not supported	Details of projects that cannot be funded
10.	Role of various agencies	Role of various agencies e.g. MoEF, CPCB, SPCB, etc.
11.	Monitoring and Evaluation	<ul style="list-style-type: none"> • Monitoring • Evaluation • Learning
12.	Reporting, accounting and audit	<ul style="list-style-type: none"> • Reporting to funders • Preparation of budget • Maintenance of accounts • Audit • Contracting and procurement
13.	Risk mitigation	<ul style="list-style-type: none"> • Political • Institutional • Impact • Sustainability • Overlap • Distortion • Capturing of benefits
14.	Way forward and work plan for FY 20XX-XX	

Appendix C. - Testing 14 steps under different scenarios

A. Testing 14 steps for sites where liable party is identifiable but unable to pay (even after assessing assets, bank guarantee, insurance etc) or not identifiable – orphan site

	Responsibility of competent authority
	Responsibility of liable party
	Not Applicable

Identification of Probably Contaminated Sites	Competent Authority receives petition
Preliminary Assessment	Competent Authority hires a third party expert agency who conducts on site work, submits report to Authority for review and approval
Notify, delineate, identify liable party	Competent authority notifies the land as “contaminated” restricts activities using section 5 powers, starts identifying the liable party, assess the payment capacity of the liable party if identified
National Priority List	Competent authority puts up the site in the list based on the PA result
Remedial Investigations	Competent Authority hires a third party expert agency who conducts on site work, submits report to Authority for review and approval
Remedial Design	Competent Authority hires a third party expert agency who prepares DPR and submits report to Authority for review and approval
Fund Generation, Financing	Government fund is used for all steps
Remedial Action	Competent Authority takes possession of the land as per provisions in the amended Environment (Protection) Act , hires a third party expert agency who conducts on site work, submits report to Authority for review and approval
Construction Completion	Competent authority reviews RA report and decides upon completion upon satisfaction
Post Construction Completion	Competent Authority decides upon monitoring, O&M activities to be carried out post remediation
Recover Costs	
Monitoring & Evaluation	Competent Authority hires a third party expert agency who conducts on site work, submits report to Authority for review and approval
NPL deletion	Competent Authority marks the site as “remediated”
Site reuse /redevelopment	Competent authority consults state government, local community, owner of the land, interested private parties for reuse of the land. If there is an owner of the land (if he is not the liable party) then gets into an agreement with the owner for payment of an agreed for reuse of land from increased land value.

B. Testing 14 steps where liable party is identified later but is able to pay:

Identification of Probably Contaminated Sites	Competent Authority receives petition
Preliminary Assessment	Competent Authority hires third party expert agency to conduct PA
Notify, delineate, identify liable party	Competent authority notifies the land as “contaminated” and restricts activities and starts identifying the liable party through land records, HW register etc.
National Priority List	Competent authority be the custodian of the list
Remedial Investigations	Competent Authority hires a third party expert agency who conducts on site work, submits report to Authority y for review and approval
Remedial Design	Competent Authority hires a third party expert agency who prepares DPR, submits report to Authority for review and approval
Fund Generation, Financing	Government fund is used initially, recovered later from liable party
Remedial Action	Competent Authority , using section 5 powers, takes over possession of land as per provisions of the amended Environment (Protection) Act, rehabilitates the owner (if owner is not the liable party), hires a third party expert agency that conducts on site work, submits report to Authority for review and approval. Assuming that the party is identified/ready to pay during actual remedial action, the authority, through an order, instructs the liable party to pay and the liable party pays.
Construction Completion	Competent authority reviews RA report and decides upon completion upon satisfaction
Post Construction Completion	Competent Authority decides upon monitoring, O&M activities
Recover Costs	Competent Authority recovers costs already incurred from the liable party through an order
Monitoring & Evaluation	Competent authority or Liable party hires competent agency who conducts on site work, submits report to Authority for review and approval , liable party pays as per order from the competent authority
NPL deletion	Competent Authority marks a site as “remediated”
Site reuse /redevelopment	Liable party reuses /redevelops the remediated land if it is the owner , else the competent authority hands over the land to the owner

C. Testing 14 steps where liable party is identified, agrees to pay but does not pay later:

Identification of Probably Contaminated Sites	Competent Authority receives petition/land assessment report from the liable party
Preliminary Assessment	Competent Authority hires competent agency to conduct PA
Notify, delineate, identify liable party	Competent authority notifies the land as “contaminated” and restricts activities and gets into agreement with the liable party
National Priority List	Competent authority be the custodian of the list
Remedial Investigations	Competent Authority hires/asks the liable party to hire an expert agency who conducts on site work, submits report to Authority for review and approval, authority orders liable party to pay as per agreement

Remedial Design	Competent Authority hires/asks the liable party to hire an expert agency who prepares DPR, submits report to Authority for review and approval, authority orders liable party to pay as per agreement
Fund Generation, Financing	Government fund is used till liable party pays
Remedial Action	Competent Authority takes over possession of land as per provisions of the amended Environment (Protection) Act, hires expert agency who conducts on site work, submits report to Authority for review and approval, asks liable party to pay as per agreement
Construction Completion	Competent authority reviews RA report and decides upon completion upon satisfaction
Post Construction Completion	Competent Authority decides upon monitoring, O&M activities
Recover Costs	Competent authority recovers cost from secured assets of liable party as per agreement
Monitoring & Evaluation	Competent Authority hires expert agency who conducts on site work, submits report to Authority for review and approval
NPL deletion	Competent Authority marks a site as “remediated”
Site reuse /redevelopment	The Competent Authority sells off the land if liable party is the owner of the land or hands it over to the owner of the land.

D. Testing 14 steps where liable party is identified from the beginning and is able to pay:

Identification of Probably Contaminated Sites	Competent Authority receives petition/ land assessment report from the liable party
Preliminary Assessment	Competent Authority hires competent agency to conduct PA
Notify, delineate, identify liable party	Competent authority notifies the land as “contaminated” and restricts activities and gets into agreement with the liable party.
National Priority List	Competent authority be the custodian of the list
Remedial Investigations	Competent Authority/liable party hires expert agency who conducts on site work, submits report to Authority for review and approval, liable party pays as per agreement
Remedial Design	Competent Authority/liable party hires expert agency who prepares DPR, submits report to Authority for review and approval, liable party pays as per agreement
Fund Generation, Financing	Liable party pays for the all steps
Remedial Action	Competent Authority takes over possession of land as per provisions of the amended Environment (Protection) Act, rehabilitates the owner (if owner is not the liable party), liable party pays Authority/liable party hires expert agency that conducts on site work, submits report to Authority for review and approval, liable party pays.
Construction Completion	Competent authority reviews RA report and decides upon completion upon satisfaction
Post Construction Completion	Competent Authority decides upon monitoring, O&M activities
Recover Costs	

Monitoring & Evaluation	Competent Authority/Liable party hires expert agency who conducts on site work, submits report to Authority for review and approval , liable party pays
NPL deletion	Competent authority marks a site as “remediated”
Site reuse /redevelopment	Liable party reuses /redevelops the remediated land if it is the owner , else the competent authority hands over the land to the owner

Development of National Program for Rehabilitation of Polluted Sites

Output of Task 4- “Preparation of NPRPS”

A Report on National Plan for Remediation
of Polluted Sites

Abbreviations

Act	Environment (Protection) Act, 1986
Assignment 1	Assignment – Inventory and mapping of probably contaminated sites in India
Assignment 2	Assignment – Development of methodologies for national program
Assignment 3	Assignment – Development of legal, institutional and financial framework of national program
CPCB	Central Pollution Control Board
CBIPMP	Capacity Building for Industrial Pollution Management Project
DPR	Detailed Project Report
ERF	Environment Restoration Fund under the Public Liability Insurance Act, 1991
HW(MH&TM) Rules, 2008	Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2008
MoEFCC	Ministry of Environment, Forest and Climate Change
NGT	National Green Tribunal
NGT Act	The National Green Tribunal Act, 2010
PPP	Public Private Partnership
RPS Authority	Remediation of Polluted Sites Authority (proposed)
RPS Rules	Remediation of Polluted Sites Rules (proposed)
SPCB	State Pollution Control Board
TSDF	Treatment, storage and disposal facility

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Appendix A- Contaminated Sites (Identification and Management) Rules, 20XX (Short Term)

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Appendix E – Proposed notification of Remediation of Polluted Sites Authority

1 Introduction

The Government of India, through the Ministry of Environment, Forest and Climate Change (“MoEFCC”) is implementing Capacity Building for Industrial Pollution Management Project (“CBIPMP”) with financial assistance from the World Bank. The two-fold objective of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites and to support the development of a national program for remediation of polluted sites.

CBIPMP has three components. Component 1 deals with strengthening of environment institutions and capacity building to undertake remediation in states. This has three sub-components, development of national program, establishment of Environmental Compliance Assistance Centres in Andhra Pradesh and West Bengal and institutional capacity building of State Pollution Control Boards (“SPCBs”)¹. As part of developing national program under Component 1, three studies are being carried out –

Inventory and mapping of probably contaminated sites in India (“Assignment 1”),

Development of methodologies for national program (“Assignment 2”) and

Development of legal, institutional and financial framework of national program (“Assignment 3”).

Component 2 supports remediation of legacy dump sites in Andhra Pradesh and West Bengal. Pilot sites chosen under this component were a part of the sites identified by SPCBs across the country as a response to the Menon Committee report. Further assessment was carried out by the National Productivity Council for World Bank’s review to confirm the pilot sites under CBIPMP. These pilot sites are – Noor Mohammad Kunta, Katedan Industrial Area in Ranga Reddy District, Andhra Pradesh; Dumpsite in Kadapa, Andhra Pradesh; Old municipal dump site at Dhapa adjacent to East Kolkata Wetlands, West Bengal; Seven chemically polluted sites in the District of Hooghly, West Bengal.

Component 3 of CBIPMP is Project Management. A Project Director at MoEFCC has been appointed and entrusted with overall supervision of the project, development and establishment of the national program, capacity building, outreach and communications, progress reporting and liaison with participating states and agencies. At the state level, project implementation units have been established in Andhra Pradesh and West Bengal to carry out day-to-day project implementation and coordination with other stakeholders.

This report sets out the legal, institutional and financial framework of national program of rehabilitation of polluted sites in India and forms part of Task 4 of Assignment 3. It draws upon the reviews of national and international remediation practices carried out in Task 1, 2 of Assignment 3, gap assessment and options for legal and institutional strengthening in Task 3 of Assignment 3 and work done under Assignment 1 and Assignment 2 and incorporates the comments received during consultation with State Governments, SPCBs, experts, academia, NGOs during stakeholder consultations conducted as part of Task 5 of Assignment 3.

¹ Reference to State Pollution Control Board includes Pollution Control Committee

2 National program framework

2.1 Need for National Program

Areas polluted by toxic and hazardous substances that pose a risk to human health, environment, flora and fauna are commonly referred to as contaminated site or polluted site. Polluted sites may include production areas, landfills, dumps, waste storage and treatment sites, mine tailings sites, spill sites, chemical waste handler and storage sites. These sites may be located in residential, commercial, agricultural, recreational, industrial, rural, urban or wilderness areas.

The ongoing study under CBIPMP has identified an initial inventory of 320 sites across the states, out of which 204 sites are probably contaminated. Site investigation of 100 probably contaminated sites has recently been concluded and the results are being analysed to confirm whether they are contaminated and require remediation. International experience shows that the inventory of sites grows significantly compared to the initial inventory once standards are defined, institutional capacities are built and identification processes are strengthened.

Remediation of polluted sites currently lacks a comprehensive legal, regulatory and financial framework and suffers from weak institutional capacity. Legacy contamination from before the enactment of Environment (Protection) Act, 1986 ("Act") and before the notification of hazardous waste management rules pose challenge in identification of the responsible persons (polluters) for undertaking remediation and paying for remediation costs.

Sporadic efforts at tracking hazardous waste and inventorying hazardous waste dump-sites, lack of expertise in remediation related activities, absence of a comprehensive remediation framework and overburdened and underfinanced SPCBs make the task of remediation particularly challenging. Further, extremely low level of fines and penalty under the Act, lack of adequate treatment, storage and disposal facilities ("TSDFs"), perceived high cost of treatment and disposal of hazardous waste, presence of large number of small and medium enterprises and informal sector engaged in hazardous activity pose significant challenge in preventing ongoing contamination.

International experience shows that remediation is complex and expensive process. High remediation costs have prompted national governments to shift their original approach of complete removal of hazardous substance and focus on remediating appropriate to the site use. Implementing polluter pays principle has understandably been litigious. The use of public funds for remediation when polluters cannot be identified or do not have sufficient resources to pay has raised the debate of tax-payers versus polluters financing remediation.

Remediation activities in India so far have been largely enforced through the judicial process. There have been just few instances where SPCBs have ordered clean-up of polluted sites that were located in industrial estates. T.S.R. Subramanian Committee that reviewed various environmental legislations of the country, in their report of November 2014, strongly recommended insertions of enabling provisions in the Act that would empower the central government to generate public funds for remediation through levy of cess and take over polluted

sites to carry out remediation through state governments and/or through public private partnerships. The report also highlighted the need for a robust institutional mechanism and emphasized on inclusion of institutional and financial mechanisms for remediation of polluted sites in the regional development policies.

A comprehensive national program covering policy, legal, regulatory, institutional and financial aspects is urgently needed to address the growing problem of polluted sites.

2.2 National Program objectives

The National Program aims to:

- (i) eliminate or minimize threat to environment, flora and fauna and human health and safety caused by existing or threatened discharge of hazardous substance
- (ii) achieve sustainable reuse of polluted sites by focusing on efficient and if required alternate use of land resource and wellbeing of local communities, taking into consideration any temporary or permanent relocation
- (iii) ensure that polluter bear the responsibility of remediation and all costs, claims and compensation related to remediation
- (iv) proactively identify polluted sites, investigate each and every identified site and where contamination exists, remediate the site and where contamination cannot be fully removed, employ post remediation measures and site restrictions

2.3 National Program strategy

The strategy for National Program is premised on the following:

- (i) *In the short term*, use appropriate provisions of the existing legal framework to take immediate measures on the polluted sites already identified Assignment 1 , recover remediation cost from the polluters and bring in additional conditions in the environmental clearance and consent procedures to any industry to prevent future contamination
- (ii) *In the long term*,
 - a. strengthen the legal and regulatory framework to enforce *polluter pays* principle, *precautionary* principle and *sustainable development* principle
 - b. usher civil liability regime and administrative adjudication, revise fines and penalties to act as effective deterrents, allow imposition of financial securities for securing performance and minimize the use of public funds
 - c. establish standards and enforcement procedures and follow flexible and enforcement led approach to remediation and significantly upgrade the information and knowledge base on polluted sites

- d. build significant institutional and infrastructure capacity to deal with the complex issues in remediation and leverage internal and external expertise
- e. emphasise the participatory role of State Government in remediation where it relates to land and land use related matters and local community issues including temporary or permanent relocation of site occupiers
- f. secure sufficient and dedicated public funds to finance upfront investigation and design costs and meet financing gaps in remediation

2.4 Outcomes of National Program

The expected outcomes of the National Program, once the legal, regulatory and financial mechanisms have been established and the national program has been rolled out, are as follows:

- (i) A national inventory of sites is prepared and updated on a regular basis
- (ii) Any site in the inventory is assessed and investigated within 3 months from the date of identification or a petition received
- (iii) A polluted site is notified and accorded appropriate priority for remediation within 6 months from the date of determination that such site is a polluted site
- (iv) A polluted site is scheduled for commencement of remediation within 12 months of such polluted site being included in the priority list of sites for remediation
- (v) Polluters remediate polluted sites and pay for all costs in more than 75% of remediation cases
- (vi) More than 90% of remediated sites are put to productive reuse within 2 years of completion of remediation and post remediation measures.

2.5 National Program framework and measures

There are a number of measures that would need to be incorporated under the National Program. These are described below.

- (i) Policy measures: The Central Government would establish policy on remediation that balances use of public funds, achieves environmental and human health objectives and encourages efficient utilisation of scarce land resource. The State Government would provide support in encouraging productive reuse of remediated sites.

Legal and regulatory measures: This would be divided into short term and long term measures. Short term measures will be based on existing environmental legislations to take immediate action on the polluted sites identified in Assignment 1 through issuance of appropriate notifications to delegate authorities to Central and State Pollution Control Boards for planning and execution of remediation, recover the cost from the polluters and issue technical guidelines. In the short term appropriate measures would be taken towards prevention of future

contamination through inclusion of provisions under consent conditions, Terms of Reference for Environmental Impact Assessment, Hazardous Waste Authorisation for technology consideration, periodic monitoring to prevent future contamination.

In the long term, appropriate amendments to existing environmental legislations along with new remediation related legislation (new Remediation of Polluted Site rules) would be necessary to define the standards of contamination, establish and enforce a duty-to-report regime to expand the knowledge base of polluted sites and determination of persons responsible for remediation. The determination of responsible person would also lead to determination of violation of the Act and rules that led or contributed to contamination. A civil liability regime would be introduced and administrative adjudication would be provided. The provisions of administrative adjudication and civil liability are present in a number of instances in India. Administrative adjudication is increasingly being used in India ranging from nuclear damage, electricity regulations, oil & gas regulations, information technology regulations, securities regulations, etc. An order or direction consequent to administrative adjudication would be subject to the appeal under the National Green Tribunal Act, 2010 (“NGT Act”). Fines and penal provisions would be strengthened. The regulatory framework would follow flexible and enforcement led approach to remediation, i.e., all efforts would be made to find the person responsible for contamination and direct the person to carry out remediation related activities. Voluntary remediation would be provided where a discharge has occurred but contamination thresholds are not reached to encourage early action and prevent threats to human health, environment, flora and fauna.

Institutional measures: Detailed step-by-step remediation process and technical guidance on methodologies, tools and techniques would be developed for agencies engaged in remediation related activities. The roles and responsibilities of authorities, including establishing new authorities (at the centre and if required in the states) in the long term, would be defined and appropriate capacity development programs would be planned and implemented to enable the authorities to discharge their responsibilities. In the short term it would be a state-led remediation mechanism where a committee comprising State Board, District Collector, and Central Ground Water Board in line with NGT Rules 37 may be established at the states for supervision of activities. Role of private and public sector organisations in remediation process would be emphasised and encouraged through establishing criteria for engaging third parties and international expertise would be leveraged to develop local expertise. Suitably qualified staff should be retained for program management and remediation implementation. General public would be informed about polluted sites, hazards of contamination and safety precautions. Local communities would be engaged in the remediation process. A program for research and development on remediation techniques would be undertaken to develop India specific remediation techniques. Public health authorities and research institutions would be engaged to develop response to health hazards relating to contamination.

Financial measures: In the short term a trust fund like Clean Ganga fund that utilizes money for Corporate Social Responsibility (CSR) for remediation purposes would be set up. Revoking Bank Guarantee from the polluters in the event of detection of pollution would be an important instrument for cost recovery for remedial measures in the short term. In the long term, the financial mechanism would involve creation of a public fund called the National Environmental Restoration Fund and setting up a mechanism through cess for financing. The fund would be

used for remediation related activities. Enforcing cost recovery from responsible persons would ensure replenishment of the fund. Over the medium term, the insurance market would be encouraged to develop products suitable for polluted sites.

Site inventory: The information base on sites would be developed by preparing initial site inventory, keeping information updated throughout the remediation process, prioritizing polluted sites and developing information base for identification of polluted sites on an ongoing basis.

These areas are set out in Table 1: Framework for National Program- Short Term

Policy, legal and regulatory framework	Site inventory	Institutional mechanism	Financial mechanism
(i) Notifications under Environment (Protection) Act 1986 (ii) A set of rules to provide for procedures, standards	(i) Initial site inventory	(i) A state-led remediation mechanism with State Government as the nodal agency (ii) A committee comprising State Board, District Collector, Central Ground Water Board, Academia in line with NGT Rules 37 (iii) Technical Guidelines for remediation	(i) Setting up trust fund (ii) Revoking Bank Guarantee for cost recovery (iii) Arrears of Land Revenue (iv) Waste exchange between industries (v) Public Private Partnerships

Table and 2 below and further described in chapter 3 to chapter 6 of this report.

Table 1: Framework for National Program- Short Term

Policy, legal and regulatory framework	Site inventory	Institutional mechanism	Financial mechanism
(iii) Notifications under Environment (Protection) Act 1986 (iv) A set of rules to provide for procedures, standards	(ii) Initial site inventory	(iv) A state-led remediation mechanism with State Government as the nodal agency (v) A committee comprising State Board, District Collector, Central Ground Water Board, Academia in line with NGT Rules 37 (vi) Technical Guidelines for remediation	(vi) Setting up trust fund (vii) Revoking Bank Guarantee for cost recovery (viii) Arrears of Land Revenue (ix) Waste exchange between industries (x) Public Private Partnerships

Table 2: Framework for National Program- Long Term

Policy, legal and regulatory framework	Site inventory	Institutional mechanism	Financial mechanism
(i) Policy statement by Central Government on remediation of polluted sites (ii) Policy statement by State Government on reuse of remediated sites (iii) Amended Environment (Protection) Act 1986 (iv) New rules for remediation of polluted sites	(iii) Initial site inventory (iv) Plan to identify sites on ongoing basis and investigate sites identified (v) Priority list of polluted sites (vi) Site registry	(i) A central, quasi-judicial authority notified under section 3/3 of amended Environment (Protection) Act 1986 - setting up Remediation of Polluted Sites Authority (ii) Roles and responsibilities of authorities (new and existing) (iii) Detailed step-by-step process for undertaking remediation (iv) Capacity development program (v) Guidelines for remediation (vi) Criteria and process for involving expertise in private and public sector organisations (vii) Platform for providing access to information to general public (viii) Outreach and communication program (ix) Research and development program	(xi) Share of public funds and levy of cess (xii) Set-up of Fund for remediation and process for appraisal and approval (xiii) Cost recovery (xiv) Insurance market development program

2.6 Additional measures

Outside the National Program, there are two key measures that would need to be implemented to reduce the occurrences of polluted sites. In order to reduce the occurrences of polluted sites, the National Hazardous Waste Management Strategy would need to be effectively implemented including measures relating to tracking hazardous waste, establishing additional TSDF capacities and strengthening the infrastructure of regulatory bodies. It is essential to create a time bound plan and annual reporting on its implementation to establish suitably located and sufficient number of TSDFs appropriate to the level of hazardous waste generation (over the next 10 years) in each of the states where hazardous waste is generated. The processes and systems to track in real time, hazardous waste handling and management in the states would need to be strengthened and the results of such tracking would need to be effectively used in granting (or refusing) consents and authorisations to existing operations. Monitoring and supervision of hazardous waste generation, transport and disposal by small and medium enterprises and informal sector would need to be strengthened.

Further, there is an urgent need to strengthen the overall institutional and financial capacity of Central Pollution Control Board (“CPCB”) and SPCBs so that there is sufficient capacity available for discharge of their roles and responsibilities under various acts, rules and notifications. Weak institutional capacity may otherwise impact the SPCBs’ capacity to prevent occurrences of polluted sites in future or reduce ongoing contamination.

2.7 Contamination covered under National Program

There are a number of areas that may overlap with the National Program including contamination caused by different types of waste and co-mingling of different substances, situations involving other agencies (e.g., disaster and accidents) and interplay with ongoing schemes involving rehabilitation and remediation (e.g., river and lake cleaning schemes). It is necessary to clarify the scope of National Program with respect to the actual or anticipated overlap and some of these aspects are set out below.

2.7.1 Substances covered

The National Program applies only to sites contaminated by hazardous substances that will be notified by the Central Government in relation to soil standards under sub-section 2(a) of section 6 of the Act. If there is a co-mingling of hazardous substances covered under the National Program with nuclear waste, the provisions of the Atomic Energy Act, 1962 (33 of 1962) would apply irrespective of the level of contamination by hazardous substance.

If there is co-mingling of hazardous substances covered under the National Program with mining waste, bio-medical waste, municipal solid waste, plastics, e-waste and battery waste, then unless the level of contamination by hazardous substance exceeds the threshold specified and then only to the extent of removal of hazardous substance would be covered under the National Program. The cost of removal of other types of waste or removal of hazardous substance below the threshold specified in the National Program would not be covered.

2.7.2 Disaster and accidents

If there is a disaster or accident that involves hazardous chemicals, the provisions of ensuring chemical safety would apply and the remediation process would be initiated after the safety measures have been completed.

2.7.3 Interaction with initiatives on cleaning water bodies

The ongoing programs on river conservation should not influence or be influenced by the National Program. However, lakes that are contaminated by hazardous substances (covered under the National Program) may be covered provided they meet the criteria set out under the National Program. Oil spills would be governed by the Merchant Shipping Act of 1958, the Marine Insurance Act of 1963 and the Merchant Shipping (Prevention of Pollution of the Sea by Oil) Rules, 1974.

3 Policy, legal and regulatory framework

This chapter contains recommendations on the policy context, legal and regulatory framework of remediation – in short term and long term.

For short term, the chapter examines how the existing regulatory framework may be utilized to immediately address the issue of remediation of polluted site till the time the long term approach with regulatory amendments is in place and accordingly provides recommendations. “Contaminated Sites (Identification and Management) Rules, 20xx” to be notified under the existing Act for short term is enclosed as Appendix A, a procedure manual to cover various aspects relating to polluters, remediation costs, actions to be taken by the government authorities in the short term etc. is provided in Appendix B as “Enforcement Policy (Contaminated Sites)”. References to these appendices have been made in relevant sections of the report.

For long term, recommendations in this chapter have been made on the amendments to the Act and amendments to the NGT Act as applicable. References have been made to the relevant sections of these acts and rules while describing the recommended amendments. The text of amendments to the Act is provided in Appendix C. New RPS Rules have been recommended and the draft of new RPS Rules is attached at Appendix D. The draft of notification for establishing a new section 3(3) authority (under the Act) is attached at Appendix E.

3.1 Short Term Measures

Based on review of several landmark judgements by the Hon’ble Supreme Court and the National Green Tribunal (NGT), it is evident that Sections 3&5 of the Act are sufficient to deal with all matters related to environmental exigencies such as requirement of emergency /immediate remediation of contamination in the short term.

The application of Section 3 of the Act is wide and it empowers² the Central Government [or its delegate] to take all measures as it deems necessary for the purpose of *protecting and improving the quality of environment*.

The powers that can be exercised under Section 5 of the Act are interpreted by the NGT as *polluter centric* and it can be exercised by invoking *precautionary and polluter-pays principle*. As a consequence, Section 5 powers will include giving directions for the removal of sludge, for undertaking remedial measures and also the power to impose the cost of remedial measures on the offending industry/polluter and to utilize the amount so recovered for carrying out remedial measures.

² Reference: Supreme Court judgment of Indian Council For Enviro-Legal & Ors vs Union Of India And Ors on 13 February, 1996:

3.1.1 Application of Liability in the Short Term

Establishing an appropriate liability regime using *polluter pays* principle is central to the National Program both in short term and in long term. The *polluter pays* principle has been part of the National Environment Policy and the environmental jurisprudence in India. The *polluter pays* principle is interpreted by Hon'ble Supreme Court as

...demands that the financial costs of preventing or remedying damage caused by pollution should lie with the undertakings which cause the pollution or produce the goods which cause the pollution. Under the principle, it is not the role of the government to meet the costs involved in either prevention of such damage or in carrying out remedial action because the effect of this would be to shift the financial burden of the pollution incident to the taxpayer. [1996 AIR 1446]

There is a related aspect that was clarified by Hon'ble Supreme Court on the measure of liability that an enterprise engaged in hazardous or inherently dangerous activity that

...if any harm results on account of such activity, the enterprise must be absolutely liable to compensate for such harm and it should be no answer to the enterprise to say that it had taken all reasonable care and that the harm occurred without any negligence on its part.

...Such hazardous or inherently dangerous activity for private profit can be tolerated only on condition that the enterprise engaged in such hazardous or inherently dangerous activity indemnifies all those who suffer on account of the carrying on of such hazardous or inherently dangerous activity regardless of whether it is carried on carefully or not. [1987 AIR 1086]

The Hon'ble Supreme Court also excluded the defences available under the Rylands vs Fletcher case to be available under the principle of absolute liability. These defences are (a) act of stranger over which the defendant has no control; (b) act of God; (c) statutory authority ordering or allowing a person to carry out a particular activity; (d) consent or benefit of the claimant or plaintiff.

Polluter pays principle is also articulated in the context of discharge of environment pollutants in excess of standards due to accidents or unforeseen events under Section 9 of the Act where the expenses of remediation may be recovered from person responsible for discharge and the person responsible for the place at which such discharge occurs.

The phrases *responsible person* or *person responsible* have been used in this report to denote organisations or individuals who have the responsibility to remediate polluted site and pay for all costs related to remediation. International liability regimes hold current or previous site owners or occupiers and in some instances, generators and transporters of hazardous substance responsible for remediation.

For application of liability in the short term without bringing in any amendment to the Act, the issues that needed evaluation are

- a) If liability can be applied retro actively as per the current form of the environmental legislations in the country i.e., without introducing retroactivity as a part of the amendment of the Act

- b) If liability in terms of remediation cost can be apportioned in case of multiple polluter-multiple pollutant situation i.e., without introducing joint and several liability as a part of the amendment of the Act

3.1.2 Retroactive liability

To evaluate applicability of retroactive liability in the short term it is required to distinguish between penalty and compensation while dealing with regulatory matters related to remediation of contamination and/or environmental damages. Based on the review of various judgements of the Hon'ble Supreme Court and the NGT, compensation is understood to be applied for remedying damage caused to the environment and penalty is imposed for causing pollution due to regulatory non-compliance. As per Article 20 (1) of the Constitution, retroactive applicability is not permissible in case of imposing 'penalty'. In case of environmental laws, NGT³ in their various judgements have described them as socio-beneficial legislation enacted to protect the environment for the benefit of the public at large and hence interpreted them as being compensatory and retroactive in nature. As a consequence liability imposed on the responsible persons for recovering cost of remediation of polluted sites would be retroactive in nature even in the existing form of the environmental legislations.

3.1.3 Apportionment of liability

Section 17(2) of the NGT Act deals with the issue of apportionment of liability. This reads as follows:

If the death, injury or damage caused by an accident or the adverse impact of an activity or operation or process under any enactment specified in Schedule I cannot be attributed to any single activity or operation or process but is the combined or resultant effect of several such activities, operations and processes, the Tribunal may, apportion the liability for relief or compensation amongst those responsible for such activities, operations and processes on an equitable basis.

The method of apportioning cost on equitable basis taking into consideration the judgment in *Oleum Gas Leak case (supra)* will be necessary for facilitating an objective decision making process when faced with complex multi-polluter and multi-pollutant situation. The cost of remediation would be driven by the type and volume of environmental pollutant(s) to be removed from the environment and the nature of remediation measure(s) adopted to remove the pollutant(s), considering the context of the site and setting, remediation objectives and feasible remediation options. If multiple polluters have released multiple environmental pollutants over a period, identifying each element of remediation cost associated with removing each type of environmental pollutant in a given site and setting context and linking it to the release by each of the polluters can become fairly challenging. This is all the more reason to develop a method to minimize legal challenge of not having examined all parameters for apportioning costs. The key drivers for remediation cost and additional parameters based on the foregoing considerations are:

³ to Himmat Singh Shekhawat V/s State of Rajasthan & Ors etc 13 January 2015

- (a) Weight / quantity of discharge of each environmental pollutant (in case multiple pollutants are involved) less any amount recovered /remediated already done: The total quantity of discharge (since the unit came into operation or for the last 40 years) provides an indication of the extent of environmental pollutant that may have been contributed, which may be present in the environment. The weight / quantity of discharge can be based on available records or estimated based on production data or installed capacity and years of operations. Wherever the data is missing, this would be sought from the alleged polluters or estimated based on the financial, operational and environmental records and correlated with material balance or water balance as the case may be.
- (b) Excess release of environmental pollutant (beyond the limits stipulated): Excess release of environmental pollutants, i.e., releases in excess of consent conditions or releases done in absence of consents or in violation of orders and directions, would bear a larger share of remediation costs. This aspect is not punitive in nature. Consent conditions, effluent standards and hazardous substances classification and related matters are manifestation of precautionary principle. These are established with the intent to anticipate and prevent the causes of environment degradation. It is infeasible to obtain real-time environmental information for all the land and water bodies across the country so the limits are established by making certain assumptions about the ambient concentrations and carrying capacity of the environment before allowing an industrial unit to operate or continue operations. Excess releases distort the environmental planning and permitting process which is central to protecting and improving the quality of environment.
- (c) Financial capacity of the polluter: This parameter has been used in the judgments of the Hon'ble Supreme Court while apportioning remediation costs. There are several indicators like revenue, gross profit, net profit, free cash flows, etc. to measure the financial capacity of the polluter. Based on interpretation of compensation amounts directed by the Hon'ble Supreme Court, it appears that revenue and gross profit (profit before interest, depreciation and tax) have been commonly employed. For the National Progra, the simple measure of total annual revenue of the organization would be used as the parameter for apportionment.

Based on the above factors, share of remediation cost is proposed to be calculated as:

$$\text{Score of polluter } i, \text{ } SC_i = \left\{ \left(\frac{\text{Quantity released by polluter } i}{\text{Minimum quantity released amongst all polluter}} \right) \times \left(\frac{\text{Revenue of polluter } i}{\text{Minimum revenue amongst all polluters}} \right) \times \left(\frac{\text{Excess Release Factor}}{\text{Factor}} \right) \right\}$$

$$\text{Percentage share of cost of polluter } i = \left(\frac{SC_i}{\sum_{i=1}^n SC_i} \right)$$

Where, Excess Release Factor is between 1 and 100; 1 for fully compliant operations since commencement of operations and up to 100 for repeated violations of the consent provisions or operating without consents.

3.1.4 Prevention of contamination

The other important matter that would be addressed in the short term is prevention of future contamination. For that it is necessary to expand the information base on environmental conditions within and around the industrial units, whether new or existing, and take action if there is suspected pollution. To implement this, it is important to embed site assessment in the following processes.

- (a) obtaining or renewing consent under section 25 and 26 of the Water Act, 1974;
- (b) obtaining environmental clearance under the Environment Impact Assessment Notification 2006, for all category “A” projects and category “B” projects;
- (c) obtaining or renewing authorisation under rule 5 or registration under rule 8 or permission for import of hazardous waste under rule 16 of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 (referred to as “HW Rules”).

The frequency of site assessment may be stipulated in the consent, authorization or clearance process depending upon criticality of site and nature of activity. The coverage of industries proposed above may be reviewed from time to time on the basis of site/region specific baseline scenario and where applicable (i) increase the frequency of site assessment and investigation in certain category of industries or industries located in certain areas, through filing such reports along with annual returns under the relevant Acts, (ii) exempt certain category of industries or industries operating in certain geographic area where the risk of contamination is negligible.

In addition, there is a requirement to include the requirement of industrial units adopting pollution prevention technology as a part of the Terms of Reference of Environment Impact Assessment and budget for the prevention technology in the Environment Management Plan.

3.1.5 The regulatory framework- short term

To exercise the existing powers under Section 3 and 5 of the Act with respect to the National Program a notification to delegate the authority of Central Government under the following sections of the Act would be required:

- i. Section 3(2)(ii) of the Act for planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution in the state (to the State Board) and at the national level (to the Central Board);
- ii. Section 5 of the Act for issuing directions relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental pollution in the state (to the State Board) and at the national level (to the Central Board);
- iii. Section 20 of the Act to require any person, State Government or authority to furnish information relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental pollution (to the State Board).

A separate set of rules called “Contaminated Sites (Identification and Management) Rules, 20xx” would be issued under section 3(2)(iii), 6(2)(a) and 25 of the Act that provides for standards for soil and water pollution, carrying out mandatory site assessment and reporting, determination of a contaminated site and related matters.

A procedure manual covering various aspects relating to polluters, remediation costs, apportionment of costs, actions to be taken by various government authorities, directions to be given, co-ordination amongst government authorities, linkages with existing consents, clearances and authorizations, would be provided as a template to the government authorities to be suitably amended and adopted as “Enforcement Policy (Contaminated Sites)”.

The technical guidelines for remediation prepared under Assignment 2 would be notified by the Central Government in exercise of its power under section 3(2)(xiii), 6 and 25 of the Act.

3.2 Long Term Measures

3.2.1 Policy context

A polluted site not only causes threat to environment, flora and fauna and human health but also impacts the use of land resource, use of water, livelihood, property, etc. While the primary objective of remediation is to eliminate or minimize the threat to human health, environment, flora and fauna from the polluted site, setting the level of reduction in contamination to be achieved and the manner by which it should be achieved involves careful consideration of several important and often competing priorities in a multi-stakeholder context.

If a complete removal or treatment of contaminant is undertaken, it is likely to be significantly expensive but will allow land and water resources to be used without restriction. On the other hand, the contaminants may be partly removed or treated, pathways from the source of contamination to receptor may be severed and/or the receptors may be protected or removed to the extent required for a specific site activity which may bring down the cost of remediation but may require monitoring post-remediation and certain safeguards, i.e., restricting the activities that a site can be used and restricting the use of land and water resources. There are likely to be public perception issues in case contamination is not completely removed and there may be a threat of future breach of safeguards.

Remediation is an expensive process and the cases where a responsible person is identified early on and agrees to pay for remediation without contesting may be few. Public funding will be required to support remediation but there are limits to how much remediation can be supported by public funding. Extensive use of public funding would also go against the *polluter pays* principle.

The value of site associated with current and future land use is another dimension that needs to be considered. Remediation activities would impact the value of site. The nature of activities that are allowed post remediation (including any changes in land use as well as any restrictions on site activities) would also impact the value of site.

International experience has shown that countries have moved away the approach of complete removal or treatment of contaminant because of significant costs. International experience also points to development of appropriate administrative controls to strictly enforce land use and site activity restrictions on a long term basis.

Given that the context of site contamination and remediation will vary significantly in the country (from one place to another), the policy cannot be prescriptive and should allow for case-to-case determination based on certain key principles. This also implies that a decision making body will be required to make the determination on a case-by-case basis. There are three key decisions that a competent authority would have to make:

- (a) How sites should be prioritized for remediation: The risk to environment and human health are key determinants for a risk based scoring proposed under the earlier consultation. However, there are other parameters like the availability of funds, value of land resource, public perception, support from local community, etc. that may need to be considered when deciding on the priority of sites.
- (b) To what level and for what purpose should the sites be remediated: If sites are required to be remediated such that any land use and site activity can be undertaken, the costs are likely to be significant. On the other hand, if the sites are remediated to allow only specific site level activities, the costs may be low but this may reduce the value of the land and there may be possibility of future breaches of contamination if site level restrictions are not observed. For a remediated site that has residual contamination, appropriate controls on land use and site activity restrictions would need to be established to ensure that these are not breached.
- (c) How to put the site to productive reuse: Remediated sites may suffer from public perception about being inherently dangerous and may require incentives and education for productive reuse. Site reuse will also depend upon the level and extent to which the site has been remediated and the land use and site restrictions that may need to be employed.

Some of the key principles to assist in decision making would include:-

- (a) Examine all available options – This means that all options including full or part removal or treatment of contaminants, severing pathways from the source of contamination to receptor and / or protecting or removing the receptors for current and alternate site activity and land use should be examined. Complete removal or treatment of contaminants is not the only policy option.
- (b) Allow staged process – This means that sites may be progressively remediated as and when more financing is available. For instance, if there is a site that poses immediate threat to human health and environment, safety measures may be undertaken to contain the risk and remediation may be undertaken once there is funding available.
- (c) Minimize use of public funds - This means that all efforts must be made to identify persons responsible for remediation and assessment should be made on the capacity to pay and remediation for such sites should be undertaken on priority where such persons are found

and are able to finance remediation, i.e., where there is little or no public funding required. Further, an assessment of increase in land value should be made and sites where land value increase due to remediation (and associated land use change) is able to finance, these should also be prioritised. Where there are no other financial resources available, public funding should be used for financing remediation option that offers lowest cost on a life-cycle cost basis (remediation activities and post-remediation activities).

All remediation will require support of the relevant State Government for land use changes, site activity control, promoting reuse of land and local community matters. A remediated site that has residual contamination would be subject to appropriate controls on land use and site activity restrictions and an appropriate mechanism involving the land and development authorities, revenue authorities, industrial development agencies, etc. would need to be established such that appropriate land use and site activity restrictions are in place and there are multiple levels of checks and balances to ensure that these are not breached. Further, reuse of a remediated site would require appropriate encouragement, awareness, incentives, planning and development and a policy promoting reuse of previously polluted sites may be required. Finally, there may be instances that the site occupiers (not being responsible person) may be impacted by remediation related activities and may require to follow site administration directions and in some cases, may need to be relocated.

3.2.2 Remediation as a distinct activity

Amendment would be made to the Act to recognize remediation of polluted sites as a distinct and separate activity. Key definitions of *polluted site* and *remediation* would be added in Section 2 of the Act. Remediation definition will include the processes relating to identification and removal of contaminants as well as restoring the quality of environment, flora and fauna. The powers of Central Government under Section 3 of the Act would be expanded to cover all activities related to remediation of polluted sites. The scope of certain existing powers would be expanded to cover all public or private land where contamination is suspected and not just at the facility or industrial premise.

The power of Central Government to make rules under Section 6 of the Act would be expanded to cover all aspects of remediation. This would enable the Central Government to notify Remediation of Polluted Sites Rules (“RPS Rules”). RPS Rules would contain further details on remediation related activities. Section 8 of the Act would be clarified to indicate that handling of hazardous substance on a polluted site will also be governed through the regulations.

3.2.3 Liability regime for polluted sites

The aspect of liability regime has been introduced and explained in section 3.1.1. In subsequent chapters we have discussed various aspects of liability that would be introduced as amendments to the Act in the long run.

3.2.4 Liability for certain aspects

In the context of polluted sites, there are five distinct aspects of liability:

- (a) there may be an interim (from the time of contamination to the time of remediation) loss or permanent loss of human health, property and loss of livelihood

- (b) there may be cost of providing relief and treating humans affected by contamination and cost of rehabilitation of humans that have been treated
- (c) there may be an interim (from the time of contamination to the time of remediation) damage or permanent damage to environment and ecological services, damage to flora and fauna
- (d) there may be cost of removing contaminants from environment, flora, fauna and cost of restoring the quality of environment, flora and fauna once contamination has been removed
- (e) there may be penalty for actions that led or contributed to contamination.

Items (a) and (b) relate to providing relief, aid and compensation to people affected by contamination and these would continue to be provided through the judicial mechanism of NGT and the district administration for the following reasons:

- (i) Long period of latency for diseases arising from exposure to hazardous substances
- (ii) Difficulty in establishing the causal connection between exposure to hazardous substances & an injury/disease
- (iii) NGT has specific mandate on relief and compensation to the victims of pollution and other environmental damages. There is no need for adding this aspect under the National Program

Items (c) and (d) relate to removal of contaminants and rehabilitation of environment, flora and fauna and would be governed under the National Program. Item (e) relates to violation of the Act and the rules thereunder and would be governed under the provisions of the Act which would be strengthened. Appeals relating to these matters would continue to be adjudicated by the NGT.

3.2.5 Types of liability

Based on the foregoing discussion, two categories of persons are responsible - one, who is responsible for discharge of hazardous substance and two, who is person responsible for the place where discharge occurs. Further, two distinct classes of liabilities appear to emerge:

- (i) Responsible persons may be subject to absolute liability (no-fault liability without any exception) if they are ordinarily engaged in hazardous activity or are aware of such activity;
- (ii) Responsible persons may be subject to fault based liability where such persons are not ordinarily engaged with hazardous activity provided they have not consented to handling or dumping of hazardous substance or are not aware of such activity.

Thus, any person who delays or obstructs the remediation process would be absolutely liable as he would have willingly and knowingly contributed to ongoing contamination of the polluted site.

3.2.6 Vicarious and extended liability

There may be instances where the hazardous activity that caused contamination may have been carried for the benefit of another entity without the other entity being involved in the management of day-to-day operations. In this context, the following possibilities arise:

- (i) **by contract:** another company has outsourced the hazardous activity to the industrial unit causing discharge
- (ii) **by ownership or control:** the industrial unit causing discharge or the owner or occupier of premise where hazardous substance is discharged may be part of a larger business group such that there is another ultimate beneficiary of the activity or another person exercising overall control, e.g., parent company or promoter group, owner who leased out the property to hazardous activity

In both these instances, it is reasonable to believe that the company that outsourced the activity or owner/parent company would be aware of the nature of hazardous activity that is being conducted by the industrial unit where the discharge occurs. Keeping with the principle that absolute liability is attached to industry that is engaged in hazardous activity, the liability would extend to companies that have commissioned such activities, whether through contract or through control, as specified in (a) and (b) above. This is especially relevant in the context of a small and medium enterprise (SME) who is carrying out hazardous process for large corporate customers.

3.2.7 Joint and several liability

There may be instances when multiple persons may be involved such that it is not possible to trace the exact activity or unit that caused discharge or the site where the discharge originated. In this context, the following possibilities arise:

- (i) **by source:** discharge of a specific hazardous substance has occurred in an industrial cluster where several units are engaged in handling of specific hazardous substance but it is not possible to attribute it to a specific industrial unit;
- (ii) **by sequence:** hazardous substance discharged has migrated to multiple locations or an industry discharged the hazardous substance on a site that was removed by another person and deposited on another site which was in turn used by a third person for land-filling another site such that it is not possible to identify the specific contributors to migration of contamination;
- (iii) **by time:** a site has changed ownership multiple times but the time when the discharge may have occurred or the owner that may have caused cannot be established.

Based on the concept of *onus of proof*, if a responsible person cannot be conclusively determined, all alleged responsible persons would continue to be jointly and severally liable and responsible for remediation.

The method of apportioning cost on equitable basis taking into consideration the judgment in Oleum Gas Leak case (supra) would be necessary for facilitating an objective decision making process when faced with complex multi-polluter and multi-pollutant situation.

3.2.8 Burden and standard of proof

Burden and standard of proof seek to answer the question – *who* must prove and *what* must be proven. Traditional liability regimes require certain standard of proof (e.g., beyond reasonable doubt) to be established against the accused by the prosecutor (or plaintiff). In environmental jurisprudence, the Hon'ble Supreme Court has referred to the emergence of concept of *onus of proof* and *reversal of burden of proof* in environmental matters. Drawing upon the *precautionary principle*, the concept places the *onus of proof* on the actor or the developer/industrialist to show that his action is environmentally benign.

Thus, an alleged responsible person would bear the burden of proof. There is however the matter of establishing the standard by which a person can be alleged as responsible person before the burden of proof reverses. This standard would be set at the level of *prima facie* evidence against a person before he can be summoned as responsible person.

The aspect of *what* must be proven has two dimensions – the person would need to conclusively prove that he is not a responsible person. In addition, the person would need to prove that someone else is a responsible person to be able to be exempt from being a responsible person or recover any costs already incurred by him from the other person. This second dimension is required to allow a person who has paid for remediation to recover costs from a responsible person but who was not identified at the stage of determination of responsible person. This is also in keeping with the *polluter pays* principle that the taxpayer would not pay for remediation.

A new Section 15A would be added to the Act to determine responsible persons.

3.2.9 Administrative adjudication

The NGT's jurisdiction extends to providing compensation or relief for damage relating to human health, property, business, livelihood and environment including cost of restitution of environment. However, the aspects of identifying contamination sources and responsible persons, quantifying damage to environment on account of contamination and ascertaining remediation costs are fairly complex and would require significant technical, financial and investigative expertise.

The competent authority's technical, financial and investigative capabilities will be significantly strengthened for planning and executing the National Program and it would therefore be appropriate to provide for administrative adjudication under the competent authority for determining the responsible person, remediation costs and compensation for damage to environment. The investigative and adjudicative powers may be vested in an authority if the two powers are mutually reinforcing or complementary especially when they are part of a continuum, which is exactly the case in dealing with polluted sites.

An added aspect of penalty for violation of the provisions of the Act that led to contamination may also be included as part of administrative adjudication as this is tightly integrated with the determination of responsible person.

The liability limits for violation of provisions under the Act determined through administrative adjudication would be set at half of the limits established under Section 15 of the Act. Subject to the foregoing, the liability may be determined as a multiple of the disproportionate gain or unfair advantage made on account of non-compliance or violation of the Act, wherever quantifiable, along with the repetitive nature and the gravity of the non-compliance. There would be no limits for loss or damage to the environment or for remediation costs.

Appropriate amendments will be made to Section 3 of the Act to provide for administrative adjudication by the Central Government. This may be delegated to a Section 3(3) authority if the Central Government so decides. Such an authority will be vested with the powers of civil court and be responsible for determining the remediation costs, damages to environment and liability on account of violation of the provisions of the Act. The limits on liability on account of violation of the provisions of the Act would be set at half the level of the limits specified in Section 15 of the Act that contains the provision of fines, penalties and punishment. There will be no limit on the amount of remediation costs and damage to environment as these will be determined on the principles of engineering costs and environmental economics and are not punitive in nature.

The NGT Act would be amended to allow administrative adjudication under the Act with respect to determination of responsible person, determination of remediation cost and determination of loss or damage to environment, if the Central Government chooses to follow the administrative adjudication route. Section 17 of the NGT Act would be amended to allow appellate jurisdiction with respect to determination of responsible person, determination of remediation costs and determination of loss or damage to environment and the relief or compensation determined by the NGT would be in addition to that determined in the Act.

The NGT already has an appellate jurisdiction by virtue of Section 16 of the NGT Act that provides for appeal against any order or direction passed under the Act. It would continue to have primary jurisdiction for all types of costs, claims and damages that are not adjudicated under the Act.

3.2.10 Clarifying powers of Central Government to give directions

Section 5 of the Act allows the Central Government to issue directions to any person, officer or authority and such person is bound to comply with such directions. This substantial and wide ranging power of Central Government is explained under the Section 5 of the Act to include direction to close, prohibit or regulate any industry, operation or process or stop or regulate supply of electricity or water or any other service.

It can be reasonably concluded that if the powers under Section 5 of the Act are such wide ranging as being able to stop the economic activity (closure of industry, operation or process) or stop essential utilities as electricity and water, it must also extend to economic matters that do not otherwise lead to stoppage of economic activity. It is then logical to conclude that the power under Section 5 would extend to directing a person to pay remediation costs, loss or damage to environment and penalty for violations under the Act. Section 5 powers also extend to requiring

such financial instruments as is common practice for securing performance or compliance, e.g., bank guarantees, advance deposits, mortgage / hypothecation of assets, etc.

Remediation may require emergency measures for containing the threat of hazardous substance and extended civil works on the site and related safety measures for remediation. It would be essential for the agencies involved in remediation to have site access and site control and management and Section 5 of the Act would provide such powers.

Section 5 of the Act would be amended to clarify, under *Explanation*, that the powers of Central Government to give directions for site management, for payment of remediation costs and environment damages and requiring performance securities for securing compliance.

3.2.11 Enhancing limits under Section 15 of the Act

Low level of fines (a maximum of Rs 1 lakh and Rs 5,000 per day of continuing offence) has not acted as sufficient deterrent for preventing violations of the Act. The fines and penalty limit under Section 15 of the Act would be enhanced from Rs 1 lakh / Rs 5000 per day to Rs 10 crore / Rs 25,000 per day for individual and Rs 25 crore / Rs 1 lakh per day for company in line with the penalty regime under the NGT Act.

The fines and penalties under Section 15 of the Act shall be over and above the liabilities determined through the civil administrative adjudication framework.

3.2.12 Financing and cost recovery

Remediating a polluted site is an expensive proposition and all attempts would be made to identify and make the responsible person pay for remediation. Schedule of payments by responsible persons would be specified in advance and aligned to the cost schedule. Bank guarantees and advance deposits would be imposed so that adequate financing is available for remediation. Mortgage and hypothecation may be created over immovable and movable assets of responsible person as part of the adjudication process to secure compliance with orders. Any unrecovered cost after enforcing financial security would be recovered as arrears of land revenue or public demand.

There may be instances when a responsible person cannot be identified and the remediation activities have to be initiated given the risks that the polluted site poses. In addition, there may be certain costs that may be incurred for identification and investigation of sites and preparing for adjudication for responsible person. In such situations, public funds would be required to finance the costs incurred until such person takes over the responsibility. A National Environmental Restoration Fund would be created to finance remediation where the responsible person is not available to pay for remediation. A new Section 8A under the Act would provide for creation of the Fund.

In the event that public funds are used for remediation, all efforts would be made to recover the contribution of public funds from responsible persons. Apart from the cost recovery processes explained above, in the event that the site owner is not a responsible person and public funds have been used for remediation of the site, the site owner would pay to the Fund an amount equal to the increase in the value of the site post remediation.

Section 24 of the NGT Act provides that compensation for damages to environment determined by NGT would be deposited with the Environment Relief Fund and such amounts would be used for purpose relating to environment in the manner prescribed. As the proposed National Environmental Restoration Fund would be designed to deal with the matters relating to environment while the Environment Relief Fund was designed to give relief for damage to health, injury and damage to property only, it may be appropriate to change the reference from the Environment Relief Fund to National Environmental Restoration Fund under Section 24 of the NGT Act.

3.2.13 Establishing soil regulatory regime

It is necessary to establish a soil regulatory regime similar⁴ to that for air and water. This would require establishing soil standards, a progressive framework for mandatory site investigation and reporting, obligation on authorities to act on information relating to suspected contamination and keeping a registry of sites updated with all information regarding site and remediation process. These aspects are described below and will be covered under the RPS Rules.

3.2.14 Soil standards

Soil standards indicating the screening level and response level would be stipulated under the RPS Rules. These standards would form the basis, in conjunction with assessment of threat of harm to human health and environment, to determine whether a site is polluted and the extent or level of remediation required.

The screening level would be the level of hazardous substance concentration below which a site will not be classified as contaminated site and no further action will be required. The response level will be the threshold above which a site will definitely be classified as a contaminated site. If the contamination level is between screening level and response level, the site will require further investigation before a conclusion can be arrived at.

To begin with, the screening level will be aligned with the screening level of Canadian soil standards while the response level will be aligned with the Dutch soil standard intervention values. Over a period of time, as more experience is gathered and better information is available, particularly on background concentration levels in soil, the screening and response level will be suitably amended.

Soil standards play a very important role in identification of contaminated sites. In India it is a relatively new exercise and hence there has been no established soil standard available. As a part of the National Program, soil standards have been developed based on detailed review and analysis of standards available in the countries that other countries have followed while developing their own soil standards, i.e., USA, UK, Canada, the Netherlands and Australia.

Internationally, the approach that is widely chosen to determine the soil standards is the risk based approach or the 'Source – Pathway –Receptor' approach. It considers that either human beings or the environment will eventually get in contact with the contamination. Here, the source is the contamination, the pathway is the route between the source and the receptor, and the

⁴ Regime under the Air (Prevention and Control of Pollution) Act, 1981, the Water (Prevention and Control of Pollution) Act, 1974 and the Environment (Protection) Act, 1986

receptor is a human/ animal/ plant/ ecosystem/ property/ or a water body that may be affected by the contamination.

Keeping the Indian condition in mind in terms of industrial development and the fact that the country has limited capacity for carrying out assessment and identification of contaminated sites, soil standards have been developed in a manner that enables quick identification of contaminated sites based on risk assessment related to human health and environment and distinguishes between sites where further action is required and sites where no further investigation is necessary. The standards provide generic soil quality guidelines for the most common land uses in India and establish a system for prioritising the sites based on the identified contamination and on the possible impacts on human health and environment.

Based on the above criteria and following a risk based approach, two assessment levels have been defined under the National Program – screening level and response level. Screening levels are generic concentrations of hazardous substances in soil, sediment, groundwater and surface water, at or below which potential risks to human health or the environment are not likely to occur and where no further investigation and assessment is needed. Response levels are generic concentrations of hazardous substances in soil and sediments, at or above which it is very likely there is an imminent threat to human health or the environment. At or above this level some form of response is required to provide an adequate level of safety to protect public health and the environment.

Based on the international review, the Canadian standards have been found to be most appropriate in the Indian context to define the screening levels for assessment of soil contamination. The Canadian standards provide generic concentrations of hazardous substances for four categories of land use, agricultural, residential/parkland, industrial and commercial. In India, as defined by the MoEFCC the common land uses are agricultural, industrial, waste lands, water bodies, habitation settlement, forests, mixed and others. The Canadian standards for industrial land can be well aligned to waste lands in India, standards for residential/parkland can be used for habitation settlement and forests. For water bodies, appropriate Canadian standards may be chosen based on the land use. For mixed and others, the standards for most vulnerable land use may be used.

For assessment of groundwater contamination for drinking water, the Indian drinking water values as per IS 10500:2012, second revision, have been considered as screening levels. The Indian standard “Environment (Protection) Rules, 1986 schedule VI, general standards for discharge of environmental pollutants” has been used as screening levels for groundwater contamination for irrigation. In both cases, if there are no Indian standards for a specific contaminant, Canadian guidelines will be used.

Similarly for surface water contamination, “Environment (Protection) Rules, 1986 schedule VI, general standards for discharge of environmental pollutants” have been considered for screening levels and in case of absence of Indian standard for any specific contaminant, Canadian guidelines will be referred.

As response levels for soil contamination, Dutch intervention values have been considered as it provides a conservative approach compared to other standards. It considers that ‘people at risk’ both live in and eat crops from the contaminated site and in this way provides a relatively low

level of risk if the concentration levels of hazardous wastes are not above the intervention values.

Once a site is identified as a probably contaminated site based on verification and evaluation of information obtained about the site through a reactive process (i.e. through complaints, petitions, media reports etc. received by a competent authority) or a proactive process (i.e. review of hazardous waste registers, regional development plans, industries changing land use etc. by a competent authority), preliminary site inspection and site investigation are carried out to ascertain the screening and response levels of the site. If the concentrations of hazardous substances are below screening level then no risk is there at current land use and no action is required. If the concentrations exceed the screening levels, then it is a probably contaminated site i.e., there is acceptable risk at current land use and further investigation is needed. If the concentrations exceed the response levels then it is a contaminated site, i.e., there is unacceptable risk and further site actions are required in terms of investigation and remediation. However, if the risk is low due to the pathway and/or receptor, remedial action may not be necessary. In other cases precautionary measures may be sufficient for protection of human health and environment. The required information for further investigation and prioritisation of remediation is described in the 14-step remediation framework.

3.2.15 Mandatory investigation and reporting

Currently, there is no regulatory requirement for conducting a soil assessment or investigation. A progressive mandatory site investigation and reporting regime would be established such that it balances the requirement of developing knowledge base on potential contamination and the costs on the site owners for carrying out such activities. In the first instance, it would cover investigation and reporting under certain circumstances involving sites where any hazardous activity defined under Schedule 1 of the HW (MH&TM) Rules, 2008 is or has been carried out. Such situations involving sites where hazardous activity is or has been carried out would cover carrying out a site investigation:

- a) prior to any change in land use;
- b) prior to any sale or lease of site;
- c) prior to any removal of soil from the site;
- d) prior to any construction or demolition of any building or structure on the site;
- e) prior to establishing new or expansion industrial projects on the site;
- f) prior to decommissioning any industry, operation or process on the site;
- g) prior to change in ownership of the company that is the owner or occupier of the site or the facility located on the site.
- h) obtaining or renewing consent under section 25 and 26 of the Water Act, 1974;
- i) obtaining environmental clearance under the Environment Impact Assessment Notification 2006, for all category "A" projects and category "B" projects;

- j) obtaining or renewing authorisation under rule 5 or registration under rule 8 or permission for import of hazardous waste under rule 16 of the HW Rules

Further, a public authority owning or having jurisdiction over land and facilities susceptible to contamination would establish and carry out such processes and procedures that facilitate early detection of polluted sites. Over a period of time, the regime may be expanded to require annual site investigation and reporting where hazardous activity is carried out and include other types of sites susceptible to contamination.

Any person who suspects or finds contamination on a site would be duty-bound to report contamination. Such a person would also include site investigators, environment labs, consultants, transporters, public authorities, etc. who have become aware of contamination during their course of business. A framework for making complaints to the competent authority would be provided. In addition, the competent authority would have the power to direct any site owner or occupier to carry out a site assessment or investigation at its own cost where contamination is suspected.

3.2.16 Obligation of the authorities

The competent authority would have the obligation to review all site assessment reports and complaints and take action without exception. Lack of information, knowledge and access to sites would not lead to deferral of action.

Further, SPCBs would monitor, on a real time basis, the handling of hazardous waste in the state. The monitoring of generation, transportation and disposal of hazardous waste would be done on a real time basis with the objective of discovering potential of mishandling hazardous waste.

3.2.17 Site registry and information

A site registry is essential to record all information related to site and all matters relating to remediation process. Accurate and updated site and remediation related information would be necessary to support adjudication. Availability of a site registry would facilitate planning for remediation. It would assist in conducting analysis on the common types of hazardous substances found at polluted sites and issues in remediation and provide a basis to carry out research and development. Such information may be useful to public for being informed about polluted sites in their area. Investors may use such information to make informed choices about contaminated sites.

Given the importance of accurate, detailed and trail of information in the remediation process, the records and information would be kept for a period of at least 30 years. Further, destruction of records and information would be an offence.

3.2.18 Flexible and enforcement led approach

The RPS Rules would provide a flexible and enforcement led approach for remediation. The competent authority would enforce remediation through a series of orders starting from identification of sites to completion of remediation. Under each order, the competent authority would have the flexibility to designate and direct such actions and aspects as may be required for the particular site and context. In addition, the competent authority may need to direct additional or alternate measures to stop any ongoing contamination, prioritize or delay remediation, address emergency situations and vary or approve variations in remediation activities.

In the event that a responsible person contravenes or fails to perform as directed, the competent authority would have the power and duty to intervene and carry out or appoint another person to carry out remediation related activities.

3.2.19 Polluted site notice and site administration order

Notifying a polluted site has multiple implications including general public becoming apprehensive about the hazard, site owner being anxious about restriction of site activity and potential impact on the health and livelihood, neighbouring site owners being concerned about potential migration of contamination, activists and media demanding action, etc. However, notifying a polluted site is necessary precisely to inform the public and site occupier about the health hazards, making people aware of potential migration of contamination and signalling commitment of the government to remediate the site.

Depending on the context of the polluted site and the extent of co-operation of site occupiers, the competent authority may take over site administration and evacuate and/or temporarily relocate site occupiers while site investigation and remediation continue. Health and safety measures would be undertaken and due process would be followed in case relocation of occupiers is involved. A site administration order would act as the administrative control for ensuring that land use and site activity restrictions are observed until there is no residual contamination on the site. The land authorities would record the land use and site activity restrictions in the land records and planning and development authorities would demarcate such areas and not allow any building or development permissions on the site until the site is decontaminated or allow such restricted activities if residual contamination remains on the site post remediation.

3.2.20 Voluntary remediation

Polluted sites are so designated because contamination exists at levels and in conditions where there is threat of harm to human health and environment. There may be instances when discharge has occurred but where the level of contamination may not be as high or the threat of harm to human health and environment may not be significant. While such sites would not ordinarily be remediated under the National Program, if an industry or person volunteers to remediate such sites, the legal framework would allow for voluntary remediation under the guidance and supervision of the competent authority. Such voluntary remediation proposals

would need to have the concurrence of all stakeholders involved and sufficient funds would need to be evidenced to carry out remediation.

3.2.21 Fees and other matters

Remediation requires extensive involvement of the authorities and hence, it is reasonable to charge a fee for all reviews and approvals involved in remediation activities. Further, if the authorities retain advisors to assist them with certain activities, these would be recoverable from responsible person as well.

There are other matters relating to responsibilities of authorities, use of third parties, guidelines, standards and checklists and research and development that would be clarified in the legal and regulatory framework.

4 Site inventory

An initial inventory of sites has been developed as part of the National Program. The inventory has been developed based on the working definitions of contaminated and probably contaminated sites discussed with and approved by the MoEFCC and the CPCB. Based on the definitions, site related data such as site name, address, current land use, industry types and processes, types of contamination and contaminants, use of surface and ground water from the sites, population at risk and their socio-economic conditions etc. were collected from various sources. Prominent sources of information considered for the inventory were MoEFCC, pollution control boards, environmental NGOs, research institutes, municipal authorities, state industrial development authorities, Special Economic Zones, TSDF operators, media reports and relevant Public Interest Litigations.

Based on the information collected and analysed, 517 sites were initially identified. The initial inventory was discussed with and reviewed by the pollution control boards. Based on the discussions 197 sites have been deleted from the initial inventory owing to lack of relevant information. Out of the remaining 320 sites, 204 sites have been confirmed as probably contaminated sites by the pollution control boards that need site investigation to confirm whether they are contaminated or not. Site investigation of 100 sites out of the 204 probably contaminated sites has been concluded. As per the investigation results of these 100 sites, contaminants in 39 sites are above response level, 29 sites above screening level and 28 sites below screening level and in 4 sites no sampling was possible to due to lack of access.

In terms of geographical distribution, most of the sites in the current inventory are located in Uttar Pradesh, West Bengal, Orissa, National Capital (Delhi), Karnataka, Gujarat, Jharkand, Tamil Nadu, Kerala, Andhra Pradesh and Punjab.

Majority of the sites in the inventory are industrial sites in terms of current land use. The rest are habitation settlement, water bodies, agricultural lands, a few mixed lands and waste lands.

Area wise bulk of the sites is in the range of 10,000 to 60,000 square meters. From the data collected for the 320 sites, it is observed that many of the sites are situated within a larger area of ongoing or legacy contamination (called as area sites) rather than individual dump sites or industrial facilities (called as point sites). In the current inventory there are at least 100 such area sites where concerns related to remediation need to be analysed from a broader perspective considering the entire area of contamination.

It is observed in the current inventory that the major contributor to contamination is hazardous wastes, followed by effluent discharge from industrial activities, municipal solid wastes, and biomedical wastes.

In the inventory multiple contaminants are observed to be present in one site. Typical contaminants are metals, especially chromium, with more than 30% of the sites having chromium contamination. Chromium is followed by lead, cadmium, mercury and copper. Arsenic, pesticides, VOCs are also present but in less than 10% of the sites.

The major source of suspected contamination is manufacturing and industrial use of synthetic dyes, pigments and intermediates. The other key contributor of contamination is metal surface treatment such as galvanising, degreasing, plating etc. Industrial processes such as pharmaceuticals, textiles, tanneries and dump sites are also observed as significant sources of contamination.

The use of groundwater for drinking water is an important parameter for risk assessment of a particular site in the inventory. It is observed that in most of the sites groundwater is being used as drinking water. The other critical parameter for risk assessment of a site is use of surface water for sensitive purposes (e.g. drinking water, irrigation, livestock, commercial food production, water recreational activities, fishing etc.). In more than 50% of the sites in the current inventory, the surface water is being used for sensitive purpose.

As a part of the National Program, the concept of typology of a site has been introduced based on the 'source-pathway-receptor' approach. Development of typology of sites is not limited to the assessment of unacceptable risks to human beings and environment but in addition it considers elements such as activities leading to contamination, geometry and type of contamination so that typology of a site may be used to facilitate the process of evaluating the remediation option. With respect to source, the typologies defined under NPRPS are Type S1: land bound solid phase contamination; Type S2: water bound sediments solid phase contamination and Type L: Land bound liquid phase contamination. With respect to pathway, Type P1: NAPL contaminants in soil (Non Aqueous Phase Liquids) and Type P2: Groundwater contaminations. In the current inventory, about half of the sites have fallen into the category of Type S1 where waste has been dumped on the land. Groundwater contamination i.e. Type P2 is observed in 134 sites. The next major type is L, observed in 124 sites, where contamination is caused by various sources and sources cannot be distinguished.

The size of the current inventory is less than what would otherwise be expected given the state of development of India. This is understandable given that there are currently no standards for determining a contaminated site. International experience has shown that the number of sites identified grows significantly (as compared to the initial inventory) as standards and guidelines are established and enforcement and monitoring increases.

4.1 Priority list of polluted sites

A prioritization algorithm for ranking polluted sites is under preparation and a national priority list of polluted sites would be prepared using the prioritization algorithm. The prioritization algorithm will establish an objective ranking criteria based on the identified contamination and on the possible impacts on human health and environment. The national priority list will be continuously updated.

4.2 Site registry and database

A comprehensive database of the sites across India would be established so that all sites have comparable data on the basic essential attributes necessary for establishing a ranking system

and tracking progress. The database would include identification information, regarding type of site, nature of contamination, level of contamination, status (active / passive) of the site, number of people that may be potentially at risk or impacted by contamination (on site and / or offsite), site, phytotoxicity, potential uses of the properties, health information and other information that is essential for identification of polluted sites.

5 Institutional mechanism

The institutional mechanism for National Program covers the following aspects:

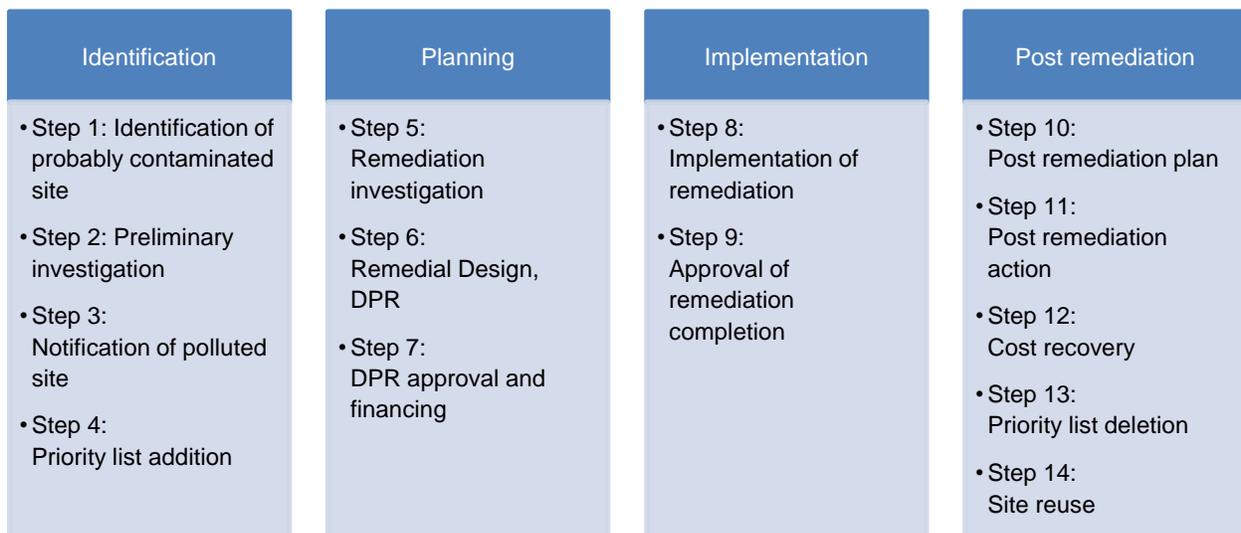
- (i) key remediation processes;
- (ii) roles and responsibilities of authorities;
- (iii) capacity development program;
- (iv) guidelines for implementation of key processes;
- (v) involvement of public and private sector organisations in remediation;
- (vi) public access to information;
- (vii) outreach and communication program;
- (viii) research and development program.

These are described below.

5.1 Key processes

A 14-step remediation implementation process has been developed that covers all aspects of remediation and is shown in Figure 1 below.

Figure 1: Remediation implementation process



The 14-step remediation implementation process is described below.

Step 1- Identification of probably contaminated site

The first step would involve identification of sites that may be polluted. Information may be sourced from general public, NGOs, industries, government departments, SPCB records, etc. This would be supplemented by information available from reporting under the mandatory site investigation and reporting regime (refer chapter 3.2.10). All information, records, reports, orders, directions, etc. about all sites (whether or not there is presence of contamination) and related activities would be stored in a computerized database commencing from this first step. This site database would be dynamic in nature and more sites and further information on such sites would continue to be added.

Step 2- Preliminary investigation

A site identified in step 1 would be investigated for contamination. This would be a two-step process involving preliminary site assessment and preliminary site investigation.

Preliminary site assessment would involve desk study of the available information from step 1 and site inspection to collect general information on the site conditions such as ownership details, presence of water bodies, population in and around the site, possible source of contamination, nearby industries, etc. During site inspection limited sampling may also be carried out to confirm the types of contaminants present. The information would be reviewed to assess if there is a requirement for preliminary site investigation.

Preliminary site investigation would involve developing investigation strategy, collecting and testing soil, air and water samples, analysing source, receptor and pathway of potential contamination and assessing if the site may pose threat to human health and environment. The level of contamination and the nature of contaminants would be assessed and compared to the screening and response levels (established under the standards) depending upon current land use and site activity.

Step 3- Notification of polluted site

Based on the information collected in Step 1 and 2, determination would be made whether a site may be polluted and requires remediation. A polluted site would be delineated and its boundary would be defined more precisely. The polluted site would be notified listing the details of the site, nature of contamination, restrictions on site use activity and safety measures that may be required. A site administration order may be issued to enforce restriction on the site occupier and take-over site management and temporarily relocate site occupiers if required.

Once a site is notified as polluted site requiring remediation, responsible persons would be identified and made to undertake remediation and pay for remediation costs. A search of responsible persons would be initiated and *prima facie* evidence would be gathered. Through a process of administrative adjudication, the responsible persons would be directed to carry out

remediation and pay for remediation cost. In addition, the responsible person would be directed to pay for violating the Act and for causing environmental damage.

Step 4- Priority list addition

All polluted sites requiring remediation would be subject to a ranking process based on the source-pathway-receptor parameters of the site to reflect the threat to human health and environment. Sites would be prioritized based on the ranking algorithm and sites above a pre-defined score would form part of priority list of polluted sites.

Step 5- Remediation investigation

Remediation investigation would be a five step process covering – i) fieldwork and laboratory testing of samples, analysis and interpretation of exploratory data, ii) assessment of concentration levels of contaminants, source-pathway-receptor combinations for human health, quantitative risk assessment of environment and human health, iii) setting remediation objectives and requirements based on the risk assessment, iv) identification of constraints to remediation, appraisal of different remediation techniques available v) comparison and evaluation of various remediation options. Remediation option development and evaluation would be a consultative process and form the basis of remedial design and detailed project report preparation.

Step 6- Remedial design, Detailed Project Report

Detailed Project Report (“DPR”) would be prepared based on the outcome of the remediation investigation. DPR would contain design of remediation, technical specifications, costing and planning of the remedial option. It would also cover environment and social impacts associated with the implementation of the remediation option.

Step 7- DPR approval and financing

The competent authority would approve the DPR. Where public funds may be required for remediation, the approved DPR would be forwarded to the National Environmental Restoration Fund for approval and appraisal.

Step 8- Implementation of remediation

Implementation of remediation would involve preparation and authorization, appointment of remediation contractors, supervision of remediation works and approval of appropriate variations to the specifications. The remediation works would be closely monitored and the outcomes would be verified against the DPR specifications.

Step 9- Approval of remediation completion

This step signifies completion of remediation works. The competent authority would review the results achieved after remediation against the contract specifications and approve completion of remediation. In case residual contamination remains at the site, post remediation plan would be developed.

Step10- Post Remediation Plan

This step would involve planning for post remediation measures and review and approval by the competent authority.

Step 11- Post Remediation Action

Based on the post remediation plan approved, a post remediation implementation program would be developed and post remediation activities would be implemented according to the program. The site would be monitored and verified periodically for the level of contamination.

Step 12- Cost recovery

Any costs, fees and penalty that have not been paid in advance or recovered from responsible person would be recovered either by enforcing financial security or through the recovery process of arrears of land revenue or public demand.

Step 13- Priority list deletion

Upon the completion of the post remediation activities and the recovery of costs, the status of the site would be updated accordingly in the site registry and the site would be removed from the priority list. If no residual contamination remains, the site may be designated as remediated site else it may be notified as a restricted site with site use and activity restrictions.

Step 14- Site reuse

The State Government would develop its reuse policy and promote the reuse of remediated sites. The State Government may provide appropriate incentives and may organize awareness programs for site reuse.

5.2 Roles and responsibilities of the authorities

The roles and responsibilities of the authorities would be allocated based on their existing roles in pollution related activities, capabilities and capacities to take on additional responsibilities and absence of conflict of interest. It is clearly recognized that many activities involved in the remediation process will be carried out first time in the country and therefore, the roles and responsibilities would continue to evolve as more experience is gained.

Most of the SPCBs do not have the capacity to take on additional responsibility of remediation enforcement or planning and supervising remediation related activities. Consultations with SPCBs have repeatedly pointed to lack of resources including inadequate infrastructure, lack of appropriate skills for remediation related activities, lack of staff to deal with existing workload under the other legislations and lack of funding. Some states have gained experience in certain aspects of remediation and have faced similar issues and in addition, difficulty in managing local community and land related matters and difficulty in managing third party consultants and contractors. Some of the SPCBs have suggested that a separate dedicated multi-disciplinary authority will be required to deal with remediation and argue for a greater role of the government department and public authorities – both in decision making on complex issues relating to remediation and in facilitating site access and site management.

There is also an issue of perception of inherent bias against acknowledging polluted sites. The existence of a polluted site in a state may be construed as a failing of the regulatory oversight of the pollution control boards with regard to hazardous waste management even though a large number of polluted sites are present in developed countries where there is arguably greater enforcement and compliance with environmental regulations. In the absence of soil standards that can help in determining polluted sites, little or no funding and limited expertise in dealing with remediation, it is understandable that the issue of polluted sites would suffer from the bias. It is important to deal with the bias and transfer the regulatory oversight of polluted sites to the pollution control boards over a period of time when there are sufficient resources, better information, availability of funding and skills. For the immediate term, it may be appropriate to keep the roles and responsibilities of regulating hazardous waste management largely separate from the roles and responsibilities of enforcing remediation of polluted sites.

The pollution control boards have limited experience in dealing with matters relating to administrative adjudication. Rule 25 of the HW(MH&TM) Rules, 2008 provide for levy of financial penalty by the State Pollution Control Board in consultation with Central Pollution Control Board but this has not been exercised frequently. Further, administrative adjudication will require appropriate judicial and technical members and properly laid out procedures. Separately, for investigating and building a case against responsible person, appropriate legal, technical and financial skills would be required.

It is reasonable to conclude that a separate authority would be required in the long term to plan and execute the National Program. The pollution control boards would continue to play a supporting role in the National Program while the State Government would be expected to deal with land related matters, i.e., removing difficulties in site access and management and promoting site reuse. A central level authority may be established along with state authorities in

one or more states on the lines of some of the interventions like the National/State Ganga River Basin Authority. Alternately, a central level authority may be established which may have regional offices based on the requirements. Given the limited experience and expertise currently available in the country on remediation related matters, the requirement for quick decision making and the fact that adjudication process is integral to the remediation process, it would be appropriate to begin with a single (central) authority which may set up regional offices based on the requirement.

5.2.1 Short Term Institutional Mechanism

However, in the short term, before the single, central authority comes into being, it is advisable to align the institutional arrangement of the National Program with that envisaged in the National Green Tribunal Rules (NGT Rules) and contained in various judgments of the NGT and follow a state-led remediation program. Rule 37 of NGT Rules mandate that the concerned department of the State Government dealing with environment and forests shall be the Nodal Agency for execution of projects or scheme(s) for restoration and remediation of environment and would associate expert agencies, like, the State Pollution Control Board or other technical institutions having expertise in the formulation and execution of project or schemes for restitution of environment. In accordance with the NGT Rules 37, the NGT in many instances directed the formation of committee comprising District Collector, State Board, Central Ground Water Board and agricultural university for assessing damage, monitoring abatement of pollution etc. In similar lines for short term execution of the National Program, a state led remediation program would be developed by the Central Government with the Environment Department of the State Government as the Nodal Agency and a committee comprising of the State Board, District Collector, Central Ground Water Board and other relevant academia would be set up for assessment of contamination, review of reports of remediation investigation, Detailed Project Report, monitoring progress of remediation implementation, review of post remediation plan etc.

The institutional mechanism would be enforcement-led but allow for implementation by the authorities depending on the situation. Training and capacity development activities under the National Program would partly address the skill gap in the short term and the balance can be addressed by engaging third parties for specific tasks.

5.2.2 Long Term Institutional Mechanism

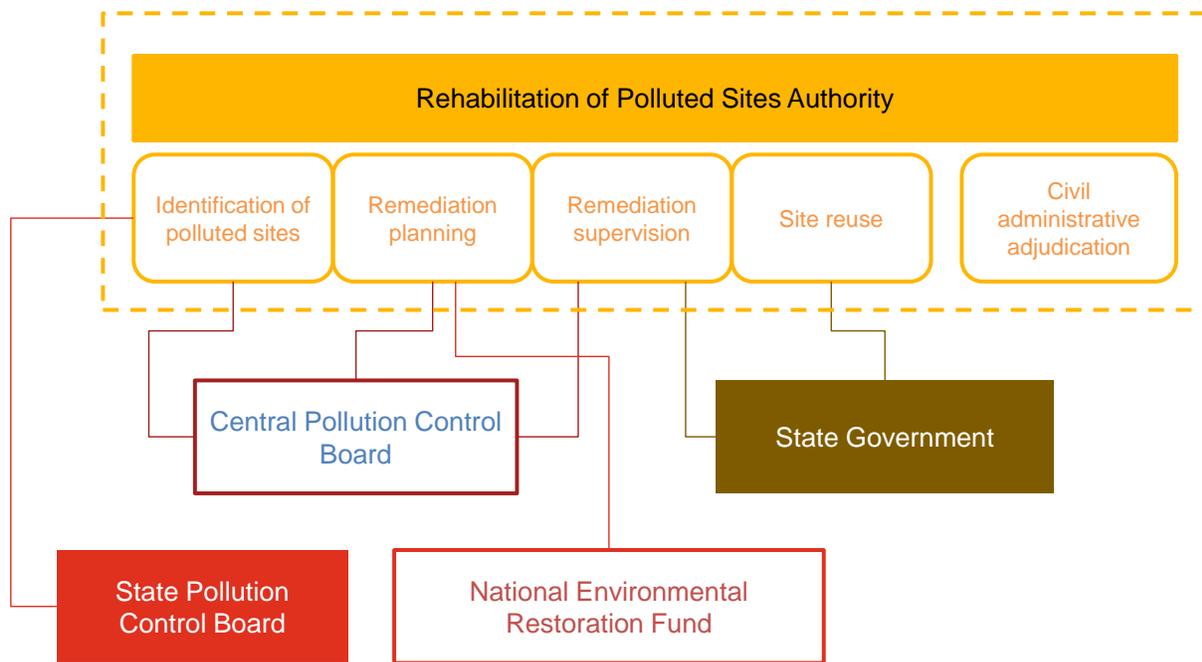
The authority that would be set up in the long term may be called the Remediation of Polluted Sites Authority ("RPS Authority"). It would be established as a Section 3(3) authority under the Act. It would be supported by the CPCB on matters relating to identification of polluted sites, laboratory analysis and field work, developing guidelines and standards relating to remediation and co-ordinating the activities with the SPCBs. As CPCB has also gained some experience with site registry and database, it would support the RPS Authority in maintaining the site

registry. CPCB would also be responsible for other functions like training and capacity building, research and development, outreach and communication, etc. – functions that it also performs under other environment laws relating to air and water. The SPCBs would be involved in supporting the RPS Authority in identifying polluted sites and working together with CPCB in fieldwork, surveys and lab analysis.

The State Government would play a supportive role in removing difficulties in site access and management, in enforcing site restrictions and in promoting site reuse. The National Environmental Restoration Fund would interface with the RPS Authority in matters relating to financing (refer chapter 6).

A schematic of the institutional mechanism is provided in Figure 2 below.

Figure 2: Institutional mechanism and role of different authorities



5.2.3 Responsibilities of authorities

The roles and responsibilities of authorities are outlined in Table 1 below:

Table 1: Roles and responsibilities of authorities

#	Authority	Corresponding Responsibilities
1.	Ministry of Environment and Forests under the Environment (Protection) Act, 1986	<ul style="list-style-type: none"> Establish a Section 3(3) authority – Remediation of Polluted Sites Authority and provide administrative and logistics support
2.	Remediation of Polluted Sites Authority (“Authority”) established under sub-section (3) of section (3) of the Environment	<ul style="list-style-type: none"> Plan and cause to be executed and monitor and report on national program on remediation of polluted sites to Central Government Lay down, modify or annul the soil standards including screening and response levels Notify polluted sites, site activity restrictions, site management measures

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	(Protection) Act, 1986	<ul style="list-style-type: none"> • Establish priority of polluted sites for remediation • Identify responsible persons, assess, adjudicate and impose remediation costs, loss and damages and penalties • Prepare and propose remediation scheme for appraisal and approval by the National Environmental Restoration Fund, where there is requirement of public funding • Propose financing of DPRs and annual plans for appraisal and approval by the National Environmental Restoration Fund • Appraise and approve remediation schemes (including voluntary remediation) that do not require public funding • Develop a national resource accounting framework for calculation of loss and damage to environment • Prepare and submit bi-monthly and annual progress report on the activities undertaken to Central Government • Appoint as required site investigators and advisors, including legal and financial advisors and monitor, supervise and verify the work of site investigators and advisors • Appoint as required remediation contractors and monitor, supervise and verify the activities of remediation contractors • Adjudicate on determination of remediation costs and order thereon, determination of responsible person and order thereon, determination of loss and damage to environment and order thereon, determination of penalty and order thereon • Approve remediation objective, remediation requirement and remediation option for a polluted site • Enforce remediation and post remediation activities, review and approve reports submitted and review and approve variations during remediation works • Prepare criteria for selection of third parties including site investigators, advisors (including legal and financial advisors) and remediation contractors • Establish committees as may be required for the tasks related to identification of polluted sites, remediation planning and implementation, responsible person determination and co-ordination with State Governments • To perform such other functions entrusted to it by the Central Government
3.	Central Pollution Control Board constituted under the Water (Prevention and Control of Pollution) Act, 1974	<ul style="list-style-type: none"> • Advise the Central Government on any matters concerning remediation of polluted sites • Co-ordinate the activities of State Pollution Control Boards on all activities relating to remediation • Establish and maintain site registry and inventory of sites • Identify polluted sites, inspect sites and keep updated information on sites in the site registry • Review site investigation reports and make recommendation on whether a site is polluted to the Authority • Carry out site surveys, investigation, laboratory analysis and monitoring of sites during the remediation process in accordance with the instructions of Authority • Provide technical assistance and guidance to State Pollution Control Boards, carry out and sponsor investigations and research relating to hazards of polluted sites and remediation of polluted sites • Plan and organise the training of persons engaged or to be engaged in programs of remediation of polluted sites • Conduct training courses and capacity development programs for

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		<p>authorities regulating and managing polluted sites and related aspects</p> <ul style="list-style-type: none"> • Collect, compile and publish technical and statistical data relating to hazards of polluted sites and remediation techniques • Organise through mass media a comprehensive program regarding the remediation of polluted sites • Prepare manuals, codes, protocols or guidelines relating to remediation and disseminate information connected therewith • Upgrade the laboratory infrastructure • Co-ordinate with insurance companies and insurance regulator to develop suitable insurance products for remediation • To perform such other functions entrusted to it by the Central Government
4.	National Environment Restoration Fund under Section 8A of the Environment (Protection) Act, 1986	<ul style="list-style-type: none"> • Appraise the proposals for financing from Fund • Approve the proposals for financing from Fund • Monitor and review progress on projects financed from Fund
5.	State Government/ Union Territory Government	<ul style="list-style-type: none"> • Issue policy statement to incentivize reuse of remediated site • Establish a state level steering committee under the chairmanship of Chief Secretary to provide overall guidance and remove difficulties in the implementation of remediation of polluted sites in the state
6.	State Pollution Control Boards or Pollution Control Committees constituted under the Water (Prevention and Control of Pollution) Act, 1974	<ul style="list-style-type: none"> • Advise the State Government on any matters concerning remediation of polluted sites • Identify polluted sites, inspect sites and keep updated information on sites in the site registry maintained by the Central Pollution Control Board • Review site investigation reports and make recommendation on whether a site is polluted to the Authority • Carry out site surveys, investigation, laboratory analysis and monitoring of sites during the remediation process in accordance with the instructions of Authority • Collect and disseminate information relating to hazards of polluted sites and remediation of polluted sites • Encourage, conduct and participate in investigations and research relating to all matters connected with polluted sites • To perform such other functions entrusted to it by the Authority, Central Pollution Control Board or the State Government

5.2.4 Composition of the RPS Authority

The Secretary, Ministry of Environment and Forests, would be the chairperson and head of the RPS Authority. There would be six members of the RPS Authority which would include Chairman of the Central Pollution Control Board and a representative from Ministry of Finance, Ministry of Chemicals and Fertilizers, Ministry of Petroleum and Natural Gas, Ministry of Urban Development and Ministry of Commerce and Industry. The RPS Authority would have a full time Member Secretary possessing appropriate qualifications, knowledge and experience of scientific, engineering or management aspects of environment pollution and remediation, who will be appointed by the Government of India.

The RPS Authority would have the following departments:

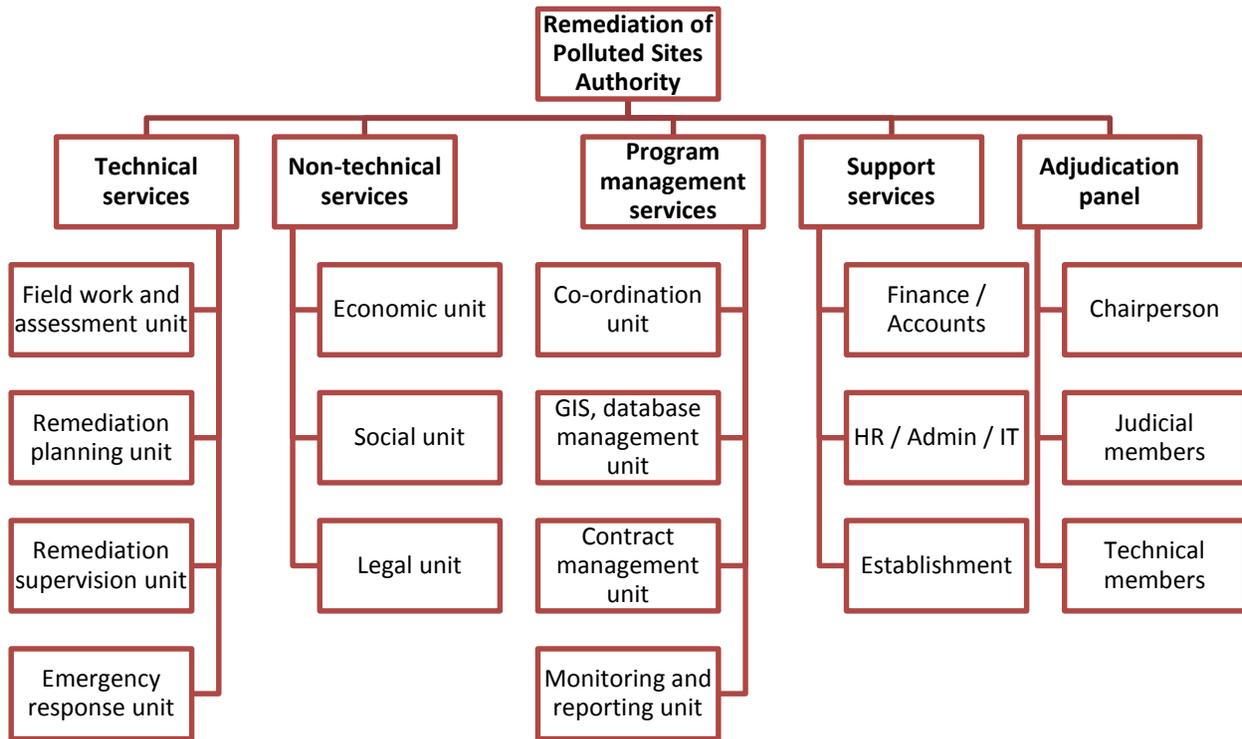
- (a) Technical services, having an expert (full time) each heading the fieldwork and assessment unit, remediation planning unit, remediation supervision unit and emergency response unit. The technical services experts will be supported by up to 20 full-time experts in remediation related field, including environmental engineering, hydro-geology, micro-biology, chemistry, civil engineering and chemical engineering. In addition, the fieldwork and assessment unit may retain up to 20 field staff for carrying out field work, site surveys and sampling.
- (b) Program management services, having
 - (i) up to 2 experts in contract management (for managing contracts of site investigators, remediation contractors, advisors, etc.),
 - (ii) up to 2 experts for program monitoring and reporting,
 - (iii) up to 3 experts for program management and co-ordination with different agencies including state governments, local authorities, pollution control boards, etc.
 - (iv) up to 3 experts in GIS and database management
- (c) Non-technical services, having an economic unit with up to 3 experts (full time) in environmental economics, a legal unit with up to 3 experts (full time) in environmental law and social unit, with up to 2 communication experts and up to 2 community engagement and social work experts.
- (d) The support services would include appropriate full time staff for internal functions including HR, administration, finance and accounts, establishment, computer section, etc.

In addition, there would be an independent Adjudication Panel having the following constitution:

- (a) A retired judge of High Court or Supreme Court, as Chairperson of the Adjudication Panel;
- (b) A retired judge of High Court or Supreme Court, as judicial member of the Adjudication Panel;
- (c) 3 experts in the field of environmental economics, hazardous waste and remediation as technical members of the Adjudication Panel.

The organisation structure of the RPS Authority is provided in Figure 3 below.

Figure 3: Organisation structure of the RPS Authority



5.2.5 Place of operation and jurisdiction

The RPS Authority would be provided administrative and technical support including financial and logistics support by the Ministry of Environment and Forests, which would be the nodal ministry and would also act as the secretariat for the RPS Authority. The RPS Authority may decide to set up regional offices, utilising the infrastructure of the regional offices of Ministry of Environment and Forests or the Central Pollution Control Board.

The jurisdiction of the RPS Authority would extend to all states and Union Territories.

5.3 Capacity development program

The National Program would undertake capacity development program to support the CPCB and SPCBs in carrying out their responsibilities. Specific training programs would be developed to build awareness and develop skills of the staff of Boards. The laboratory infrastructure upgrade program would be undertaken to enable existing labs to conduct analysis on the hazardous substances covered under the National Program. New labs may be created in states where there is insufficient capacity.

5.3.1 Training program

Training program would be developed to build awareness and capacity in the SPCBs, site investigators, remediation contractors and other third parties on all aspects of remediation. CPCB would be responsible for developing and implementing the training program. It would organise intensive training on the Guidelines developed under the National Program and training on carrying out preliminary investigation and detailed site investigation. It would also schedule select training on remediation technologies and techniques, remedial design, risk assessment, etc. over a period of time.

5.3.2 Laboratory infrastructure upgrade

During the course of remediation, samples may have to be taken multiple times for analysis and laboratory infrastructure would need to be available for accurate and timely analysis and reporting. Both the number of samples to be analysed as well as the range of contaminants will increase exponentially. The laboratory infrastructure of the CPCB and SPCBs would be upgraded to handle analysis of all hazardous substances covered under the National Program.

A laboratory upgrade involves the following aspects:

- (i) Laboratories have sufficient number of equipment for testing hazardous substances covered under the National Program.
- (ii) Laboratories follow the calibration procedures and calibrate testing equipment at stipulated intervals.
- (iii) Laboratory staff is trained on conducting analysis for screening and response levels of contamination.

CPCB will prepare a national laboratory infrastructure upgrade plan, taking into account the existing lab capacities and capabilities at CPCB, SPCB and private sector and the new requirements on the basis of initial inventory of sites and review the requirement from time to time.

5.4 Guidelines for implementation of key processes

In line with the 14-step remediation implementation process described in chapter 5.1, detailed guidelines covering methodologies, tools, checklists, standards and templates have been prepared as part of National Program. This would provide the process to be followed for conducting remediation activities and the factors to be considered for evaluation. The guidelines would be used by any person who may be connected with remediation including staff of authorities, remediation contractors, advisors, site investigators and responsible persons.

The guidelines contain comprehensive list of contaminants to be considered for sampling and laboratory testing, information checklists to be filled in during preliminary site assessment, detailed procedures for air, water and soil sample collection and testing for carrying out a preliminary site investigation or a remedial investigation or during post remediation monitoring. One of the key features of the guidelines is the use of risk based approach. It also introduces

the concept of Conceptual Site Model that is commonly used to implement a structured and efficient investigation for risk assessment.

The contents of preliminary assessment report, remedial investigation report and DPR form part of the guidelines. The guidelines also describe step wise procedures for health and safety measures to be taken while carrying out preliminary assessment, remedial investigation and on-site remediation. The guidelines provide a list of remediation techniques that may be used in different context, land use and nature of contamination.

The guidelines also include the criteria for selection of third party for remediation related activities. These criteria set out the expertise, qualifications and years of experience that a person would have in order to conduct remediation related activity.

Table 2 below outlines the guidelines arranged in accordance with the 14 step remediation implementation process:

Table 2: Coverage of guidelines

S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
1	Identification of probably contaminated site	Petition format	Guidance to the general public, NGOs who would like to petition about suspected cases of contamination
2	Preliminary site investigation	Guidelines for preliminary site assessment	Gathering a preliminary understanding of site conditions from desk review and limited sampling
		Checklist for prequalification for site investigation	Forms the basis for decision making on sites where preliminary site investigation is to be conducted and where it is not to be conducted
		Manual on Site Inspection Protocol	Guidance on data collection, sampling, determination of contaminants of concern, quality control and assurance measures, health and safety measures for onsite work
		Strategy for Preliminary site investigation	Guidance on carrying out sampling and testing
		Manual on techniques for site investigation	Guidance on techniques to be used for preliminary site investigation
		Manual on conceptual site model for identifying source-receptor-pathways	Guidance on risk assessment based on environment and health impacts
		Standards for screening and response level	Determining probably contaminated and contaminated sites
		Checklist for a preliminary investigation report	Forms the basis for evaluating if all requirements of a preliminary investigation are met
		Checklist for reviewing a preliminary investigation report	Forms the basis for evaluating a preliminary investigation report and its approval
3	Notification of polluted site	Guidelines on delineation of a contaminated site	Drawing a tentative boundary of the site to be considered for remediation.
		Guidelines and checklists on site restrictions, temporary safety	Forms the basis of a notification format to determine the types of restrictions to be

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S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
		measures to be implemented	applied on a site depending on the contamination level.
4	Priority list addition	Guidelines to apply prioritization algorithm to obtain a priority score for a contaminated sites	Forms the basis for ranking a site in the national priority list
5	Remediation Investigation	Guidelines on scoping and site investigation strategy	Defines the scope of work for a remedial site investigation
		Guidelines on fieldwork , laboratory testing	Guidance on carrying out sampling and testing
		Guidelines for applying source-pathway-receptor combinations on human health, quantitative risk assessment for human health and environment	Basis for determining the remediation objectives
		Guidelines to set remediation requirements and objectives	Basis for determining the remediation techniques
		Guidelines for identification and appraisal of different remediation techniques	Basis for evaluating different remediation techniques and deciding upon a technique based on remediation objectives
		Checklists for background information for setting remediation objectives	Forms the basis for decision making on post remediation standards to be achieved
		Checklist for appraisal criteria for remediation options	Forms the basis for decision making on one remediation option
		Checklist of a remedial investigation report	Forms the basis for evaluating if all requirements of a remedial investigation are met
		Checklist for reviewing a remedial investigation report	Forms the basis for evaluating a remedial investigation report and its approval
6	Remedial Design , DPR	Checklist of DPR	Forms the basis for evaluating if all requirements of a DPR are met
		Checklist for reviewing a DPR	Forms the basis for evaluating a DPR and its approval
7	DPR approval and financing	Format for cost estimation	
8	Implementation of Remediation	Guidelines for preparation, execution and management of remedial measures	Overall guidance on how to carry out remedial action
		Guideline on verification of remediation measures against DPR specifications	Forms the basis for evaluating the progress of a remedial action , determining the future course of action
		Checklists for permits for remediation works	Guidance on what permits are required for remediation implementation
		Checklists for health and safety plan	Prepares for health and safety measures to be taken during on-site work
		Checklist for supervision and verification of remediation measures	Forms the basis for evaluating if the remedial action is correctly implemented

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S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
		Checklists of remediation evaluation report	Forms the basis for evaluating if all requirements of a remediation implementation are fulfilled
9	Approval of remediation completion	Checklist for reviewing a remedial evaluation report	Forms the basis for evaluating a remedial action and its approval
10	Post remediation plan	Guidelines for developing post remediation plan, post remediation activities	Guidance on how to conduct post remediation activities
		Checklist for post remediation plan	Forms the basis for evaluating if all requirements of a post remediation plan are met
11	Post remediation action	Guidelines on developing post remediation implementation program, supervision of post remediation activities	Guidance on sampling, testing requirements , operation and maintenance requirements
		Checklist for post remediation status report	Forms the basis for evaluating if all requirements of post remediation are met
		Checklist for review of post remediation status report	Forms the basis for evaluating if the remedy is intact
12	Cost recovery	Collating costs incurred during remediation and post remediation	
13	Priority list deletion	Guidelines on assessment of site use restrictions	Before marking a site as remediated, this provides a basis for assessing the site use restrictions imposed on the site and taking a decision on the same.
14	Site reuse	Guidelines on anticipating site use restrictions	Basis for decision making if certain site use restrictions will continue to be imposed or will be revoked
	For all steps	Guidelines for selection of contractor	Selection of third party contractors based on credentials, qualifications
		Checklist for pre-qualification of contractor	Basis of selection of contractors for on-site work

5.5 Involvement of public and private sector organisations

The National Program would require diverse skill-sets and management experience that may not be available within an organisation or even a group of organisations. Involvement of public and private sector organisations would be important for implementing remediation activities in a timely manner. The RPS Authority would lay down the criteria for engaging such third parties. It may initiate empanelment of third parties once sufficient experience in implementing the National Program has been gained. Over a period of time, it may look to start an accreditation program for third parties.

Some of the key roles for which third parties may be engaged include:

5.5.1 Remediation contractor

A remediation contractor may be engaged by an authority or by a responsible person. A remediation contractor would be a company or consortium with experience and technical expertise in remediation techniques and implementation of remediation works. Remediation contractor may work on specific scope of work or may undertake turnkey implementation. Turnkey implementation may cover, apart from technical measures for remediation, engaging with local communities and stakeholders, program management, fund management, obtaining permits and licenses, monitoring and supervision, etc.

Central and State Governments would encourage state owned enterprises, agencies and departments that have significant civil construction and project management experience to develop stakeholder management capabilities, enter into joint business arrangements for remediation techniques and enhance skills to act as remediation contractors.

5.5.2 Site investigator

A site investigator may be engaged when an authority intends to carry out additional checks or may be engaged by persons covered under the mandatory site investigation and reporting regime or may be used by responsible persons during remediation.

Site investigator would be a company with experience in conducting preliminary investigation, detailed site investigation and monitoring and verification of polluted sites. It may have laboratory infrastructure to analyse and test samples collected or may be an independent service provider.

The National Program would leverage on CPCB and SPCB laboratories as well as the presence of private laboratories that have been notified by the CPCB. Such labs may be evaluated whether they meet the requirement of test equipment, calibration and trained technicians and experts for the purpose of analysing hazardous substances under the National Program.

Further, the environment consulting organisations would be encouraged to develop skills and expertise in conducting site investigation and assessments using the guidelines under the National Program.

5.5.3 Advisors

There may be a requirement for retaining external experts to provide an independent opinion on certain matters, for reviewing reports or for certain specific skill set that is not available within the Authority.

Advisors may be engaged for a specific scope of work covering legal services, valuation, remediation planning, remediation supervision, community engagement, outreach and education, monitoring and evaluation, etc.

5.6 Public access to information

Public would have access to information on polluted sites and the nature of site restrictions so that they are aware of contamination where they live or work. Investors may use the information to make informed choices about acquiring land or industry. Access to information by general public covering each aspect from identification of probably contaminated sites to post remediation activities would contribute to transparency and public involvement. CPCB would establish a policy for making appropriate site information available to the public. CPCB may charge a fee for making appropriate additional details available.

5.7 Outreach and communication program

Outreach and communication programs at the national and state levels would be targeted to promote greater awareness of contamination and associated health hazards and impacts. The programs would also promote greater involvement of public and local communities in remediation activities. Engaging the public would be essential for promoting the site reuse post remediation due to stigma that may be attached with polluted sites. CPCB would develop and implement an outreach and communication program.

5.8 Research and development program

The primary objective of National Program is to eliminate or minimize threat to human health and environment. The impact of hazardous substances covered under the National Program on human health would be addressed jointly by the environment and public health authorities. CPCB would prepare a list of top hazardous substances found in polluted sites based on the results of the site investigation currently underway for the 100 sites and engage with public health authorities and research institutions for preparation of toxicological profile, identification of signs of health impacts and appropriate treatment. Over a period of time, this list would be expanded to cover other hazardous substances that are prominently found in polluted sites.

Developing low cost and effective remediation techniques would significantly assist in meeting the National Program objectives. CPCB would prepare a list of remediation techniques that are most commonly required for polluted sites in India and engage with the research institutions to develop appropriate low cost remediation techniques, conduct field trials and establish the use of such techniques.

The National Program would finance up to research grants for health impact and remediation techniques. Research institutes in the areas of health, science, engineering and technology may be engaged by the CPCB to undertake research with regard to health impacts of polluted sites and development of cost effective remediation techniques suitable for site conditions in India.

6 Financial mechanism

This chapter provides an approximate estimate of the cost of National Program and share of public funds that may be required and identifies key financial mechanisms in short term and long term under the National Program.

6.1 Short Term- Public Fund and Financial Mechanisms

6.1.1 Fund for remediation in the short term

While polluter paying for remediation is the ideal scenario in the context of remediation of polluted sites, there will be instances when it is not possible to trace the polluter or the polluter may have closed down or become bankrupt. In those cases, for the shorter term one or more of the following options would be adopted.

- a) **CSR Fund:** The Clean Ganga fund is an appropriate example of utilizing CSR money for remediation purposes. The Central Government may consider setting up a similar trust fund that can utilize the resources to remediate the site and improve the quality of environment within the state or at a national level. In that case, contributions would be sought from industrial units and service sector organizations and the fund would be utilized for remediation related activities for orphan sites having non-industrial use, i.e., in villages, agricultural land, water bodies and urban residential areas. City level remediation programs can also be initiated for the metros and larger cities where citizens and service sector organizations are encouraged to contribute to remediation related activities.
- b) **Budgetary sources:** Financing from state government and central government is the last resort for remediation of orphan sites because this goes against the polluter pays principle. However, risk of damage to environment and consequent threat to human health, flora and fauna would mean that action would have to be taken using budgetary sources for orphan sites. Lack of budget cannot be used as a reason to delay action as has been observed by the Hon'ble Supreme Court in *Dr. B. L. Wadehra v. Union of India* AIR 1996 SC 2969. Initial financing for preparatory activities under the National Program like conducting site assessments, laboratory upgrades, training and capacity building, technical assistance, software for site registry, identifying polluters, etc. would have to be provided to the State Boards and Central Boards. Absence of adequate budget for the preparatory activities can severely hamper the identification and management of contaminated sites.

6.1.2 Use of Bank Guarantee for Cost Recovery

Bank guarantee would be an important instrument for securing environmental compliance and in the event that pollution is detected, the bank guarantees from the polluters can be invoked to

ensure availability of financing for undertaking remediation activities. NGT has upheld the use of bank guarantee for securing environmental performance which can be utilized for remedial purposes keeping in mind that condition requiring the respondents to furnish the bank guarantee is not penal and the Bank guarantee shall be utilized for the compensatory purposes or restoration of the degraded environment. As per interpretation of Indian environmental remediation of contamination and environmental damages is considered as a compensatory activity in contrast with violation/non-compliance of law which is penal. Therefore revoking Bank Guarantee will be applicable for recovery of remediation cost.

Procedures would have to be developed to set the amount of bank guarantees required for (i) normal course of business, (ii) suspected pollution (for example, contaminated areas identified by the Central Board under the Comprehensive Environmental Pollution Index applied to 88 industrial clusters where the index score was highest in terms of soil and water pollution), (iii) when a pollution has been detected.

6.1.3 Arrears of Land Revenue

In the case of land owner being a polluter (e.g., the industrial unit where the discharge took place), then the polluter has to pay for remediation and if it fails to do so, the money would be recovered as arrears of land revenue or of public demand.

6.1.4 Waste exchange platform

A win-win model for Industrial waste exchange is around using the residual heat in the solvents (e.g. wastes from bulk drug industries) in cement kilns. Andhra Pradesh Pollution Control Board (APPCB) has successfully piloted this model. These solvents are hazardous in nature in absence of a business model; the bulk drug industries dump these solvents in barren/forest lands illegally to avoid cost of transportation of these wastes to an authorized treatment/disposal site. With implementation of this exchange model, cement industries get cheaper fuel and bulk drug industries are able to realize the commercial value of the waste. The model leads to prevention of soil and water contamination from illegal dumping of wastes. There is a need to assess feasibility of similar waste-exchange models across industry sectors in the country.

6.1.5 Public Private Partnerships

There are ample examples in the country where Public Private Partnership (PPP) models are implemented in the space of environmental pollution abatement and wellbeing. One is MoEFCC's initiative on TSDFs. Under this funding mechanism a maximum 2 crore is funded by the Central Government and the remaining fund is provided by State Government and the private entities. TSDFs are set up on a PPP basis according to the principle of Build, Operate and Own. Under Jawaharlal Nehru National Urban Renewal Mission, Urban Local Bodies partnered with private sector companies based on the same principle. In case of remediation, site owners (who are not responsible person/polluter), buyers interested in the commercial use of the land post remediation can get into such PPP models with the government on the principles of Build, Operate and Own where they remediate and reuse the land to their benefits.

6.2 Long Term- Program cost over next 10 years

Given the nascent stage of the remediation activities in India, there are significant uncertainties in ascertaining the program cost, both in terms of estimating the extent and nature of remediation required in the country as well as the unit remediation cost. In almost all instances, there are no benchmarks available that can be applied in the Indian context to estimate the components of program cost. The significant uncertainties notwithstanding, an attempt has been made to estimate the program cost and the relative share of public funds, so that appropriate financial mechanisms are put in place and initial funding be secured.

All estimates in this chapter are budget estimates for planning purpose rather than firm estimates.

6.2.1 Key assumptions

Some of the key assumptions that have been made to estimate the program cost over 10 years are:

- (i) The current inventory of 320 sites is expected to at least double, i.e., additional 320 sites would be added over the next 10 years, as the general trend in identification of sites internationally shows that the inventory of sites grows significantly compared to the initial inventory once standards are defined, institutional capacities are established and identification processes are strengthened. All identified sites will require investigation to assess whether the site is a polluted site.
- (ii) It is estimated that a majority of the sites, say 75%, will require remediation. It is expected that over the next 10 years, 480 sites will be remediated while the balance 160 sites that were subject to investigation would not require remediation.
- (iii) Unit cost of implementation of remediation, all inclusive, is estimated to be Rs. 33.5 crore per site. Unit cost of identification, preliminary and detailed investigation is

estimated to be Rs. 0.50 crore per site. These are based on average site remediation estimates prepared under Assignment 2. Site conditions, site area, nature of contamination, extent of contamination, land use patterns, etc. can vary significantly and therefore these estimates should be seen as budgetary estimates.

- (iv) The above cost does not include any amount for restoring and improving the quality of environment, flora and fauna that were lost due to contamination. In the absence of any estimates, a budgetary amount of 20% of the cost of implementation of remediation has been provided.
- (v) Project management, technical assistance costs, site registry database, legal costs, etc. are budgeted at 10% of the overall program cost.
- (vi) Training and capacity building costs, outreach and communication programs, setting up of remediation authority, online monitoring of hazardous waste generation, transport and disposal, research and development, upgrading lab infrastructure, etc. are budgeted at 10% of the overall program cost.

6.2.2 Summary of program cost

The total program cost is estimated to be Rs 22,700 crore over 10 year period. Component-wise estimate of the program cost is set out in Table 3 below.

Table 3: Estimate of program cost (10 years)

Program Cost components	Amounts (Rs Crore)
Identification of 320 sites, preliminary site assessment of 540 sites and detailed investigation of 480 sites	300
DPR, remediation implementation, post-remediation monitoring, etc. of 480 sites	16000
Restoring and improving the quality of environment, flora and fauna at the remediated sites	3200
Project management, technical assistance costs, site registry database, legal costs, etc.	1600
Training and capacity building costs, outreach and communication programs, setting up of remediation authority, online monitoring of hazardous waste generation, transport and disposal, research and development, upgrading lab infrastructure, etc.	1600
Total	22,700

6.3 Share of public funds

There is currently no basis to estimate the number of sites that would be remediated by responsible persons or the stage in remediation process when responsible persons may be determined and consequently, there is no basis to estimate the amount of public funding required. Public funds would be required to meet upfront financing requirements (if responsible persons are determined later in the remediation process) and financing of remediation where responsible person cannot be identified.

As *polluter pays* principle is a stated National Program objective, it is assumed that in 75% of cases, the responsible person would eventually pay for remediation costs and the balance 25%

of cases would be financed through public funds without cost recovery. However, given the nascent stage of development and the likely time consuming litigations that will follow, it is likely that public funding would be required to fund the entire requirement in the initial years with the expectation that money will be recovered from responsible person over the years. For budgeting purpose, the entire quantum of program cost will be planned through public funding. Once cost recovery begins, the amount of public funding may be reduced or may be redeployed.

6.4 Financing mechanism – public fund

6.4.1 Contributions

The public fund und may receive contributions from Central Government and money received from levy of cess and recovery of remediation costs and payment of penalties and damages. Money for the fund may be raised by levying a cess as duty of excise, through the Finance Act, on industries that are listed as processes generating hazardous waste under Schedule 1 of the HW(MH&TM) Rules 2008. This is based on the following considerations:-

- (i) no new tax reduces administrative burden of collecting tax;
- (ii) cess is sufficiently broad-based so that it does not distort competition, trade or investments;
- (iii) cess covers the list of processes that generate hazardous waste which is in line with *polluter pays* principle when viewed at the national level;
- (iv) change to the financing requirements may be reviewed on a periodic basis and the cess may be amended or removed once the National Program has achieved its objectives;

A provisional contribution of Rs 400 crore may be made to the fund through the budget in the first year so that the initial activities relating to investigations, DPR preparation, capacity development, program management, setting up of remediation authority etc. may be financed through the Fund until such time that contribution from levy of cess starts to flow.

6.4.2 Cess as duty of excise

The amount of excise duty collected under the commodity groups that involve hazardous waste generating processes are set out in Table 4 below:

Table 4: Central excise collection of select commodity groups

Commodity Group	Excise duty collections (Rs Crore)	
	2010-11	2011-12 (P)
Crude & petroleum products	76,546	74,829
Electrical and non-electrical machinery	5,356	6,417
Textiles	499	409
Chemicals, plastics & misc. chemical products	7,549	9,466

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Iron & steel and articles thereof	14,483	14,601
Non ferrous Metals	2,000	1,060
Cement	7,458	10,034
Motor vehicles and tractors	8,668	9,331
Pharmaceutical products	376	693
Paper & paper board	691	2,184
Cosmetics	385	495
Television receivers, etc.	121	138
Total	124,132	129,657

Source: Department of Revenue

Considering average excise duty collection of Rs. 130,000 crore, the cess works out to slightly lower than 2% of the excise duty collection on an average.

A cess of 2% of the excise duty would be levied on the following tariff headings and reviewed after 5 years:

- (i) Section-V Mineral products
- (ii) Section-VI Products of the chemical or allied industries
- (iii) Section-VII Plastics and articles thereof: rubber and articles thereof
- (iv) Section-VIII Raw hides and skins, leather, furskins and articles thereof; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk - worm gut)
- (v) Section-X Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard; paper and paperboard and articles thereof
- (vi) Section-XI Textiles and textile articles
- (vii) Section-XV Base metals and articles of base metal
- (viii) Section-XVI Machinery and mechanical appliances, electrical equipments; parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
- (ix) Section-XVII Vehicles, aircraft, vessels and associated transport equipment

6.4.3 Activities eligible for funding

The Fund may be used for financing the following:

Category – I (Annual plan) for financing preparatory activities including identification of polluted sites, preliminary investigation and identification of responsible persons and financing support activities including program management and implementation, technical assistance, training and development, setting up remediation authority, up-gradation of labs, establishing new labs, research and development, knowledge centres, solution exchanges, updating standards and

guidelines, establishing and updating site registry, communication and outreach, legal costs, etc.

Category – II (DPR) for financing DPR related activities including remediation investigation, remediation design and preparation of DPR

Category – III (Remediation works) for financing remediation works including implementation of remediation and post remediation plan and action;

Any financing that is related to:

- (i) Category – I (Annual Plan) would be grant based and finance up to 100% of the proposed annual plan
- (ii) Category – II (DPR) would be grant based and finance up to 100% of the proposed cost of DPR preparation (less any amounts paid by responsible person)
- (iii) Category – III (Remediation Works) would be grant based and finance up to 100% of the cost of implementation of remediation and post remediation plan and action (less any amounts paid by the responsible person less any contribution from the State Government)

All amounts collected from responsible persons, including compensation for damage to environment, payment of remediation costs and liability for violation of the Act would be credited to the Fund.

6.4.4 Appraisal Committee and Approval Forum

An Appraisal Committee and Approval Forum would be designated for appraising and approving financing from the Fund in line with the Delegation of Financial Powers Rules, 1978 as amended from time to time. The Appraisal Committee may appoint external experts for appraising the proposals. The Appraisal Committee would receive regular reports on use of funds and on the progress of the activities and programs.

The Appraisal Committee would forward its recommendation to the Approval Forum. The composition of Appraisal Committee and Approval Forum is set out in Table 5 below:

Table 5: Appraisal and approval limits

Limit	Appraisal Committee	Approval Forum
Up to Rs 20 crore	Additional Secretary and Financial Advisor, MoEFCC	Secretary, MoEFCC
>= Rs 20 crore and < Rs 50 crore	Standing Finance Committee of Department of MoEFCC	Minister, MoEFCC
>= Rs 50 crore and < Rs 75 crore	Standing Finance Committee of MoEFCC and representative of Department of Expenditure	Minister, MoEFCC
>= Rs 75 crore and < Rs 150 crore	Secretary, Department of Expenditure as Chairman of the Appraisal Committee, Secretary, Planning	Minister, MoEFCC

>= Rs 150 crore and < Rs 300 crore	Commission and Secretary, MoEFCC	Minister, MoEFCC and Minister, Ministry of Finance
>= Rs 300 crore		Cabinet Committee on Economic Affairs

An outsourced activity is eligible for financing provided it meets the above criteria and follows the MoEFCC guidelines for selecting third parties. All financing proposals would be prepared by the RPS Authority and submitted in a standard form and follow such time lines as set out by the Appraisal Committee.

Proposal for financing under Category – I (Annual Plan) may be submitted three months prior to the beginning of the new financial year and contain schedule of activities proposed during the following year, milestones and deliverables, roles and responsibilities and budgeted costs.

Proposals for financing under Category – II (DPR) would be accompanied by:

- (a) site investigation report(s)
- (b) priority listing of the site
- (c) polluted site notice
- (d) budgetary estimate of costs
- (e) such other matters as may be considered appropriate by the Appraisal Committee

Proposals for financing under Category – III (Remediation Works) would be accompanied by:

- (i) detailed project report, costing of remediation measures, costing of redevelopment measures, implementation plan and environment and social impact assessment report;
- (ii) responsible person orders and provision of financial securities;
- (iii) share of financing from State Government, if any, and requirement of balance financing;
- (iv) such other matters as may be considered appropriate by the Appraisal Committee.

The Appraisal Committee and Approval Forum would endeavour to make its recommendation to the Approval Forum or return the financing proposal to the RPS Authority within 90 days of receiving a proposal.

6.4.5 Review of Environment Relief Fund

There is currently a fund called the Environment Relief Fund (“ERF”) established under the the Public Liability Insurance Act, 1991 (PLI Act) to provide relief and compensation for victims of accident involving hazardous substance. The ERF is managed and administered by the United India Insurance Company. It receives inflows from insurance companies who collect an amount equal to premium of insurance policy, income from investments and compensation for environment damages caused. Claims for relief are determined by the Collector where the accident involving hazardous substance occurred. In case the claims exceed the insurance liability and ERF money, the Collector shall recover the balance money as arrears of land

revenue or of public demand. In case the amount of award exceeds the insurance liability, the excess amount shall be paid through the ERF. The Collector would recover the money from the owner the excess amount that was paid from the ERF and credit the amount to the ERF. The total amount lying in fixed deposits under ERF as on 31 March 2013 is Rs. 451.42 crore⁵.

In order to review the suitability of using the ERF and its mechanism for remediation, three aspects need to be considered – whether the inflows, fund management, approval and disbursal mechanism of the Environment Relief Fund can be aligned to the requirements of remediation.

- (a) Inflows: The inflows to ERF are through insurance premium collections while the inflows for the public fund for remediation will be through levy of cess. Further, the amounts involved in remediation will be significantly higher than the fund size of ERF.
- (b) Fund management: The ERF is managed by United India Insurance Company while the funds collected through levy of excise will need to be managed through the Public Account of Government of India.
- (c) Approval and disbursal mechanism: The approval and disbursal mechanism of ERF is through the district administration where the accident involving hazardous substance has taken place. The remediation program would require approval of the remediation schemes through MoEFCC (and MoF) and would not ordinarily involve the state government or district administration. The disbursements under the remediation program will be to remediation contractors and other third parties involved with remediation and will require specialized procurement and contracting skills that the ERF fund manager or the district administration may not possess.

PLI Act has a narrow purpose to deal with insurance for providing immediate and minimum relief to victims of accidents while handling hazardous substances. Further, as explained in section 3.2.4, the aspects of providing relief, aid and compensation to people affected by contamination would be outside the National Program and therefore, the fund for dealing with people related issues and environment related issues may be kept separate. The National Program would therefore create a dedicated non-lapsable National Environmental Restoration Fund would be established in the Public Account through an amendment of the Act.

An amendment to the NGT Act may also be required. Currently, the NGT Act provides for compensation or relief determined by the Tribunal on ground of damage to environment be credited to the ERF which may be utilised for purposes relating to environment in the manner prescribed under the NGT Act. The reference to ERF would be amended to National Environmental Restoration Fund.

6.5 Financing mechanism – polluter pays

The challenges to determining the responsible persons and making them pay for remediation cannot be underestimated. It is expected that several cases for remediation would be contested and therefore a systematic approach to identifying the responsible person and gathering

⁵ Annual Report of United India Insurance, FY 2012 – 13

evidence and information on the responsible person would be followed and refined with experience.

There are two routes to identifying responsible persons that may be followed in any order depending upon the site context:

- (i) begin with the site owner or occupier where contamination has been detected: all records relating to land ownership, lease agreements, permits, consents, licenses, description of industrial activity, annual returns with registrar of companies, significant suppliers and customer contracts, transport agreements, shareholder agreements directors and management of the company would be obtained and examined to identify potentially responsible persons. Such persons would be directed to provide further information relevant to their business activities;
- (ii) begin with the hazardous substance found at polluted site: All industrial processes in the vicinity of site (which may be determined based on experience) that are capable of generating such hazardous substances or are capable of generating such substances that may convert into hazardous substance at site would be identified. SPCB records, information with the industries department, municipal records and information with the inspector under the Factories Act, 1948 would be used to identify all industrial units that may handle such hazardous substance. Such industrial units would be directed to provide further information relevant to their business activities.

Once the potentially responsible persons are identified and have responded to information requests, an assessment would be made about the persons who may be responsible and the information that is available to establish a *prima facie* case against such persons.

Given that the key objective of this exercise is to make the responsible person pay for remediation, an assessment would be made about the paying capacity of such persons. Additional information on the financial standing of such companies would be sought including significant financing agreements, annual reports, previous credit assessment reports, previous valuation reports, bank statements, insurance policies, credit limits with banks and information on related parties.

6.6 Financing mechanism – increase in land value

If there are unrecovered costs, i.e., costs not fully recovered from responsible persons and the site owner is not a responsible person, such amounts may be recovered from increase in land value post remediation. This is based on the principle that taxpayer money has been used to benefit the site owner and therefore, the site owner should return the amount of increase in land value due to remediation. It is important to note that the site owner may be any person including government authorities, municipalities, private persons, buyers/ real estate developers interested in the land etc.

There are valuation methodologies available and used internationally that deal with valuation of polluted sites. They follow the same generic valuation principles of cost based approach, income based approach and sales comparison approach. However, they may be modified

significantly to consider damages (person, property or environment), penalties (if applicable), remediation, monitoring, restrictions on site activity, stigma associated with polluted sites and uncertainty associated with extent of remediation and remediation costs.

These methodologies may be adapted to Indian context and the site valuation experts may be encouraged to adopt these approaches and develop knowledge-base around such methodologies.

From the time that a polluted site is notified to the time that remediation has been completed, the value of the site is likely increase on account of reasons that may be attributed to remediation including:

- (i) greater certainty with respect to costs, claims and penalties – many of which may have been settled;
- (ii) a change to land use and site activity post remediation may have been allowed, which may significantly impact value;
- (iii) incentives may have been provided by the State Government for reuse of remediated sites.

However, there is also going to be a general increase in asset value over time, considering that remediation process may take several years.

In order to fairly determine the increase in value of land, the valuation approach for polluted site would be followed which would be indexed by a suitable indexation factor, e.g., income tax indexation for capital gains. Such indexation may be made from the time such site was notified until completion of remediation. At the time of completion of remediation, another valuation may be undertaken and the difference from the indexed original value of the site may be attributed to remediation and recovered from site owner. Such recovery may be restricted to the amount of public funds used for the purpose of remediation.

6.7 Financing mechanism – insurance

Insurance market currently plays a limited role in matters relating to discharge of hazardous substance through the public liability insurance product that covers accidental death, injury and loss or damage to property. The public liability insurance product usually excludes any liability on account of pollution or transportation of materials.

Insurance market may be expected to play a more significant role once the nature of risks and the nature of liabilities in context of remediation are better understood. CPCB as the program manager would be entrusted with the task of engaging with the insurance regulator and the insurers and work towards the development of insurance market. It is expected that such engagement with insurance regulator and insurers would start after there is experience with the adjudication process for determination of responsible persons and would therefore be undertaken after a period of 3 years from commencement of National Program.

Such insurance products may be on the following lines:

- (i) insurance for land owners (not engaged with hazardous activity) against illegal dumping
- (ii) insurance for land owners who may have become responsible person solely on account of migration of contamination
- (iii) insurance for parent companies, promoter groups and companies who contract hazardous activity
- (iv) insurance for persons ordinarily engaged in hazardous activities against accident or negligence leading to discharge of hazardous substance

Companies operating in industrial clusters that are susceptible to contamination may be encouraged to look at self-insurance mechanisms.

Appendix A-Contaminated Sites (Identification and Management) Rules, 20XX (Short Term)

In exercise of the powers conferred by sections 3, 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules, namely:-

CHAPTER-I

PRELIMINARY

1. SHORT TITLE AND COMMENCEMENT:-

- (1) These rules may be called the Contaminated Sites (Identification and Management) Rules, 20xx.
- (2) They shall come into force on the date of their publication in the official Gazette.

2. APPLICATION:-

- (3) These Rules shall apply to sites that may be contaminated by one or more substances contained in Schedule II of these Rules and shall not apply to sites contaminated by radioactive substances as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and the rules made thereunder.

3. DEFINITIONS:-

- (4) In these rules, unless the context otherwise requires,-
 - (a) "Act" means the Environment (Protection) Act, 1986 (29 of 1986);
 - (b) "Central Board" means the Central Pollution Control Board constituted under sub-section (1) of section 3 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);
 - (c) "contaminant" means one or more substances contained in Schedule 2 of the Rules;
 - (d) "contamination" means discharge of contaminant at a site or migration of contaminant to a site or presence of contaminant in the environment;
 - (e) "contaminated site" is a delineated area consisting of aggregation of contamination sources, the areas between contamination sources, and areas that may contain contaminants due to migration from contamination sources so determined in accordance with Rule 4 of these Rules;

- (f) “discharge” means any act of spilling, releasing, leaking, dumping, pouring, pumping, emitting, emptying, injecting, escaping, leaching or disposing contaminants into the environment including drums, barrels, containers containing such contaminants;
- (g) “facility” means any establishment, vehicle, ship or premise wherein the processes incidental to handling of a contaminant are carried out;
- (h) "handling", in relation to any substance, means the manufacturing, processing, treatment, packaging, storage, transportation, use, collection, reception, recycling, recovery, reuse, destruction, conversion, disposal, offering for sale, transfer or the like of such substance;
- (i) “land use and site activity” means any generic land use including residential, agricultural, industrial, commercial or public use and any site specific activity, whether designate in a plan in force by law or the actual use of such land or site, that may expose a receptor to a contaminant including but not limited to use of or contact with soil, use of or contact with surface water or municipal water supply and abstraction and use of or contact with ground water and related activities including construction, excavation, drilling, demolition, industry, operation, process, residence, commerce, trade, entertainment, recreation, education, cultivation and movement of vehicles and people;
- (j) “notification” means a notification published in the Gazette of India or, as the case may be, the Gazette of a State and the expression “notify” shall be construed accordingly;
- (k) "occupant", includes (i) in relation to any facility or part of facility, means a person who has authority, control, oversight, responsibility or influence over the facility or part of facility or has the capacity to impose any requirements or influence any practices directly or indirectly relating to any environment, health, safety and security aspects, and in case of land and building, includes a tenant (ii) in relation to any substance, the person in possession of the substance (iii) in relation to transport of a substance, a person engaged in the off-site transportation of the substance by air, rail, road or water;
- (l) “person” means a person defined in The National Green Tribunal Act, 2010;
- (m) “petition” means a petition made in accordance with the Rule 6 of these Rules;
- (n) “probably contaminated site” is an area (whether or not delineated) where the presence of contaminants is suspected but not conclusively determined or where contaminants exceed specified standards but the threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property with regard to present or future land use and site activity is not conclusively established. A probably contaminated site may require further investigation to establish whether it is a contaminated site that requires remediation. The area may consist of aggregation of contamination sources, the areas between contamination sources, and areas that may contain contaminants due to migration from contamination sources;

- (o) “public authority” means in any government authority or agency or department that is entrusted with the responsibility for industrial development related matters, urban development related matters, ground water related matters, water and sanitation related matters, public health related matters, animal health related matters, agriculture related matters, soil conservation and agriculture related matters, environment related matters, safety related matters, administration related matters and law and order (including traffic) related matters in the context of a site and includes town planning authority (by whatever name called) set up under any law for the time being in force, a Panchayat as defined in article 243 and a Municipality as defined in article 243P, of the Constitution, land and land revenue departments of State Government;
- (p) “remediation”, means the doing of any works, or carrying out of any operations or taking of any steps in relation to a contaminated site for the purpose of (a) identifying or investigating or preventing or minimising or remedying or mitigating the adverse effects by reason of which contaminated site is such site; (b) restoring the quality of environment at the site to an acceptable level; and includes making of subsequent inspections from time to time for the purpose of keeping under review the condition of the site in question;
- (q) “remediation costs” means costs of remediation determined in accordance with Rule 7 of these Rules;
- (r) “response level” are generic levels of contaminants in soil and sediments in at or above which it is very likely there is threat to human health or the environment, that may be imminent, and these are provided in Schedule 2 of the Rules;
- (s) “responsible person” or “person responsible” means one or more persons responsible for remediation of contaminated sites determined in accordance with Rule 6 of these Rules;
- (t) “screening level” are generic concentrations of contaminants in soil, sediments, ground water and surface water distinguished by land use at or below which potential risks to human health or the environment are not likely to occur and where no further investigation and assessment is needed, and these are provided in Schedule 2 of these Rules;
- (u) “site” means any area, place, premise, establishment, land and related structures including well, pit, pond, lagoon, landfill, groundwater, sediments, building, structure, pipeline and container and any facility, factory, industry, operation, process or equipment located over such area;
- (v) “site registry” means a registry established and maintained in accordance with Rule 10 of these Rules;
- (w) “source” in relation to a contaminant means the location from which a contaminant has entered or may enter the environment including the soil, water and sediments that have

been contaminated at the point of entry of the contaminant but excludes contamination through migration;

- (x) "specified industrial activity" means an industry, operation or process contained in Schedule 1 of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and such other industry, operation or process as may be notified from time to time;
- (y) "State Government" in relation to a Union territory means, the Administrator thereof appointed under article 239 of the Constitution;
- (z) "State Board" means the State Pollution Control Board or the Pollution Control Committee constituted under sub-section (1) of section 4 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);

Words and expressions used in these rules and not defined but defined in the Act shall have the meanings respectively assigned to them in the Act.

4. MANDATORY SITE ASSESSMENT:-

- (5) A person shall conduct a site assessment at its own cost and submit a copy of the report to the State Board when filing an application for
 - (a) obtaining or renewing consent under section 25 and 26 of the Water Act, 1974;
 - (b) obtaining environmental clearance under the Environment Impact Assessment Notification 2006, for all category "A" projects and category "B" projects;
 - (c) obtaining or renewing authorisation under rule 5 or registration under rule 8 or permission for import of hazardous waste under rule 16 of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008.
- (6) In addition to sub-Rule (1), where any specified industrial activity was or is being carried out, a site assessment shall be carried out and the report shall be submitted to the State Board, by the following persons under the following circumstances:
 - (a) at least 30 days prior to filing application for land use change, by the owner of the site;
 - (b) at least 10 days prior to the signing agreement for sale or lease of land (including land that is part of establishment or facility), by the owner of the site;
 - (c) at least 60 days prior to filing application for removal of soil from site, by the person carrying out such activity;
 - (d) at least 30 days prior to applying for a permit to construct on such site, by the owner or occupant of the site;

- (e) at least 30 days prior to the commencement of demolishing any property, building or structure and decommissioning any industry, operation or process, by the owner or occupant of the facility;
 - (f) within 60 days of signing an agreement for any change in ownership of a company that owns or leases such site or is owner or occupant of the facility, by the company.
- (7) A trustee, receiver or liquidator or any person who takes possession or control of a site for the benefit of lenders or creditors shall carry out site assessment at its own cost and submit the report to the State Board within 30 days of taking possession or control, if the site has been or is being used for specified industrial activity.
- (8) A public authority owning or having jurisdiction over land and facilities susceptible to contamination shall establish and carry out such processes and procedures that facilitate early detection and prevention of contamination in consultation with the State Board.
- (9) If the State Board suspects existing or threat of contamination in a site, it may direct the owner or occupant of the site to conduct a site assessment at its own cost and within the time frame specified and submit the report to the State Board.
- (10) Nothing contained in these Rules shall prevent the State Board or the Central Board to conduct any assessment or investigation on its own account or direct a person to carry out such assessment or investigation when it believes that there is an existing or threat of contamination.

5. DETERMINATION OF CONTAMINATED SITE:-

- (11) The site may be determined as contaminated site if on the basis of site assessment or investigation, it is concluded that the constituents and characteristics of contaminants discharged or otherwise come to be located at the site, exist at or above response levels and in conditions including possible combination of contaminants and interaction between contaminants and/or environmental constituents which pose existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property with regard to present or future land use and site activity.
- (12) The site may be determined as investigated site if on the basis of site assessment or investigation, the contaminants exist at or below the lower of screening levels and response levels and there is no existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property with regard to present or future land use and site activity.
- (13) The site may be classified as probably contaminated site or investigated site if on the basis of site assessment or investigation, it is concluded that the level of contaminants found do not meet the criteria under sub-Rule (1) or (2) above and further investigations should be

carried out to assess the threat to human health and the environment to determine whether it is a contaminated site or an investigated site.

Provided that such determination in sub-Rule (2) or (3) above shall not preclude further assessment or investigation of such site in future as and when circumstances merit such further assessment or determination.

(14) Notwithstanding anything contained in any other law but subject to the provisions of the Act, a contaminated site shall be remediated under the direction and supervision of the State Board or the Central Board.

6. PERSON RESPONSIBLE FOR REMEDIATION:-

(15) Every person who prima facie (a) caused or permitted or handled the contaminants whose discharge or threat of discharge may be the reason because of which the contaminated site is so designated, and (b) owns or occupies or owned or occupied the contaminated site are responsible person(s).

(16) A person shall be excluded from being a responsible person within the terms of sub-Rule (1) above if and only if the person proves that he did not cause or permit or handle any contaminant because of which the contaminated site is so designated or the person proves that he owned or occupied the site prior to the time of discharge of contaminant, as the case may be; and a different person or persons are solely responsible within the terms of sub-Rule (1) above.

(17) Notwithstanding the provisions of sub-Rule (2) above, a person shall automatically be a responsible person

(a) who has by contract outsourced any industry, operation or process to a person that is covered within the terms of sub-Rule (1) above;

(b) who is the parent company or the promoter of a company that is covered within the terms of sub-Rule (1) above;

(c) who has management and control over the person that is covered within the terms of sub-Rule (1) above;

(d) who is the result of one or more reorganization, amalgamation, reconstruction, acquisition, merger or demerger of a company that may have become a person covered within the terms of sub-Rule (1) above but for the reorganization, amalgamation, reconstruction, acquisition, merger or demerger;

(e) who (i) in any way, delays or obstructs the remediation of contaminated site or exercise of any powers by any authority or agency under the Act and these Rules (ii) does not provide full cooperation, assistance and access for remediation of contaminated site, (iii) does not follow any order, notice, or direction under the Act and these Rules (iv) does

not comply with any information request sought under the Act and these Rules, (v) obstructs or delays or prevents the hand-over of custody and control of the contaminated site or identification of responsible person, (vi) does not follow or fails to take such safeguards and restrictions on land use and site activity during and after completion of remediation of contaminated site (vii) fails to take any step as directed to stop any continuing discharge or prevent future contamination or prevent exposure of contaminants.

(18) A responsible person is absolutely, retroactively and jointly and severally liable for remediation costs, whether incurred on or off the contaminated site. A responsible person shall not be in any way be exempted or its liability reduced on account of any of the following factors:

- (a) whether the activity causing contamination and effects of contamination occurred at different points in time, including before coming of the Act;
- (b) whether the discharge of contaminants were within the limits prescribed under the Acts or the consents;
- (c) whether the requirement of a site assessment was neither mandatory nor expected as part of normal business practice and the person cannot be expected to carry out such investigations or examinations;
- (d) whether the contaminants were not notified prior to the commencement of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 or Hazardous Wastes (Management and Handling) Rules, 1989;
- (e) whether each and every source of discharge of contaminant or each and every responsible person has been identified;
- (f) whether it is possible to separately identify each contamination source, pathway or receptor when there are multiple sources of contamination (e.g., an industrial cluster or contamination of ground water); and
- (g) whether one or more responsible person(s) may be unable to pay their share of the liability.

7. REMEDIATION COSTS:-

(19) The remediation cost shall mean all costs of remediation of a contaminated site including but not limited to:

- (a) all costs associated with engaging third parties including contractors, consultants, specialists, experts, lawyers, laboratories, research institutes and public authorities;

- (b) all costs associated with investigation, survey, assessment, sampling, laboratory analysis, preparation, management, supervision, verification, reporting, review, approval, evaluation, corrective measures, project management, permitting, licensing, tendering and insurance;
 - (c) all costs associated with remediation and post remediation measures including site access measures, establishing project offices, excavation, removal, transport, filling, treatment, paving, repaving, replanting, boring, digging, pumping, operation, maintenance, supplies, utilities, equipment, material and vehicles;
 - (d) all costs associated with temporary or permanent relocation and rehabilitation of affected persons;
 - (e) all costs associated with organizing stakeholder, co-ordination, communication and conflict resolutions;
 - (f) all costs associated with securing and enforcing compliance with land use and site activity restrictions, obtaining custody and control of site and cost recovery;
 - (g) all costs associated with demolishing, repairing or rebuilding of any building and structure at the contaminated site;
 - (h) all costs associated any administrative or legal action or to cope with any harm or damage, including compensation for environmental damage and restoration of equality of environment;
 - (i) all taxes, duties and levies as applicable.
- (20) Without prejudice to the joint and several liability under sub-Rule 4 of Rule 6 of these Rules, the State Board or the Central Board may apportion costs using one or more of the following parameters:
- (a) Weight and characteristics of the contaminant discharged by each responsible person, on actual or estimated basis;
 - (b) Weight and characteristics of the contaminant discharged in excess of consent or authorisation conditions or discharge of contaminant in absence of consents or authorisations or in violation of orders and directions by each responsible person, on actual or estimated basis;
 - (c) Magnitude, capacity and financial prosperity of each responsible person.

Provided that nothing shall prevent the State Board or the Central Board to apportion costs equally among the responsible persons or to recover the entire remediation cost from any one responsible person.

(21) The State Board or the Central Board may direct the responsible person(s) to:

- (a) deposit sums of money in advance of incurring any element of remediation costs or the entire remediation costs on estimated basis;
- (b) submit bank guarantee for securing performance of a time-bound remediation plan;
- (c) submit bank guarantee for securing timely payments;
- (d) reimburse any remediation costs incurred;
- (e) pay directly to a third party in relation to any element of remediation costs incurred or expected to be incurred.

(22) The amounts specified pursuant to sub-Rule (21) shall be recovered together with interest (at such reasonable rate as the Central Government may, by order, fix) from the date when a demand is made until it is paid, as arrears of land revenue or of public demand.

8. DIRECTION FOR REMEDIATION

(23) The State Board may direct the responsible person to undertake any or all activities relating to remediation of contaminated sites including but not limited to:

- (i) undertake detailed site investigation, carry out risk assessment, establish remediation objectives and remediation design, prepare detailed project reports, execute remediation works and perform post remediation monitoring including the manner in which such activities shall be carried out and the time frame for carrying out such activities;
- (ii) provide such financial securities, make such payments including advance payments and in such time as directed;
- (iii) take prior consent of any change to the ownership of responsible person or its business;
- (iv) work under the direction and supervision and subject to such monitoring, reporting, verification and audit requirements as may be specified.

(24) The responsibility and liability set out in these Rules shall be in addition and not in derogation to the responsibility or liability of a person under any other law in matters relating to contaminated sites.

9. PROHIBITION OF ACTIVITIES RELATING TO CONTAMINATED SITE:-

(25) Notwithstanding anything contained in any other law for the time being in force, no public authority, government, agency or person shall or shall cause to

- (a) change the land use of a contaminated site;

- (b) transfer or change the ownership of any portion or all of land or building of a contaminated site;
- (c) transfer or change the ownership of any facility at the contaminated site including any transfer or change in ownership of the company that owns such facility at the contaminated site;
- (d) carry out any activity or cease an activity on the contaminated site including transfer or transport of any material to or from the contaminated site.

without the written permission of the State Board, on such terms and conditions as the State Board considers appropriate.

10. PRIORITIZATION OF CONTAMINATED SITES:-

- (26) The Central Board shall prepare and keep updated the priority of remediation of contaminated sites based on such factors as it considers appropriate including the risks and hazards to human health and environment. The State Board may undertake remediation of the highest priority contaminated sites in the state.
- (27) The State Government may direct the State Board to select other sites in the priority list or change the priority listing based on such factors as it considers appropriate. The State Government shall record its decision to change the order of priority of any site.

11. MAINTAINING A SITE REGISTRY:-

- (28) The Central Board may establish and, in consultation with the State Board, keep updated a site registry that contains all information on sites including
 - (a) site description and location;
 - (b) extent and level of contaminant and threat to human health and environment damage;
 - (c) all information on the site including but not limited to records, documents, maps, petitions, reports, orders, notices, approvals, decisions, communication, plans evidences, court proceedings and noting in land register;
 - (d) land use and site activity restrictions;
 - (e) status of remediation process;
 - (f) contact details of all persons associated or involved with the site or remediation;
 - (g) such other information that the Central Board may deem appropriate.
- (29) The Central Board may provide for public access to such information in the site registry as it may consider appropriate. The Central Board may charge a fee for making available such

additional details of a site as it may consider appropriate, subject to confidentiality requirements, to an interested person. It shall publish and follow a procedure for keeping the public informed on contaminated sites and for making an application along with fees for providing additional details.

12. PETITIONS:-

- (30) Any person may submit a petition relating to contamination or presence of contaminants in a site with such details as may be available in a format specified in Schedule 1 of these Rules.
- (31) Upon receiving a petition, the State Board shall take appropriate action by carrying a review of the petition and conducting such procedures to determine whether a site assessment is warranted or if it has already been already carried out.
- (32) The State Board shall respond within reasonable time in writing to the petitioner stating the decision it has taken and provide reasons for its decision to the petitioner.
- (33) Any person who becomes aware of the presence of contaminants on a site or of discharge of contaminants is bound by duty to report, in the format specified in Schedule 1 of these Rules, to the State Board, as soon as practicable.

13. POLICIES, GUIDELINES, STANDARDS AND CHECKLISTS:-

- (34) For any matter connected with these Rules, the State Board or Central Board may make or amend enforcement policies, guidelines, standards, protocols, tools, manuals, methodologies and checklists in accordance with the provisions of the Act, Rules and good industry practices for its own use and for the use of any person engaged in the remediation of contaminated site. Unless otherwise directed by the State Board or Central Board and recorded in an order, a person shall substantially comply with the guidelines, standards, protocols, tools, methodologies and checklist requirements.

SCHEDULE 1

FORM FOR MAKING PETITION

The completed form should be delivered to the (regional) office of State Pollution Control Board.

Applicant Details

Name of petitioner
Address
Email
Telephone number

Site Details, (please provide a description where possible)

Relation of the petitioner to the site:

Owner of the site, tenant of the site, occupier or resident of the site or nearby site, use of the site for specific purpose, etc.

Site Location and description:

Address or coordinates. Attach a plan, sketch map /drawing with landmark information clearly identifying the site. If not possible describe the surrounding area and distance to notable landmarks, roads, rivers, etc.

Description of the land-use:

Habitation settlement/residential, agricultural land, industrial, forests, park, water body, waste land, or other.

Description of the signs of suspected contamination:

For example: well water that is discoloured or with bad taste or smell; unpleasant smells related to waste material or soil surface; human and animal health problems not related to general diseases or lack of food and water; damaged crops, plants or trees not to be related to lack of water or nutrients.). Containers containing suspected chemical substances.

Description of substances involved:

If possible please provide a description on the substances including symbols and / or labels on containers, chemical name (common name), solid/liquid/gas form, type of smell and colour.

Description of possible cause of the contamination:

Presence of (former or existing) industry buildings, materials stockpiles, industrial process equipment, storage tanks, broken pipelines, illegal dumping etc

Description of previous involvement of local or regional governmental agencies regarding contamination of the site (if applicable):

Date of receipt of the petition:

Reference number:

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SCHEDULE 2

SCREENING AND RESPONSE LEVELS

Chemical Name	Chemical Groups	Soil and sediment (Screening and Response Levels)						Drinking water (Screening levels)			Surface water Quality (Screening levels)					
		Levels in soil (HW Rules, 2008)	Response levels (Dutch Intervention levels)	Screening levels Soil Quality Guidelines for the Protection of Environmental and Human Health				Indian Standard for Drinking Water (IS: 10500:2012) - Maximum acceptable concentration	Guidelines for Canadian Drinking Water Quality	WHO guidelines for Drinking water	The Environment (Protection) Rules, 1986 Schedule VI General standards for discharge of environmental pollutants				Canadian Water Quality Guidelines for the Protection of Aquatic Life	Canadian Water Quality Guidelines for the Protection of Agriculture
				Agricultural	Residential/-parkland	Commercial	Industrial				Inland surface water	Public sewers	Land for irrigation	Marine coastal areas		
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
1,1,1-Trichloroethane (TCA)	Halogenated aliphatic compounds	5000	15	0,1	5	50	50	-	-	-	-	-	-	-	-	-
1,1,2,2- Tetrachloroethene (PCE)	Halogenated aliphatic compounds	5000	8,8	0,1	0,2	0,5	0,6	-	0.03	0,04	-	-	-	-	110	-
1,1,2,2-Tetrachlorethane	Halogenated aliphatic compounds	5000		0,1	5	50	50	-			-	-	-	-	-	-
1,1,2-Trichloroethane	Halogenated aliphatic compounds	5000	10	0,1	5	50	50	-	-		-	-	-	-	-	-
1,1,2-Trichloroethene (TCE)	Halogenated aliphatic compounds	5000	2,5	0,01	0,01	0,01	0,01	-	0.005	0,02	-	-	-	-	21	-/50
1,1-Dichloroethane	Halogenated aliphatic compounds	5000	15	0,1	5	50	50	-	-		-	-	-	-	-	-
1,1-Dichloroethene	Halogenated aliphatic compounds	5000	0,3	0,1	5	50	50	-	0.014		-	-	-	-	-	-
1,2,3,4-Tetrachlorobenzene	Halogenated aromatic compounds	50	2,2	0,05	2	10	10	-	-		-	-	-	-	1,8	-
1,2,3,5-Tetrachlorobenzene	Halogenated aromatic compounds	50	2,2	0,05	2	10	10	-	-		-	-	-	-	-	-
1,2,3-Trichlorobenzene	Halogenated aromatic compounds	50	11	0,05	2	10	10	-	-		-	-	-	-	8	-
1,2,4,5-Tetrachlorobenzene	Halogenated aromatic compounds	50	2,2	0,05	2	10	10	-	-		-	-	-	-	-	-
1,2,4-Trichlorobenzene	Halogenated aromatic	50	11	0,05	2	10	10	-	-		-	-	-	-	24	-

Development of National Program for Remediation of Polluted Sites
Task 4- A Report on National Plan for Remediation of Polluted Sites

Chemical Name	Chemical Groups	Soil and sediment (Screening and Response Levels)						Drinking water (Screening levels)			Surface water Quality (Screening levels)					
		Levels in soil (HW Rules, 2008)	Response levels (Dutch Intervention levels)	Screening levels Soil Quality Guidelines for the Protection of Environmental and Human Health				Indian Standard for Drinking Water (IS: 10500:2012) - Maximum acceptable concentration	Guidelines for Canadian Drinking Water Quality	WHO guidelines for Drinking water	The Environment (Protection) Rules, 1986 Schedule VI General standards for discharge of environmental pollutants				Canadian Water Quality Guidelines for the Protection of Aquatic Life	Canadian Water Quality Guidelines for the Protection of Agriculture
				Agricultural	Residential/ parkland	Commercial	Industrial				Inland surface water	Public sewers	Land for irrigation	Marine coastal areas		
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L
	compounds															
1,2-Dichlorobenzene	Halogenated aromatic compounds	50	19	0,1	1	10	10	-	-	1	-	-	-	-	0,7	-
1,2-Dichloroethane	Halogenated aliphatic compounds	5000	6,4	0,1	5	50	50	3	0.005	3	-	-	-	-	100	-/5
1,2-Dichloroethene	Halogenated aliphatic compounds	5000	1	0,1	5	50	50	-	-	0,05	-	-	-	-	-	-
1,2-Dichloropropane	Halogenated aliphatic compounds	5000	2	0,1	5	50	50	-	-	0,04	-	-	-	-	-	-
1,2-Dichloropropene (cis and trans)	Halogenated aliphatic compounds	5000		0,1	5	50	50	-	-		-	-	-	-	-	-
1,3,5-Trichlorobenzene	Halogenated aromatic compounds	50		0,05	2	10	10	-	-		-	-	-	-	-	-
1,3-Dichlorobenzene	Halogenated aromatic compounds	50		0,1	1	10	10	-	-		-	-	-	-	150	-
1,4-Dichlorobenzene	Halogenated aromatic compounds	50		0,1	1	10	10	-	0.005	0,3	-	-	-	-	26	-
1,4-Dioxane		-		-	-	-	-	-	-	0,05	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	Halogenated aromatic compounds	50		0,05	0,5	5	5	-	0.1		-	-	-	-	-	-
2,4,6-Trichlorophenol	Halogenated aromatic compounds	50		0,05	0,5	5	5	-	0.005	0,2	-	-	-	-	-	-
2,4-Dichlorophenol	Halogenated aromatic compounds	50		0,05	0,5	5	5	-	0.9		-	-	-	-	-	-
2,4-Dichlorophenoxyacetic acid (2,4- D)	Pesticides (Phenoxy herbicide)	-		-	-	-	-	0,03	-	0,03	-	-	-	-	-	-
3-Iodo-2-propynyl butyl carbamate	esticides, Carbamate Polycyclic aromatic hy	-		-	-	-	-	-	-		-	-	-	-	1,9	-
Acenaphthene	(PAH) Polycy	-		0.1 µg	1 µg	10 µg	10 µg	-	-		-	-	-	-	5,8	-

Development of National Program for Remediation of Polluted Sites
Task 4- A Report on National Plan for Remediation of Polluted Sites

Chemical Name	Chemical Groups	Soil and sediment (Screening and Response Levels)						Drinking water (Screening levels)			Surface water Quality (Screening levels)					
		Levels in soil (HW Rules, 2008)	Response levels (Dutch Intervention levels)	Screening levels Soil Quality Guidelines for the Protection of Environmental and Human Health				Indian Standard for Drinking Water (IS: 10500:2012) - Maximum acceptable concentration	Guidelines for Canadian Drinking Water Quality	WHO guidelines for Drinking water	The Environment (Protection) Rules, 1986 Schedule VI General standards for discharge of environmental pollutants				Canadian Water Quality Guidelines for the Protection of Aquatic Life	Canadian Water Quality Guidelines for the Protection of Agriculture
				Agricultural	Residential/-parkland	Commercial	Industrial				Inland surface water	Public sewers	Land for irrigation	Marine coastal areas		
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Acenaphthylene	(PAH) Polycy	-		0.1 µ	1 µ	10 µ	10 µ	-	-		-	-	-	-	-	-
Acridine	(PAH)	-		0.1 µ	1 µ	10 µ	10 µ	-	-		-	-	-	-	4,4	-
Aldicarb	Pesticides, Carbamate	-		-	-	-	-	-	0.009	0,01	-	-	-	-	1	54,9/11
Aldrin	Pesticides, Organochlorine	50	0,32	-	-	-	-	0.00003	0.0007	0,00003	-	-	-	-	0.004	-
Aliphatics nonchlorinated (each)	Non-halogenated aliphatic	-		0,3	-	-	-	-	-		-	-	-	-	-	-
Aluminium	compo Metal	-		-	-	-	-	0.03	-		-	-	-	-	Variable	5000/5000
Ammonia (total)	Inorganic	20000		-	-	-	-	0,5	-		5		5	Table	-	-
Ammonia (un-ionized)	Inorganic	-		-	-	-	-		-		-	-	-	-	19	-
Aniline	Organic Polycycl	-		-	-	-	-		-		-	-	-	-	2,2	-
Anthracene	(PAH)	50		0.1 µ	1 µ	10 µ	10 µ		-		-	-	-	-	12	-
Antimony (metallic)	Inorganic	50	22	20	20	40	40		0.006	0,02	-	-	-	-	-	-
Arsenic	Metal	50	76	12	12	12	12	0,01	0.01	0,01	0,2	0,2	0,2	0,2	5	100/25
Asbestos		5000	100	-	-	-	-		-		-	-	-	-	-	-
Atrazine	Pesticides, Triazine	-	0,71	-	-	-	-	0.002	0.005	2	-	-	-	-	1,8	10/5
Barium	Inorganic	20000	-	750	500	2000	2000	0.7	1.0	0,7	-	-	-	-	-	-
Benzene	Monocyclic aromatic compounds	50	1.1	0.050	0.50	50	50		0.005		0,01*	-	0,01*	0,01*	370	-
Benzo(a)anthracen	(PAH)	50		0.10	10	100	1014		-		-	-	-	-	18	-
Benzo(a)pyrene	(PAH)	50		0.10	10	100	100		0.00001		-	-	-	-	15	-
Benzo(b)fluoranthene	(PAH)	-		0.1 µ	114	100	100		-		-	-	-	-	-	-
Benzo(k)fluoranthene	(PAH)	50		0.1 µ	1 µ	10 µ	10 µ		-		-	-	-	-	-	-
Beryllium	Inorganic	50		4	4	8	8		-		-	-	-	-	-	100/100
Boron	Inorganic	-		2	-	-	-	0,5	5.0		-	-	-	-	1.5mg/L	5000/5000
Bromacil	Pesticides	-		-	-	-	-		-		-	-	-	-	5	0,2/1100
Bromoxynil	Pesticides, Benzonitrile	-		-	-	-	-		0.005		-	-	-	-	5	0,33/11

Development of National Program for Remediation of Polluted Sites
Task 4- A Report on National Plan for Remediation of Polluted Sites

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				Agricultural	Residential/ parkland	Commercial	Industrial				Inland surface water	Public sewers	Land for irrigation	Marine coastal areas		
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L
Cadmium	Metal	50	13	1,4	10	22	22	0.003	0.005		2	1	-	2	Equation	5,1/80
Calcium	Inorganic	-		-	-	-	-	75	-		-	-	-	-	-	-/1000000
Captan	Pesticides	-		-	-	-	-		-		-	-	-	-	1,3	-/13
Carbaryl	Pesticides, Carbamate	-	0,45	-	-	-	-		-		0.01	-	0.01	0.01	0,2	-/1100
Carbofuran	Pesticides, Carbamate	-	17	-	-	-	-		0.09		-	-	-	-	1,8	-/45
Chlordane	Pesticides, Organochlorine	50	4	-	-	-	-		-		-	-	-	-	0.006	-/7
Chloride	Inorganic	-		-	-	-	-	250	-		-	-	-	-	or 120 mg/L	Variable/-
Chlorothalonil	Pesticides	-		-	-	-	-		-		-	-	-	-	0,18	crops/170
Chlorpyrifos	Pesticides, Organophosphorus	5000		-	-	-	-	0,03	0.09	0,03	-	-	-	-	2	-/24
Chromium (total)	Metal	-	-	64	64	87	87		0.05	0,05	2	2	-	2	-	-
Chromium, hexavalent (Cr(VI))	Metal	50	78	0,4	0,4	1,4	1,4	0.05	-		0,1	2	-	1	1	8/50
Chromium, trivalent (Cr(III))	Metal	5000	180	-	-	-	-		-		-	-	-	-	8,9	4,9/50
Chrysene	(PAH)	50		0.1 µ	1 µ	10 µ	10 µ		-		-	-	-	-	-	-
Cobalt	Inorganic	5000	190	40	50	300	300		-		-	-	-	-	-	50/1000
Coliforms, fecal (Escherichia coli)	Biological	-		-	-	-	-		-		-	-	-	-	-	mL/-
Coliforms, total	Biological	-		-	-	-	-		-		-	-	-	-	-	mL
Colour	Physical	-		-	-	-	-	5 Hazen Units	-		-	-	-	-	Narrative	-
Conductivity	Physical	-		2 dS/m	2 dS/m	4 dS/m	4 dS/m		-		-	-	-	-	-	-
Copper	Metal	5000	190	63	63	91	91	0.05	-	2	3	3	-	3	Equation	Variable/variable
Cyanazine	Pesticides, Triazine	-		-	-	-	-		0.01	0,0006	-	-	-	-	2	0,5/10
Cyanide	Inorganic	50	50	0,9	0,9	8	8	0.05	0.2	0,07	0,2	2	0,2	0,2	5 (as free CN)	-/-
Cyanobacteria	Biological	-		-	-	-	-		0.0015		-	-	-	-	-	-/-
Debris	Physical	-		-	-	-	-		-		-	-	-	-	-	-/-

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mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Deltamethrin	Pesticides	-	-	-	-	-	-	-	-	-	-	-	-	-	0,0004	-/2.5
Di(2-ethylhexyl) phthalate	Phthalate esters	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-/-
Di-n-butyl phthalate	Phthalate esters	-	-	-	-	-	-	-	-	-	-	-	-	-	19	-/-
Di-n-octyl phthalate	Phthalate esters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-/-
Dibenz(a,h)anthracene	(PAH)	-	-	0.1 µ	1 µ	10 µ	10 µ	-	-	-	-	-	-	-	-	-/-
Dibromochloromethane	Halogenated methanes	5000	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-/100
Dicamba	Pesticides, Aromatic Carboxylic Acid	-	-	-	-	-	-	-	-	-	-	-	-	-	10	0,006/122
DDT Total (Dichloro diphenyl trichloroethane; 2,2-Bis(p-chlorophenyl)-1,1,1-trichloroethane)	Pesticides, Organochlorine	50	1,7	0,7	0,7	12	12	1	-	1	10*	-	10*	10*	0.001	-/30
DDD (Dichloro diphenyl dichloroethane, 2,2-Bis (p-chlorophenyl)-1,1-dichloroethane)	Pesticides, Organochlorine	50	34	-	-	-	-	1	-	1	-	-	-	-	-	-
DDE (Dichloro diphenyl ethylene, 1,1- Dichloro-2,2-bis(p-chlorophenyl)- ethene)	Pesticides, Organochlorine	50	2,3	-	-	-	-	1	-	1	-	-	-	-	-	-
DDT (Dichloro diphenyl trichloroethane; 2,2-Bis(p-chlorophenyl)-1,1,1-trichloroethane)	Pesticides, Organochlorine	50	1,7	-	-	-	-	1	-	1	-	-	-	-	-	-
Dichlorobromomethane	Halogenated methanes	5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-/100
Dichloromethane (Methylene chloride)	Halogenated aliphatic compounds	5000	3,9	0,1	5	50	50	-	0.05	0,02	-	-	-	-	98,1	-/50
Dichlorophenols	Chlorinated phenols	50	22	0,05	0,5	5	5	-	0.9	-	-	-	-	-	0,2	-
Diclofop-methyl	Pesticides	-	-	-	-	-	-	-	-	-	-	-	-	-	6,1	0,18/9
Didecyl dimethyl ammonium chloride	Pesticides	-	-	-	-	-	-	-	-	-	-	-	-	-	1,5	-
Dieldrin	Pesticides, Organochlorine	50	-	-	-	-	-	0.00003	-	0.00003	-	-	-	-	-	-
Diethylene glycol	Glycols	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Diisopropanolamine	Organic	-	-	180	180	180	180	-	-	-	-	-	-	-	1600	2 000/-
Dimethoate	Pesticides, Organophosphorus	5000	-	-	-	-	-	-	-	6	-	-	-	-	6,2	-/3
Dinoseb	Pesticides	-	-	-	-	-	-	-	0.01	-	-	-	-	-	0,05	16/150
Dissolved gas supersaturation	Physical	-	-	-	-	-	-	-	-	-	-	-	-	-	Narrative	-
Dissolved oxygen	Inorganic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Endosulfan	Pesticides, Organochlorine	50	4	-	-	-	-	0.0004	-	-	10*)	-	10*)	10*)	3	-
Endrin	Pesticides, Organochlorine	50	-	-	-	-	-	-	-	0,0006	-	-	-	-	0.0023	-
Ethylbenzene	Monocyclic aromatic compounds	20000	110	0.1	5	50	50	-	-	0,3	-	-	-	-	90	-/2.4
Ethylene glycol	Glycols Polycyc	-	-	960	960	960	960	-	-	-	-	-	-	-	192000	-
Fluoranthene	(PAH) Polycy	50	-	0.1 µg	1 µg	10 µg	10 µg	-	-	-	-	-	-	-	0,04	-
Fluorene	(PAH)	-	-	0.1 µg	1 µg	10 µg	10 µg	-	-	-	-	-	-	-	3	-
Fluorine		5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride	Inorganic	5000	-	200	400	2000	2000	1.0	1.5	1,5	2	15	-	15	120	1000/variable
Glyphosate	Pesticides, Organophosphorus	5000	-	-	-	-	-	-	0.28	-	-	-	-	-	800	-/280
Heptachlor	Pesticides, Organochlorine	50	4	-	-	-	-	-	-	-	-	-	-	-	0.01	-/3
Hexachlorobenzene	Halogenated aromatic compounds	50	2	0,05	2	10	10	-	-	-	-	-	-	-	-	-/0.52
Hexachlorobutadiene	Halogenated aliphatic compounds	5000	-	-	-	-	-	-	-	-	-	-	-	-	1,3	No data
Hexachlorocyclohexane (HCH)	Pesticides, Organochlorine	50	-	0,01	-	-	-	-	-	-	-	-	-	-	0,01	-/4
Hexachlorocyclohexane (alfa HCH)	Pesticides, Organochlorine	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane (beta HCH)	Pesticides, Organochlorine	-	1,6	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorocyclohexane (delta HCH)	Pesticides, Organochlorine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Hydrazine(s)		5000							-		-	-	-		-	
Imidacloprid		-		-	-	-	-		-		-	-	-	0,23	-	
Indeno(1,2,3-c,d)pyrene	(PAH)	50		0.1 µ	1 µ	10 µ	10 µ		-		-	-	-	No data	-	
Iron	Inorganic	-		-	-	-	-	0.3			3	3	-	3	300	5000/-
Lead	Metal	5000	530	70	140	260	600	0.01	0.01		0,1	1	-	2	Equation	200/100
Lindane (gamma HCH)	Pesticides, Organochlorine	50	1,2	-	-	-	-	0.002	-		-	-	-	-		
Linuron	Pesticides	-		-	-	-	-		-		-	-	-	7	0,071/-	
Lithium	Inorganic	-		-	-	-	-		-		-	-	-	-	2500/-	
Malathione	Pesticide, Organophosphorus	5000		-	-	-	-	0.19	0.19		10	-	10	10		-
Manganese	Inorganic	-		-	-	-	-	0.1			2	2	-	2	-	200/-
Mercury (inorganic)	Metal	50	36	6,6	6,6	24	50	0.001	0.001		0,01	0,01	-	0,01	0,026 9 (Tar)	-
Methoprene		-		-	-	-	-		-		-	-	-	-	Organism	-
Methyl tertiary-butyl ether (MTBE)	Aliphatic ether	-		-	-	-	-		-		-	-	-	-	10000	-
MCPA (Methylchlorophenoxyacetic acid (4-Chloro-2-methyl phenoxy acetic acid; 2-Methyl-4-chloro phenoxy acetic acid)	Pesticides	-	4	-	-	-	-		0.1		-	-	-	-	2,6	0,025/25
Methylmercury	Organic	5000		-	-	-	-		-						4	-
Methylparathion	Pesticide, Organophosphorus	5000		-	-	-	-	0.0003	-		10	-	10	10		-
Metolachlor	Pesticide, Organophosphorus	50		-	-	-	-		0.05						7,8	28/50
Metribuzin	Pesticides, Triazine	-		-	-	-	-		0.08		-	-	-	-	1	0,5/80
Molybdenum	Inorganic	5000	190	5	10	40	40	0.07	-	0,07	-	-	-	-	73	Narrative/500
Monobromomethane	Halogenated aliphatic compounds	5000		-	-	-	-		-		-	-	-	-	-	-
Monochlorobenzene	Halogenated aromatic	50	15	0,1	1	10	10		0.08		-	-	-	-	1,3	-

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	compounds															
Monochloromethane	Halogenated aliphatic compounds	5000		-	-	-	-		-		-	-	-	-	-	-
Monochlorophenols	Chlorinated phenols Polycyclic aromatic h	50	5,4	0,05	0,5	5	5		-		-	-	-	7	-	
Naphthalene	(PAH)	50		0.1 µg	1 µg	10 µg	10 µg		-		-	-	-	1,1	-	
Nickel	Metal	5000	100	50	50	50	50	0.02	-	0,07	3	3	-	5	Equation 000 µg/L	200/1000
Nitrate	Inorganic nitrogen compounds	20000		-	-	-	-	45	45	50	10	-	-	20	13 mg/L	0
Nitrate + Nitrite	Inorganic nitrogen compounds	20000		-	-	-	-		-		-	-	-	-	-	NO3+NO2-N
Nitrite	Inorganic nitrogen compounds	5000		-	-	-	-		-	3	-	-	-	-	60 NO2-N	-/10 000 NO2-N
Nonylphenol and its ethoxylates	Nonylphenol and its ethoxylates	-		5,7	5,7	14	14		-		-	-	-	-	1 da	-
Nutrients		-		-	-	-	-		-		-	-	-	-	Framework	-
n-hexane	Aliphatic hydrocarbon	-		0.49/6.5 #	0.49/6.5 #	6.5/21 #	6.5/21 #		-		-	-	-	-	-	-
Parathione	Pesticide, Organophosphorus	5000							-		-	-	-	-	-	-
Pentachlorobenzene	Halogenated aromatic compounds	50	6,7	0,05	2	10	10		-		-	-	-	-	6	-
Pentachlorophenol	Halogenated aromatic compounds Pesticides Organochlorine	50	12	7,6	7,6	7,6	7,6		0.06	9	-	-	-	-	0,5	-
Permethrin	compounds	50		-	-	-	-		-		-	-	-	-	4	-
Phenanthrene	(PAH) Non-h	50		0.1 µg	1 µg	10 µg	10 µg		-		-	-	-	-	0,4	-
Phenolic compounds (as C6H5OH)	compounds	5000	14	0,1	1	10	10	0.001	-		1	5	-	5	-	-
Phenols (mono- & dihydric)	Aromatic hydroxy compounds	5000		3,8	3,8	3,8	3,8		-		-	-	-	-	4	-/2

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mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Phenoxy herbicides	Pesticides	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-/100
Phosphorus (as P)	Inorganic	20000	-	-	-	-	-	-	-	-	5	-	-	-	Framework	-
Phthalic acid esters (each)	Phthalate esters	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-
Picloram	Pesticides Organic Po	-	-	-	-	-	-	-	-	-	-	-	-	-	29	-/190
PCBs (Polychlorinated biphenyls)	Polychlorinated biphenyls	50	1	0,5	1,3	33	33	0.0005	-	-	-	-	-	0.001	-	
Poly cyclic Hydrocarbon (PAH)		-	40					0.0001	-	-	-	-	-	-	-	-
Polychlorinated dibenzo-p-dioxins/dibenzo furans	Polychlorinated dioxins and furans	-	0,00018	4 ng TEQ.kg-1	4 ng TEQ.kg-1	4 ng TEQ.kg-1	4 ng TEQ.kg-1		-	-	-	-	-	-	-	-
Propylene glycol	Glycols	-	-	-	-	-	-	-	-	-	-	-	-	-	500000	-
Pyrene	(PAH)	-	-	0.1 µg	1 µg	10 µg	10 µg		-	-	-	-	-	-	25	-
pH	Inorganic Acidity, alkalinity and pH	-	-	6 to 8	6 to 8	6 to 8	6 to 8	6.5-8.5			5,5 - 9,0	5,5 - 9,0	5,5 - 9,0	5,5 - 9,0	6.5 to 9.0	-
Quinoline	(PAH)	-	-	0.1 µg	1 µg	10 µg	10 µg		-	-	-	-	-	-	3,4	-
Reactive Chlorine Species	compounds	-	-	-	-	-	-	-	-	-	-	-	-	-	0,5	-
Salinity	Physical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	Inorganic	50	-	1	1	2,9	2,9	0.01	0.01	0,01	0,05	0,05	-	0,05	1	Variable/50
Silver	Inorganic	5000	-	20	20	40	40	0,1	-	-	-	-	-	-	0,1	-
Simazine	Pesticides, Triazine	-	-	-	-	-	-	-	0.01	2	-	-	-	-	10	0,5
Sodium adsorption ratio		-	-	5	5	12	12		-	-	-	-	-	-	-	-
Streambed substrate	suspended solids Total particulate	-	-	-	-	-	-		-	-	-	-	-	-	Narrative	-
Styrene	Monocyclic aromatic compounds	20000	86	0,1	5	50	50		-	0,02	-	-	-	-	72	-
Sulfolane	Organic sulphur compound	-	-	0,8	0,8	0,8	0,8		-	-	-	-	-	-	50000	500
Sulphate	compounds	-	-	-	-	-	-	200	-	-	-	-	-	-	-	No data
Sulphur (elemental)	compounds	50000	-	500	-	-	-		-	-	-	-	-	-	-	-

Development of National Program for Remediation of Polluted Sites
Task 4- A Report on National Plan for Remediation of Polluted Sites

Chemical Name	Chemical Groups	Soil and sediment (Screening and Response Levels)						Drinking water (Screening levels)			Surface water Quality (Screening levels)					
		Levels in soil (HW Rules, 2008)	Response levels (Dutch Intervention levels)	Screening levels Soil Quality Guidelines for the Protection of Environmental and Human Health				Indian Standard for Drinking Water (IS: 10500:2012) - Maximum acceptable concentration	Guidelines for Canadian Drinking Water Quality	WHO guidelines for Drinking water	The Environment (Protection) Rules, 1986 Schedule VI General standards for discharge of environmental pollutants				Canadian Water Quality Guidelines for the Protection of Aquatic Life	Canadian Water Quality Guidelines for the Protection of Agriculture
				Agricultural	Residential/ parkland	Commercial	Industrial				Inland surface water	Public sewers	Land for irrigation	Marine coastal areas		
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Suspended sediments	suspended solids Total particulate	-	-	-	-	-	-	-	-	-	-	-	-	-	Narrative	-
Tebuthiuron	Pesticides	-	-	-	-	-	-	-	-	-	-	-	-	-	1,6	tame hays, and
Tellurium		50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	Physical Temperature	-	-	-	-	-	-	-	-	-	above	-	-	-	Narrative	-
Tetrachloromethane	Halogenated aliphatic compounds	5000	0,7	0,1	5	50	50	-	-	-	-	-	-	-	13,3	-/5
Tetrachlorophenols	Halogenated aromatic compounds	50	21	0,05	0,5	5	5	0.1	-	-	-	-	-	-	1	-
Thallium	Inorganic	50	-	1	1	1	1	-	-	-	-	-	-	-	0,8	-
Thiophene	Miscellaneous organic compound	-	-	0,1	-	-	-	-	-	-	-	-	-	-	-	-
Tin (inorganic)	Inorganic	5000	-	5	50	300	300	-	-	-	-	-	-	-	-	-
Tin (organic)		50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	Monocyclic aromatic compounds	20000	32	0.1	3	30	30	-	0,7	-	-	-	-	-	2	-/24
Total dissolved solids (TDS)	suspended solids	-	-	-	-	-	-	500	-	-	100	600	200	100	-	0
Total hydrocarbons (TPH) (mineral oil)		50000	5000	-	-	-	-	0,5	-	-	10	20	10	20	-	-
Toxaphene	Pesticides, Organochlorine	50	-	-	-	-	-	-	-	-	-	-	-	-	0.008	-/5
Triallate	Pesticides, Carbamate	-	-	-	-	-	-	-	-	-	-	-	-	-	0,24	-/230
Tribromomethane	Halogenated aliphatic compounds	5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-/100
Tributyltin	Organotin compounds	50	-	-	-	-	-	-	-	-	-	-	-	-	8	-/250
Trichlorfon		-	-	-	-	-	-	-	-	-	-	-	-	-	9	-
Trichloromethane (chloroform)	Halogenated aliphatic compounds	5000	0,7	0,1	5	50	50	0,2	-	0,3	-	-	-	-	1,8	-/100
Trichlorophenols	Halogenated aromatic compounds	50	22	0,05	0,5	5	5	-	0.005	-	-	-	-	-	18	-

Development of National Program for Remediation of Polluted Sites
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Chemical Name	Chemical Groups	Soil and sediment (Screening and Response Levels)						Drinking water (Screening levels)			Surface water Quality (Screening levels)					
		Levels in soil (HW Rules, 2008)	Response levels (Dutch Intervention levels)	Screening levels Soil Quality Guidelines for the Protection of Environmental and Human Health				Indian Standard for Drinking Water (IS: 10500:2012) - Maximum acceptable concentration	Guidelines for Canadian Drinking Water Quality	WHO guidelines for Drinking water	The Environment (Protection) Rules, 1986 Schedule VI General standards for discharge of environmental pollutants				Canadian Water Quality Guidelines for the Protection of Aquatic Life	Canadian Water Quality Guidelines for the Protection of Agriculture
				Agricultural	Residential/-parkland	Commercial	Industrial				Inland surface water	Public sewers	Land for irrigation	Marine coastal areas		
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	µg/L	µg/L	
Tricyclohexylin	Organotin compounds	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-/250
Trifluralin	Pesticides, Dinitroaniline	-	-	-	-	-	-	-	0,02	-	-	-	-	0,2	-/45	
Triphenyltin	Organotin compounds Physical Turbidity clar	50	-	-	-	-	-	-	-	-	-	-	-	22	-/820	
Turbidity	suspended solids Total particulate	-	-	-	-	-	1 NTU	0.1-1.0 NTU	-	-	-	-	-	Narrative	-	
Tungsten compounds		5000	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium	Inorganic	-	23	23	33	300	-	0.0s	15	-	-	-	-	15	10/200	
Vinylchloride	Halogenated aliphatic compounds	5000	0,1	-	-	-	-	0.002	0,0003	-	-	-	-	-	-	
Vanadium	Inorganic	5000	130	130	130	130	-	-	-	0,2	0,2	-	0,2	-	100/100	
Xylene	Monocyclic aromatic compounds	20000	17	0.1	5	50	50	-	0,5	-	-	-	-	-	-	
Zinc	Metal	20000	720	200	200	360	360	5	-	5	15	-	15	30	-/50000	

NR: No relaxation

#: CCME (Canadian Council of Ministers of the Environment). 1991. Interim Canadian environmental quality criteria for contaminated sites. CCME, Winnipeg.

#: coarse/fine sediment

Appendix B- Enforcement Policy on Contaminated Sites (Short Term)

Template to be customized by the State

1. CONTEXT

- (1) Under the National Program, the Central Government has prepared an inventory of probably contaminated sites, undertaken pilot remediation projects, developed technical Guidelines for remediation, notified Contaminated Sites (Identification and Management) Rules, 20xx and delegated authority to State Board and Central Board. The State Boards have undergone training programs on the technical Guidelines.
- (2) Given the complexity of issues involved in remediation and the obligation on the state authorities to apply the polluter pays principle, precautionary principle and sustainable development principle in a fair, objective and transparent manner, an enforcement policy is required which can be adapted by the states according to their context.

2. OBJECTIVES

- (3) The overarching objective of the Enforcement Policy on contaminated sites is to identify contaminated sites and to remediate them so that the unacceptable risks to human health and environment are removed and sites are made suitable for their current and future use.
- (4) The objective of this document is to aid and assist the state authorities by establishing procedure for identifying contaminated site, developing remediation scheme, identifying person responsible for remediation, apportioning liability where required and directing the responsible person to pay and remediate the site. This document also provides the institutional framework for remediation depending on the remediation context and related measures to be taken by the state authorities.
- (5) This document is intended to supplement the technical Guidelines under the National Program and the internal policies and procedures of the state authorities. This is a dynamic document and should be regularly updated based on the experiences gained by the state authorities.

3. SCOPE

- (6) The scope of this policy is restitution of environment under the National Program under a compensatory regime (as opposed to penal regime). This is because the legal mandate under the Environment (Protection) Act, 1986 and the Water (Prevention and Control of Pollution) Act, 1974 deal solely with environment (defined as air, water and land and their relationship with biotic components and assets) and do not cover matters relating to relief, compensation and restitution of victims of pollution and damage to ecology, property and assets.

(7) However, the process of restitution of environment will certainly aid and assist the victims of pollution and the restitution of ecology and the restitution of property damage in filing claims for relief, compensation or restitution at the National Green Tribunal as they can use the evidence base on contaminated site, impacts and alleged polluters. The victims of pollution and state will be further supported in getting appropriate relief from the National Green Tribunal if loss based valuation methodologies to deal with injury to human health, loss of ecological services, loss of damage to property and assets as well as the quantification of costs of restitution of ecology, property and assets and relief for injury are developed. The state authorities may choose to develop such methodologies and include these in this policy.

4. GUIDELINES

(8) Detailed technical Guidelines covering methodologies, tools, checklists, standards and templates have been prepared as part of National Program. The Guidelines should be used by any person who may be connected with remediation including the State Board, remediation contractors, advisors, site investigators and responsible persons.

(9) The Guidelines contain comprehensive list of contaminants to be considered for sampling and laboratory testing, information checklists to be filled in during preliminary site assessment, detailed procedures for sample collection and testing for carrying out a preliminary site investigation or a remedial investigation or during post remediation monitoring. One of the key features of the guidelines is the use of risk based approach. It also introduces the concept of *Conceptual Site Model* that is commonly used to implement a structured and efficient investigation for risk assessment.

(10) The contents of preliminary assessment report, remedial investigation report and detailed project report form part of the Guidelines. The Guidelines also describe step wise procedures for health and safety measures to be taken while carrying out preliminary assessment, remedial investigation and on-site remediation. The Guidelines provide a list of remediation techniques that may be used in different context, land use and nature of contamination. The Guidelines also include the criteria for selection of third party for remediation related activities. These criteria set out the expertise, qualifications and years of experience that a person would have in order to conduct remediation related activity. The table below outlines the coverage of Guidelines:

S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
1	Identification of probably contaminated site	Petition format	Guidance to the general public, NGOs who would like to petition about suspected cases of contamination
2	Preliminary site investigation	Guidelines for preliminary site assessment	Gathering a preliminary understanding of site conditions from desk review and limited sampling
		Checklist for prequalification for site investigation	Forms the basis for decision making on sites where preliminary site investigation is to be conducted and where it is not to be conducted
		Manual on Site Inspection Protocol	Guidance on data collection, sampling, determination of contaminants of concern, quality control and assurance measures, health and safety measures for onsite work

Development of National Program for Remediation of Polluted Sites
Task 4- A Report on National Plan for Remediation of Polluted Sites

S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
		Strategy for Preliminary site investigation	Guidance on carrying out sampling and testing
		Manual on techniques for site investigation	Guidance on techniques to be used for preliminary site investigation
		Manual on conceptual site model for identifying source-receptor-pathways	Guidance on risk assessment based on environment and health impacts
		Standards for screening and response level	Determining probably contaminated and contaminated sites
		Checklist for a preliminary investigation report	Forms the basis for evaluating if all requirements of a preliminary investigation are met
		Checklist for reviewing a preliminary investigation report	Forms the basis for evaluating a preliminary investigation report and its approval
3	Notification of polluted site	Guidelines on delineation of a contaminated site	Drawing a tentative boundary of the site to be considered for remediation.
		Guidelines and checklists on site restrictions, temporary safety measures to be implemented	Forms the basis of a notification format to determine the types of restrictions to be applied on a site depending on the contamination level.
4	Priority list addition	Guidelines to apply prioritization algorithm to obtain a priority score for a contaminated sites	Forms the basis for ranking a site in the national priority list
5	Remediation Investigation	Guidelines on scoping and site investigation strategy	Defines the scope of work for a remedial site investigation
		Guidelines on fieldwork , laboratory testing	Guidance on carrying out sampling and testing
		Guidelines for applying source-pathway-receptor combinations on human health, quantitative risk assessment for human health and environment	Basis for determining the remediation objectives
		Guidelines to set remediation requirements and objectives	Basis for determining the remediation techniques
		Guidelines for identification and appraisal of different remediation techniques	Basis for evaluating different remediation techniques and deciding upon a technique based on remediation objectives
		Checklists for background information for setting remediation objectives	Forms the basis for decision making on post remediation standards to be achieved
		Checklist for appraisal criteria for remediation options	Forms the basis for decision making on one remediation option
		Checklist of a remedial investigation report	Forms the basis for evaluating if all requirements of a remedial investigation are met
		Checklist for reviewing a remedial investigation report	Forms the basis for evaluating a remedial investigation report and its approval

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S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
6	Remedial Design , DPR	Checklist of DPR	Forms the basis for evaluating if all requirements of a DPR are met
		Checklist for reviewing aDPR	Forms the basis for evaluating a DPR and its approval
7	DPR approval and financing	Format for cost estimation	
8	Implementation of Remediation	Guidelines for preparation, execution and management of remedial measures	Overall guidance on how to carry out remedial action
		Guideline on verification of remediation measures against DPR specifications	Forms the basis for evaluating the progress of a remedial action , determining the future course of action
		Checklists for permits for remediation works	Guidance on what permits are required for remediation implementation
		Checklists for health and safety plan	Prepares for health and safety measures to be taken during on-site work
		Checklist for supervision and verification of remediation measures	Forms the basis for evaluating if the remedial action is correctly implemented
		Checklists of remediation evaluation report	Forms the basis for evaluating if all requirements of a remediation implementation are fulfilled
9	Approval of remediation completion	Checklist for reviewing a remedial evaluation report	Forms the basis for evaluating a remedial action and its approval
10	Post remediation plan	Guidelines for developing post remediation plan, post remediation activities	Guidance on how to conduct post remediation activities
		Checklist for post remediation plan	Forms the basis for evaluating if all requirements of a post remediation plan are met
11	Post remediation action	Guidelines on developing post remediation implementation program, supervision of post remediation activities	Guidance on sampling, testing requirements , operation and maintenance requirements
		Checklist for post remediation status report	Forms the basis for evaluating if all requirements of post remediation are met
		Checklist for review of post remediation status report	Forms the basis for evaluating if the remedy is intact
12	Cost recovery	Collating costs incurred during remediation and post remediation	
13	Priority list deletion	Guidelines on assessment of site use restrictions	Before marking a site as remediated, this provides a basis for assessing the site use restrictions imposed on the site and taking a decision on the same.
14	Site reuse	Guidelines on anticipating site use restrictions	Basis for decision making if certain site use restrictions will continue to be imposed or will be revoked

S. No.	Step	Technical Guidelines / checklists/ formats	Purpose
	For all steps	Guidelines for selection of contractor	Selection of third party contractors based on credentials, qualifications
		Checklist for pre-qualification of contractor	Basis of selection of contractors for on-site work

5. IDENTIFYING CONTAMINATED SITE

- (11) The State Board should examine all the sites in the state contained in the inventory prepared under the National Program and prepare an action plan for carrying out site assessments within 90 days to the Central Board. The State Board should submit quarterly reports to Central Board on the site assessments done and the decisions with regard to such sites.
- (12) The State Board should provide a facility to register online petitions relating to contaminated sites in addition to allowing petitions to be submitted at its offices. The State Board should promptly but no later than 90 days from the date of receiving a petition revert to the petitioner with its conclusion on the site assessment conducted and decision to proceed with subsequent remediation related activities.
- (13) The State Board should take proactive measures to identify areas that may be susceptible to contamination and build the information base on waste. These measures would include, inter alia,
- (i) facilitate the development of solid waste management plans for industrial clusters / estates / areas which should include inventory of waste (both hazardous and non-hazardous) generation, segregation, transportation and disposal and monitor its implementation;
 - (ii) require information on detailed water balance as part of consent process and carry out analysis of the discharge load in the industrial cluster / estate / area;
 - (iii) monitor the water quality of major water bodies, streams and major aquifers for contamination based on the nature of industries and their waste profile in the vicinity.
- (14) The State Board should prepare a quarterly report and provide it to Principal Secretary, Environment Department of State Government on the outcome of the analysis and inspections undertaken for the purpose of identifying contaminated sites.
- (15) The site assessment reports received by the State Board pursuant to the Contaminated Site (Identification and Management) Rules, 20xx should be reviewed and if the results exceed screening levels, further investigations should be undertaken and a decision on whether the site or its surrounding areas are contaminated should be taken within 90 days of receiving site assessment reports.

6. REMEDIATION SCHEME

- (16) Setting the remediation objective, i.e., level of reduction in contamination to be achieved and the manner by which it should be achieved is a key decision point. If a complete removal or treatment of contaminant is undertaken, it is likely to be significantly expensive but will allow land and water resources to be used without restriction. On the other hand, the contaminants may be partly removed or treated, pathways from the source of contamination to receptor may be severed and/or the receptors may be protected or removed to the extent required for a specific site activity which may bring down the cost of remediation but may require monitoring post-remediation and certain safeguards, i.e., restricting the activities that a site can be used and restricting the use of land and water resources. International experience has shown that countries have moved away the approach of complete removal or treatment of contaminant because of significant costs but this has been possible on the basis of development of appropriate administrative controls to strictly enforce land use and site activity restrictions on a long term basis.
- (17) The State Board should evaluate all options including full or part removal or treatment of contaminants, severing pathways from the source of contamination to receptor and / or protecting or removing the receptors for current and alternate site activity and land use should be examined. It is reiterated that complete removal or treatment of contaminants is not the only option to ensure that the threat to human health, ecology and environment is eliminated. The State Board should also evaluate the appropriateness and feasibility of staged remediation process where a site may be progressively remediated.
- (18) A remediated site that has residual contamination would need to be subject to appropriate controls on land use and site activity restrictions. In addition to the State Board, the land and revenue authorities would need to ensure that appropriate land use and site activity restrictions are in place and there are multiple levels of checks and balances.
- (19) The State Board may prepare the remediation scheme using external agencies if expedient or necessary to do so. The State Board should obtain an independent review of the remediation scheme by research and academic institutions of national importance in the area of soil and water pollution. It should obtain an independent review from the Central Ground Water Board when groundwater contamination is involved. The State Board may consult the Central Board on specific issues while formulating the remediation scheme or may request an independent review of the entire remediation scheme.
- (20) Depending upon the site context, the State Board should complete preparation of remediation scheme within 12 months from the determination of a site as contaminated site.

7. IDENTIFYING RESPONSIBLE PERSON

- (21) The search for responsible person should commence once there is information available on the type of contaminants and its potential sources, pathways and receptors and any environmental or ecological impacts that are evident. This would be obtained through a site assessment report and should be initiated immediately after a determination is made that the site is contaminated and requires remediation.

- (22) Based on the contaminants and the site context, the State Board should prepare a list of activity, industry or process that can potentially cause or contribute to discharge of contaminants that led to the site becoming contaminated. The State Board should review its records to identify all such activities, industries and processes including potential transporters of such contaminants. If required, the State Board should extend the search in the catchment area for the sources of discharge.
- (23) Based on the information available with the State Board and site visits as necessary, the State Board should identify the facility(or group of facilities) that may have caused the discharge and the site from where the contamination may have originated. In some cases, it may be possible to pin-point the discharge to a single source. In other cases, it may involve multiple large and small industrial units. The State Board should exclude such facilities or sites where there is evidence that discharge from such facilities cannot have caused contamination.
- (24) For each such facility or site, the State Board should establish the identity of each person (whether corporate, individual, authority, trust, partnership, etc.) who owns the facility or site, has control or influence over the facility or site and manages the affairs of the facility or site. Such persons may include parent company, board of directors, key management personnel and shareholders. The State Board should examine the documents and assess if there are previous owners or occupiers of the site or facility. The State Board should conduct interviews with the plant personnel, industry association, government authorities, local population, etc. to gather additional information on the facility or site including its owner and occupier.
- (25) The State Board should obtain information on the promoters, directors and the key management personnel as defined under the Companies Act 2013, preferably as part of the consent and authorisation process so that the information base on the owners and operators of the facility / site is readily available.
- (26) Before deciding on the persons responsible for remediation, the State Board should satisfy itself that there is a reasonable suspicion of linkage between the facility and discharge of contaminants and linkage between such discharge of contaminants and contamination at site and the responsible persons so identified owns, control, influence or manage the affairs of the facility or the site or both where discharge occurred or originated, whether or not they exercise such control, influence or management.

8. LIABILITY AND APPORTIONMENT OF COSTS

- (27) The liability of responsible person under this policy covers all elements of remediation costs. The State Board has the right to recover the entire remediation costs from one responsible person, under the joint and several liability provisions. In making any decision for recovery of remediation costs, the State Board should have regard to the following general principles:
- (i) The State Board should aim for an overall result which is as fair and as equitable as possible to all responsible persons who may have to meet the costs of remediation.
 - (ii) The polluter pays principle should be applied with a view that, where possible, the costs of remediating pollution should be borne by the polluter. The State Board should

therefore consider the degree and nature of responsibility of the relevant responsible person/s applying this principle.

- (iii) While in general the State Board should seek to recover all of its reasonable costs, it may reduce or waive the recovery of costs to the extent that it considers this appropriate and reasonable. In making any such decision the State Board shall have regard to any hardship which the recovery may cause to the responsible person from whom the cost is recoverable.
- (iv) In making any decision on recovery of remediation costs the State Board should bear in mind that recovery is not necessarily an 'all or nothing' matter i.e. where reasonable, responsible persons can be made to pay part of the State Boards' costs even if they cannot reasonably be made to pay all of the costs.

(28) Recognizing that the liability of responsible person is *joint and several* under this policy, the State Board may apportion liability in case there are multiple responsible persons. If a responsible person is aggrieved by the apportionment of remediation costs, it may prefer an appeal at the Tribunal after paying its share.

(29) The factors for apportionment of remediation costs are described below:

- (i) Weight / quantity of discharge of each environmental pollutant (in case multiple pollutants are involved) less any amount recovered /remediated already done: The total quantity of discharge (since the unit came into operation or for the last 40 years) should be determined based on available records or estimated based on production data or installed capacity and years of operations. Wherever the data is missing, this may be sought from the alleged polluters or estimated based on the financial, operational and environmental records and correlated with material balance or water balance as the case may be.
- (ii) Excess release of environmental pollutant (beyond the limits stipulated): If there is information available that the responsible person has been discharging environmental pollutant in excess of limits prescribed, then a suitable score between 1 and 100 should be given based on the extent and severity of excess release.
- (iii) Financial capacity of the polluter: A simple measure should be taken, i.e., the total annual revenue based on latest audit financial statements.

(30) The State Board should follow a staged process which allows for different level of information that can be reasonably obtained as part of the remediation process. The remediation costs should be apportioned equally to all responsible persons irrespective of size, nature of operations, whether compliant or not, unless it is possible to obtain reliable estimates for the parameters mentioned in sub-rule (3) above.

(31) The State Board may consider an appropriate formulation for apportioning remediation costs. In addition, the State Board may consider imposing external limits, i.e., no polluter should bear a cost greater than 90%, or lesser than 1%, depending on the context. One such formula is as follows:

Score of polluter i ,

$$SC_i = \left\{ \left(\frac{\text{Quantity released by polluter } i}{\text{Minimum quantity released amongst all polluter}} \right) \times \left(\frac{\text{Revenue of polluter } i}{\text{Minimum revenue amongst all polluters}} \right) \times \left(\text{Excess Release Factor} \right) \right\}$$

$$\text{Percentage share of cost of polluter } i = \left(\frac{SC_i}{\sum_{i=1}^n SC_i} \right)$$

where, *Excess Release Factor* is between 1 and 100; 1 for fully compliant operations since commencement of operations and up to 100 for repeated violations of the consent provisions or operating without consents

9. DIRECTING RESPONSIBLE PERSON TO PAY AND REMEDIATE

(32) The State Board shall direct the responsible person(s) to pay all costs and remediate the contaminated site in accordance with the remediation scheme. The Central Government shall delegate its powers relating to contaminated site matters to the State Boards and the State Board shall be empowered to issue directions under section 5 of the Environment (Protection) Act, 1986. Until such time that the Central Government has not delegated powers to the State Board for matters relating to remediation of contaminated sites, the State Government shall issue such directions under section 5 of the Environment (Protection) Act, 1974 on the request of State Board. The State Board must serve the directions fully in accordance with the relevant rules – Rule 4 of the Environment (Protection) Rules 1986 as the directions may be subject to challenge on ground of procedural impropriety if the said Rules are not followed.

(33) The State Board must prepare a reasoned direction which sets out the facts, analysis, conclusions and decision on contaminated site, responsible person, remediation costs and apportionment of remediation costs. It is essential to provide reasoning otherwise the direction may be challenged on grounds of irrationality. It should be able to show the linkage between the activity of responsible person and discharge of contaminants leading to contaminated site requiring remediation.

(34) The State Board must provide an opportunity for the responsible person to file objections. In accordance with the precautionary principle, the onus of proof is on the responsible person to demonstrate that its actions are environmentally benign. The State Board must intimate that the responsible person has to establish beyond reasonable doubt, by cogent and reliable evidence,

- (i) that there has been no discharge of alleged contaminants from its activities;
- (ii) that, if discharge of alleged contaminants have occurred, it is of specific quantity and within the limits prescribed under the consent and clearance;
- (iii) that, hazardous waste has been duly and properly handled and disposed in accordance with the conditions prescribed in the authorisation.

(35) Upon receiving the objections, the State Board must consider these in a fair, transparent and objective manner and follow the due process laid out in the said Rules.

- (36) Recognizing that the determination of full remediation costs actually incurred may occur only after the completion of remediation process, the State Board may require the responsible person to:
- (i) Deposit amounts in advance; and/or
 - (ii) Reimburse expenses incurred; and/or
 - (iii) Submit bank guarantees as payment security; and/or
 - (iv) Directly make a payment;
 - (v) Make multiple deposits, reimbursements or payments or submit multiple bank guarantees;
 - (vi) Any combination of the above.
- (37) The State Board shall maintain a separate project account for each site to be remediated for incurring expenses relating to the remediation of the contaminated site and receiving payments and deposits from the responsible person of the corresponding contaminated site (other than any direct payments made). Upon completion of the remediation process, the State Board may undertake a reconciliation of the project account and return any balances remaining unspent to the responsible person or raise a final demand.
- (38) The remediation program is based on compensatory regime for restitution of the environment. It does not have any element of penalty, fine or punishment. The responsible person is liable for the entire cost of remediation, no more and no less. This does not in any way impact the liability of a responsible person for separately providing relief and compensation for victims of pollution, for restitution of property and assets or for damage and restitution of ecology or be tried under the penal provisions of the Environment (Protection) Act, 1986, the Water (Prevention and Control of Pollution) Act, 1974 or upon any legal intervention, under the National Green Tribunal Act, 2010.
- (39) The State Board must maintain proper records, documents and evidences and follow the procedures during the remediation process as if it is preparing for litigation. It must use appropriate standard of due process and documentation that would stand the scrutiny of a judicial review by the Tribunal.

10. AUTHORITIES TO BE INVOLVED

(1) A Steering Committee under the chairmanship of Chief Secretary would be constituted by the State Government to monitor the performance and provide overall guidance to the implementation of state level remediation plan. The Committee would oversee the state level remediation program and provide guidance and course correction as appropriate. The Committee would meet at least once every six months.

(2) An Approval Committee would be constituted by the State Government under the chairmanship of the Principal Secretary, Environment with representatives from the finance and land revenue

department, State Board and Central Ground Water Board to review and approve remediation schemes / proposals requiring budgetary support and deal with any exceptional matters.

(3) The State Board shall be the nodal agency for implementing the state level remediation program. For each remediation scheme, the State Government shall constitute a Supervising Committee and task it to undertake all steps for effective enforcement and implementation of the remediation. Each Supervising Committee shall be under the chairmanship of the Member Secretary or the Chairman, State Board and depending on the site context and remediation requirements, it may have one or more of the following members:-

- (i) Representative of the Central Ground Water Board, particularly when the matter involves groundwater contamination;
- (ii) Representative of the urban local body and state urban development department particularly when the matter involves municipal solid waste or urban water and wastewater;
- (iii) Representative of the public health department and chief medical officer particularly when there are cases involving victims of pollution;
- (iv) District Collector, where the matter relates to collecting arrears of land revenue, disaster / crisis management and as District Magistrate (together with Superintendent of Police), where the matter relates to law and order;
- (v) Representative of environment department and forests department when matters relate to ecology, bio-diversity hotspot, forests, mangroves, etc.;
- (vi) Representative of the agriculture, animal husbandry, fishery and livestock department when matters relate to crop damage or animal / fish damage;
- (vii) Representative of the irrigation department and soil and water conservation department;
- (viii) Representative of research or academic institution engaged in contaminated sited matters;
- (ix) Representative of the Central Board.

(40) A Program Management Unit (PMU) would be established under the State Board to assist with planning and implementation of state level remediation plan. The PMU would have one or more of the following experts to augment the man-power and the skill base in dealing with remediation related activities – program management experts, hazardous waste experts, site investigation experts, risk assessment experts, geologists, hydro-geologists, soil experts, GIS and database experts, etc. The State Board may utilise the services of remediation contractors, monitoring and evaluation experts, legal experts, social experts, etc. or may require the responsible person to pay for such experts to work under the direction and supervision of the State Board.

11. ORPHAN SITES

- (41) A contaminated site would be designated as “orphan site” where, in spite of the best efforts of the State Board, a responsible person cannot be identified or cannot be made to pay for remediation (e.g., bankrupt, property under litigation, etc.). The State Board should make submit the remediation scheme prepared for such “orphan sites” to the State Government for approval and allocation of budgetary resources for financing remediation.
- (42) The State Board may develop a Corporate Social Responsibility (CSR) program that targets restitution of environmental damage at “orphan sites”. Remediation of each “orphan site” may be set up as a separate CSR program under section 35AC of the Income Tax Act, 1961 that, if approved under the process specified, will allow 100% deduction of contributions made by companies. This will make it attractive to companies that are interested in contributing to the environment sustainability. Rule 11-K of the Income Tax Rules, 1962 provide the following categories of CSR programs to be covered – *pollution control* and *any programme of conservation of natural resources or of afforestation*. The State Board may register a separate trust or society for remediation of each “orphan site” and seek contributions from companies that have large presence in the state. The state industrial development corporation may be tasked to raise CSR contributions for the remediation of “orphan site”. Companies operating in and around such sites may also contribute as no responsible person could be identified.

12. RELATED MEASURES

- (1) There are several related measures that would need to be taken as part of remediation of contaminated sites. These include:
- (i) Where there is a violation of act, rule or direction, either prior to the commencement of remediation process or during the remediation process, the State Board must file a complaint under penal provisions, i.e., section 15 of the Environment (Protection) Act, 1986 or under Chapter VII of the Water (Prevention and Control of Pollution) Act, 1974 and under section 33 of the Water (Prevention and Control of Pollution) Act, 1974;
 - (ii) The State Board may examine whether withdrawal of consent under section 27 of the Water (Prevention and Control of Pollution) Act, 1974 and cancellation of authorisation under rule 6 of the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 are warranted of there is ongoing contamination and take actions accordingly;
 - (iii) The State Environment Department should conduct a study on the ecological damage (biotic components like flora, fauna, micro-organisms, etc. excluding human beings, crops, orchards, milch cattle, etc.) and the cost of restoring the ecology and file a claim of compensation and restitution of ecology against responsible person with the National Green Tribunal;
 - (iv) Where the state government or any state authority is a victim of pollution damage, the relevant state department or authority should file a claim for relief and compensation against responsible person with the National Green Tribunal.

(43) In preparing annual budget and plan of activities, the State Board should make provision for identification of contaminated sites and responsible persons and remediation related activities. The State Government should allocate appropriate budgetary resources for the remediation related activities including provision for remediating orphan sites.

(44) The State Board should upload all the information relating to any complaint received or any site inspection conducted on the site inventory maintained by the Central Board, including all actions taken.

(45) Where there has been an instance of excess discharge of environmental pollutant or mishandling of waste, the State Board should, inter alia, direct the facility to submit a bank guarantee amount of [2.5%] of annual revenue (latest audited financial statements), subject to a minimum of [Rs 10 lakhs] and a maximum of [Rs 50 crore]. The bank guarantee may be invoked and the amounts may be utilised to undertake measures to prevent contamination and where contamination has occurred, to undertake remediation related measures. This shall not prevent the State Board to modify the amount of bank guarantee sought once the estimates of remediation costs are available. The State Board may also define appropriate milestones for returning the bank guarantee.

(46) The State Board should require proof of adequate insurance against environmental damage as part of granting or renewing consent or authorisation. This is consistent with the precautionary principle and the principle of sustainable development. The State Board may establish the amount of insurance required by industry category, location of the industry and the size of industry. As a first step, it may stipulate the requirement of insurance towards restitution of environment at an amount equal to [10%] of the annual revenue (latest audited financial statements at the time of applying for consent / authorisation or renewal of consent / authorisation), with a minimum of [Rs 1 crore] and a maximum of [Rs 200 crore]. The consent and authorisation conditions should stipulate that the facility owner or occupier has to provide evidence of continuing insurance every year.

Appendix C – Proposed amendments to Act and rules

1. Changes to the Environment (Protection) Act, 1986

The proposed amendments to the Environment (Protection) Act, 1986 are set out below. For ease of reference, the full text of the Environment (Protection) Act, 1986 along showing amendments as double-underline is attached at the end of this Appendix.

A. Section 2 (Definitions)

Insert the following:

(g) “polluted site” means areas where hazardous substances exist at levels and in conditions which may pose existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living creatures, plants, micro-organisms, property, water quality or the environment in general, determined in the manner prescribed.

(i) “remediation”, means the doing of any works, or carrying out of any operations or taking of any steps in relation to a polluted site for the purpose of (a) identifying or investigating or preventing or minimising or remedying or mitigating the adverse effects by reason of which polluted site is such site; (b) restoring the quality of environment, flora and fauna at the site to an acceptable level; and includes making of subsequent inspections from time to time for the purpose of keeping under review the condition of the site in question, in the manner prescribed.

B. Section 3 (Powers of Central Government to take measures to protect and improve environment)

Amend in the following manner (double underlined text shows amendment):

Sub-section (2) (ii): planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution and remediation of polluted site;

Sub-section (2) (x): inspection of any public or private land or premises plant, equipment, machinery, manufacturing or other processes, materials or substances, and giving, by order, of such directions to such authorities, officers or persons as it may consider necessary to take steps for the prevention, control and abatement of environmental pollution and remediation of polluted sites;

Insert the following:

Sub-section (2) (xiii-a): for laying down standards, procedures, safeguards, restrictions and measures to be adopted and to take all steps for remediation of polluted sites, including but not limited to the provisions of access, possession, management and control of a polluted site or the assets of person responsible for remediation, taking all necessary steps towards creation of financial security for ensuring compliance, prescribing enforcement of land use, recovery from responsible persons and from persons that benefit from remediation, and reuse and redevelopment of remediated sites;

Sub-section (2) (xiii-b): apply the principles of sustainable development, precautionary principle and the polluter pays principle for all measures to protect and improve the environment.

Sub-section (2) (xiii-c): determine the person responsible and impose remediation costs, compensation for environment damage and liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder

Sub-section (3):

Provided that when the Central Government vests an authority with the powers and functions referred to in sub-section (2) (xiii-c),

(a) the authority shall have same powers as are vested in a civil court under the Code of Civil Procedure, 1908 while trying a suit. Such an authority shall not be bound by the procedure laid down in the Code of Civil Procedure, 1908 but shall be guided by the principles of natural justice and subject to the other provisions of this Act and of any rules made thereunder and shall have the power to regulate its own procedure. All proceedings of the authority shall be deemed to be judicial proceedings within the meaning of sections 193, 196, 219 and 228 of the Indian Penal Code and the authority shall be deemed to be a civil court for the purposes of sections 195 and Chapter XXVI of the Code of Criminal Procedure, 1973.

(b) while determining and imposing remediation costs, the authority shall consider the reasonableness, appropriateness and affordability of the remediation scheme and no limitation shall be applicable on the liability for remediation costs.

(c) while determining and imposing compensation for environmental damage, the authority shall have due regard to the accepted principles of environmental damage and natural resource valuation and no limitation shall be applicable on the liability for environmental damage.

(d) while determining and imposing liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder, the authority shall have due regard to the amount of disproportionate gain or unfair advantage, wherever quantifiable, made as a result of the failure to comply with the provisions of this Act along with the repetitive nature and the gravity of the non-compliance of this Act.

Provided that such liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder may extend to half of the limits specified under section 15.

(e) where a person fails to make the payment or deposit the amount directed by the authority in an order or award within the time period so specified in the award or order, such amount, without prejudice to the filing of complaint for prosecution for an offence under this Act or any other law for the time being in force, shall be recoverable, together with interest (at such reasonable rate as the Government may, by order, fix) from the date when a demand for the is made until it is paid, may be recovered from the person concerned as arrears of land revenue or of public demand.

C. Section 5 (Powers to give directions)

Insert the following

(c) imposition of compensation for environmental damages for loss or injury caused by any industry, operation or process as may be prescribed, remediation costs, liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder

(d) submission of bank guarantees, payment of advance deposits and creation of mortgage and hypothecation over assets, property, land and building for securing compliance

(e) hand over possession, management and control of a polluted site

(f) imposition of restrictions on land use, land use change and site related activities of a polluted site

D. Section 6 (Rules to regulate environment pollution)

Insert the following

(g) the standards, procedures, safeguards, restrictions and all necessary measures to be adopted for any or all activities relating to remediation of polluted sites, including but not limited to notifying, categorizing, taking steps in cases of emergency to abate adverse impact on human beings and the environment and determining liability, damage to environment, remediation costs, taking possession, use, management or control of properties and assets, creation and enforcement of financial security of assets and property for ensuring compliance.

E. Section 8 (Persons handling hazardous substances to comply with procedural safeguards)

Amend in the following manner (double underlined text shows amendment)

No person shall handle or cause to be handled any hazardous substance including on a polluted site except in accordance with such procedure and after complying with such safeguards as may be prescribed.

F. New section 8A (Creation of National Environmental Restoration Fund)

Insert the following under Section 8A

(1) The Central Government may, by notification, create a National Environmental Restoration Fund (“Fund”) to finance remediation and related activities as may be prescribed.

(2) The Fund may receive contributions from:

(a) Central or State Government;

(b) levy of cess as duty of excise, to be administered by the Department of Revenue;

(c) recovery of remediation costs, compensation for damage to environment and liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder from persons responsible for remediation.

(3) The sums of money received under sub-section 2(b) shall first be credited to the Consolidated Fund of India, and the Central Government may, if Parliament by appropriation made by law in this behalf so provides, credit such proceeds to the Fund, by way of grants, from time to time for being utilized exclusively for meeting the requirements in Section 8(1).

(4) The monies received in the Fund shall be an interest bearing fund under Public Account of India and the balance in the Fund shall be non-lapsable and get interest as per the rate declared by the Central Government on year-to-year basis.

(5) The Central Government shall administer the Fund in such manner as may be prescribed. The Central Government shall be responsible for the co-ordination and ensuring timely utilization and release of sums in accordance with the criteria as may be prescribed.

G. Section 15 (Penalties for contravention of the provisions of the Act and the Rules, Orders and Directions)

Amend in the following manner (double underlined text shows amendment):

Sub-section: (1) Whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued thereunder, shall, in respect of each such failure or contravention, in addition to the liability determined pursuant to orders of the authority established under sub-section (3) of section 3, be punishable with imprisonment for a term which may extend to five years with fine which may extend to ten crore rupees, or with both, and in case the failure or contravention continues, with additional fine which may extend to twenty five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

Provided that in case a company fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued thereunder, shall, in respect of each such failure or contravention, be punishable with fine which may extend to twenty five crore rupees, and in case the failure or contravention continues, with additional fine which may extend to one lakh rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

H. New section 15A (Remediation of polluted site by responsible persons)

Insert the following under new section

(1) In any case where a polluted site is designated as such in terms of this Act, the State Government shall in accordance with such procedure as may be prescribed assess cost of measures for remediation of a polluted site, determine the person responsible for the same and direct such person to do such acts and activities by way of remediation and the period within which the remediation is to be carried out.

Provided that where two or more persons are jointly and severally responsible for remediation, the notice served upon each of them shall, to the extent possible, state the proportion of the cost of remediation which each of them respectively is liable to bear and the share of responsibility of remediation.

(2) All persons who prima facie (a) caused or permitted or handled the hazardous substances, or any of the hazardous substances whose discharge or threat of discharge may be the reason because of which the polluted site gets designated as such, and (b) owns or occupies or owned or occupied the polluted site are responsible person(s) within the terms of sub-section (1) above.

Provided that a person shall be excluded from being a responsible person within the terms of sub-section (1) above if:

(i) subject to the provisions of sub-section (3) below, the person under sub-section (2)(a) proves that he did not cause or permit or handle any hazardous substance or the person under sub-section (2)(b) proves that he owned or occupied the site prior to the time of discharge; and

(ii) a different person or persons are solely responsible within the terms of sub-section (1) above.

(3) A person,

(a) who has by contract outsourced any industry, operation or process to a person that is covered within the terms of sub-section (1) above, shall be a responsible person within the terms of sub-section (1) above;

(b) who is the parent company or the promoter of a company that is covered within the terms of sub-section (1) above, shall be a responsible person within the terms of sub-section (1) above;

(c) who has management and control over the person that is covered within the terms of sub-section (1) above, shall be a responsible person within the terms of sub-section (1) above;

(d) who is the result of one or more reorganization, amalgamation, reconstruction, acquisition, merger or demerger of a company that may have become a person covered within the terms of sub-section (1) above but for the

reorganization, amalgamation, reconstruction, acquisition, merger or demerger, shall be a responsible person within the terms of sub-section (1) above

(4) A person who is responsible for remediation of a polluted site is absolutely, retroactively and jointly and separately liable to any person or government body for reasonably incurred costs of remediation of the polluted site, whether incurred on or off the polluted site.

2. Changes to the National Green Tribunal Act, 2010

Amend in the following manner (double underlined text shows amendment):

Section 17(1) Subject to the provisions of Section 3 and Section 15A of the Environment (Protection) Act, 1986, where death of, or injury to, any person (other than a workman) or damage to any property or environment has resulted from an accident or the adverse impact of an activity or operation or process, under any enactment specified in Schedule I, the person responsible shall be liable to pay such additional relief or compensation for such death, injury or damage, under all or any of the heads specified in Schedule II, as may be determined by the Tribunal.

Section 24(1) Where any amount by way of compensation or relief is ordered to be paid under any award or order made by the Tribunal on the ground of any damage to environment, that amount shall be credited to the National Environmental Restoration Fund established under section 8A of the Environment (Protection) Act, 1986 ~~remitted to the authority specified under sub-section (3) of section 7A of the Public Liability Insurance Act, 1991 for being credited to the Environmental Relief Fund established under that section.~~

Section 24(2) The amount of compensation or relief credited to the National Environmental Restoration Fund ~~Environmental Relief Fund~~ under sub-section (1), may, ~~notwithstanding anything contained in the Public Liability Insurance Act, 1991,~~ be utilised by such persons or authority, in such manner and for such purposes relating to environment, as may be prescribed.

3. Text of the amended Environment (Protection) Act, 1986

For ease of reference, the text of the Environment (Protection) Act, 1986 has been set out below. The proposed amendments are highlighted as double-underline.

Proposed Amendment

THE ENVIRONMENT (PROTECTION) ACT, 1986

No. 29 OF 1986

[23rd May, 1986]

An Act to Provide for the Protection and Improvement of Environment and for Matters Connected there with:

WHEREAS the decisions were taken at the United Nations Conference on the Human Environment held at Stockholm in June, 1972, in which India participated, to take appropriate steps for the protection and improvement of human environment;

AND WHEREAS it is considered necessary further to implement the decisions aforesaid in so far as they relate to the protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property;

BE it enacted by Parliament in the Thirty-seventh Year of the Republic of India as follows:-

CHAPTER I PRELIMINARY

1. SHORT TITLE, EXTEND AND COMMENCEMENT

(1) This Act may be called the Environment (Protection) Act, 1986.

(2) It extends to the whole of India.

(3) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint and different dates may be appointed for different provisions of this Act and for different areas.

2. DEFINITIONS

In this Act, unless the context otherwise requires,--

(a) "environment" includes water, air and land and the inter- relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property;

(b) "environmental pollutant" means any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, injurious to environment;

(c) "environmental pollution" means the presence in the environment of any environmental pollutant;

- (d) "handling", in relation to any substance, means the manufacture, processing, treatment, package, storage, transportation, use, collection, destruction, conversion, offering for sale, transfer or the like of such substance;
- (e) "hazardous substance" means any substance or preparation which, by reason of its chemical or physico-chemical properties or handling, is liable to cause harm to human beings, other living creatures, plant, micro-organism, property or the environment;
- (f) "occupier", in relation to any factory or premises, means a person who has, control over the affairs of the factory or the premises and includes in relation to any substance, the person in possession of the substance;
- (g) "polluted site" means areas where hazardous substances exist at levels and in conditions which may pose existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living creatures, plants, micro-organisms, property, water quality or the environment in general, determined in the manner prescribed.
- (h) "prescribed" means prescribed by rules made under this Act.
- (i) "remediation" means the doing of any works, or carrying out of any operations or taking of any steps in relation to a polluted site for the purpose of (a) identifying or investigating or preventing or minimising or remedying or mitigating the adverse effects by reason of which polluted site is such site: (b) restoring the quality of environment, flora and fauna at the site to an acceptable level: and includes making of subsequent inspections from time to time for the purpose of keeping under review the condition of the site in question, in the manner prescribed.

CHAPTER II

GENERAL POWERS OF THE CENTRAL GOVERNMENT

3. POWER OF CENTRAL GOVERNMENT TO TAKE MEASURES TO PROTECT AND IMPROVE ENVIRONMENT

(1) Subject to the provisions of this Act, the Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.

(2) In particular, and without prejudice to the generality of the provisions of sub-section (1), such measures may include measures with respect to all or any of the following matters, namely:--

- (i) co-ordination of actions by the State Governments, officers and other authorities--
- (a) under this Act, or the rules made thereunder, or
- (b) under any other law for the time being in force which is relatable to the objects of this Act;

- (ii) planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution ~~and remediation of polluted site;~~
- (iii) laying down standards for the quality of environment in its various aspects;
- (iv) laying down standards for emission or discharge of environmental pollutants from various sources whatsoever:

Provided that different standards for emission or discharge may be laid down under this clause from different sources having regard to the quality or composition of the emission or discharge of environmental pollutants from such sources;

- (v) restriction of areas in which any industries, operations or processes or class of industries, operations or processes shall not be carried out or shall be carried out subject to certain safeguards;
- (vi) laying down procedures and safeguards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents;
- (vii) laying down procedures and safeguards for the handling of hazardous substances;
- (viii) examination of such manufacturing processes, materials and substances as are likely to cause environmental pollution
- (ix) carrying out and sponsoring investigations and research relating to problems of environmental pollution;
- (x) inspection of any ~~public or private land or premises~~ plant, equipment, machinery, manufacturing or other processes, materials or substances, and giving, by order, of such directions to such authorities, officers or persons as it may consider necessary to take steps for the prevention, control and abatement of environmental pollution ~~and remediation of polluted sites;~~
- (xi) establishment or recognition of environmental laboratories and institutes to carry out the functions entrusted to such environmental laboratories and institutes under this Act;
- (xii) collection and dissemination of information in respect of matters relating to environmental pollution;
- (xiii) preparation of manuals, codes or guides relating to the prevention, control and abatement of environmental pollution;
- ~~(xiii-a) for laying down standards, procedures, safeguards, restrictions and measures to be adopted and to take all steps for remediation of polluted sites, including but not limited to the provisions of access, possession, management and control of a polluted site or the assets of person responsible for remediation, taking all necessary steps towards creation of financial security for ensuring compliance, prescribing enforcement of land use, recovery from responsible persons and from persons that benefit from remediation, and reuse and redevelopment of remediated sites;~~
- ~~(xiii-b) apply the principles of sustainable development, precautionary principle and the polluter pays principle for all measures to protect and improve the environment.~~

(xiii-c) determine the person responsible and impose remediation costs, compensation for environment damage and liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder

(xiv) such other matters as the Central Government deems necessary or expedient for the purpose of securing the effective implementation of the provisions of this Act;

(3) The Central Government may, if it considers it necessary or expedient so to do for the purpose of this Act, by order, published in the Official Gazette, constitute an authority or authorities by such name or names as may be specified in the order for the purpose of exercising and performing such of the powers and functions (including the power to issue directions under section 5) of the Central Government under this Act and for taking measures with respect to such of the matters referred to in sub-section (2) as may be mentioned in the order and subject to the supervision and control of the Central Government and the provisions of such order, such authority or authorities may exercise and powers or perform the functions or take the measures so mentioned in the order as if such authority or authorities had been empowered by this Act to exercise those powers or perform those functions or take such measures.

Provided that when the Central Government vests an authority with the powers and functions referred to in sub-section (2) (xiii-c),

(a) the authority shall have same powers as are vested in a civil court under the Code of Civil Procedure, 1908 while trying a suit. Such an authority shall not be bound by the procedure laid down in the Code of Civil Procedure, 1908 but shall be guided by the principles of natural justice and subject to the other provisions of this Act and of any rules made thereunder and shall have the power to regulate its own procedure. All proceedings of the authority shall be deemed to be judicial proceedings within the meaning of sections 193, 196, 219 and 228 of the Indian Penal Code and the authority shall be deemed to be a civil court for the purposes of sections 195 and Chapter XXVI of the Code of Criminal Procedure, 1973.

(b) while determining and imposing remediation costs, the authority shall consider the reasonableness, appropriateness and affordability of the remediation scheme and no limitation shall be applicable on the liability for remediation costs.

(c) while determining and imposing compensation for environmental damage, the authority shall have due regard to the accepted principles of environmental damage and natural resource valuation and no limitation shall be applicable on the liability for environmental damage.

(d) while determining and imposing liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder, the authority shall have due regard to the amount of disproportionate gain or unfair advantage, wherever quantifiable, made as a result of the failure to comply with the provisions of this Act along with the repetitive nature and the gravity of the non-compliance of this Act.

Provided that such liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder may extend to half of the limits specified under section 15.

(e) where a person fails to make the payment or deposit the amount directed by the authority in an order or award within the time period so specified in the award or order, such amount, without prejudice to the filing of complaint for prosecution for an offence under this Act or any other law for the time being in force, shall be recoverable, together with interest (at such reasonable rate as the Government may, by order, fix) from the date when a demand for the is made until it is paid, may be recovered from the person concerned as arrears of land revenue or of public demand.

4. APPOINTMENT OF OFFICERS AND THEIR POWERS AND FUNCTIONS

(1) Without prejudice to the provisions of sub-section (3) of section 3, the Central Government may appoint officers with such designation as it thinks fit for the purposes of this Act and may entrust to them such of the powers and functions under this Act as it may deem fit.

(2) The officers appointed under sub-section (1) shall be subject to the general control and direction of the Central Government or, if so directed by that Government, also of the authority or authorities, if any, constituted under sub-section (3) of section 3 or of any other authority or officer.

5. POWER TO GIVE DIRECTIONS

Notwithstanding anything contained in any other law but subject to the provisions of this Act, the Central Government may, in the exercise of its powers and performance of its functions under this Act, issue directions in writing to any person, officer or any authority and such person, officer or authority shall be bound to comply with such directions.³

Explanation--For the avoidance of doubts, it is hereby declared that the power to issue directions under this section includes the power to direct--

- (a) the closure, prohibition or regulation of any industry, operation or process; ~~or~~
- (b) stoppage or regulation of the supply of electricity or water or any other service;
- (c) imposition of compensation for environmental damages for loss or injury caused by any industry, operation or process as may be prescribed, remediation costs, liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder
- (d) submission of bank guarantees, payment of advance deposits and creation of mortgage and hypothecation over assets, property, land and building for securing compliance
- (e) hand over possession, management and control of a polluted site
- (f) imposition of restrictions on land use, land use change and site related activities of a polluted site

6. RULES TO REGULATE ENVIRONMENTAL POLLUTION

(1) The Central Government may, by notification in the Official Gazette, make rules in respect of all or any of the matters referred to in section 3.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:--

- (a) the standards of quality of air, water or soil for various areas and purposes;
- (b) the maximum allowable limits of concentration of various environmental pollutants (including noise) for different areas;
- (c) the procedures and safeguards for the handling of hazardous substances;
- (d) the prohibition and restrictions on the handling of hazardous substances in different areas;
- (e) the prohibition and restriction on the location of industries and the carrying on process and operations in different areas;
- (f) the procedures and safeguards for the prevention of accidents which may cause environmental pollution and for providing for remedial measures for such accidents.
- (g) the standards, procedures, safeguards, restrictions and all necessary measures to be adopted for any or all activities relating to remediation of polluted sites, including but not limited to notifying, categorizing, taking steps in cases of emergency to abate adverse impact on human beings and the environment and determining liability, damage to environment, remediation costs, taking possession, use, management or control of properties and assets, creation and enforcement of financial security of assets and property for ensuring compliance.

CHAPTER III

PREVENTION, CONTROL, AND ABATEMENT OF ENVIRONMENTAL POLLUTION

7. PERSONS CARRYING ON INDUSTRY OPERATION, ETC., NOT TO ALLOW EMISSION OR DISCHARGE OF ENVIRONMENTAL POLLUTANTS IN EXCESS OF THE STANDARDS

No person carrying on any industry, operation or process shall discharge or emit or permit to be discharged or emitted any environmental pollutants in excess of such standards as may be prescribed.

8. PERSONS HANDLING HAZARDOUS SUBSTANCES TO COMPLY WITH PROCEDURAL SAFEGUARDS

No person shall handle or cause to be handled any hazardous substance including on a polluted site except in accordance with such procedure and after complying with such safeguards as may be prescribed.

8A. CREATION OF NATIONAL ENVIRONMENTAL RESTORATION FUND

(1) The Central Government may, by notification, create a National Environmental Restoration Fund ("Fund") to finance remediation and related activities as may be prescribed.

(2) The Fund may receive contributions from:

(a) Central or State Government;

(b) levy of cess as duty of excise, to be administered by the Department of Revenue;

(c) recovery of remediation costs, compensation for damage to environment and liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder from persons responsible for remediation.

(3) The sums of money received under sub-section 2(b) shall first be credited to the Consolidated Fund of India, and the Central Government may, if Parliament by appropriation made by law in this behalf so provides, credit such proceeds to the Fund, by way of grants, from time to time for being utilized exclusively for meeting the requirements in Section 8(1).

(4) The monies received in the Fund shall be an interest bearing fund under Public Account of India and the balance in the Fund shall be non-lapsable and get interest as per the rate declared by the Central Government on year-to-year basis.

(5) The Central Government shall administer the Fund in such manner as may be prescribed. The Central Government shall be responsible for the co-ordination and ensuring timely utilization and release of sums in accordance with the criteria as may be prescribed.

9. FURNISHING OF INFORMATION TO AUTHORITIES AND AGENCIES IN CERTAIN CASES

(1) Where the discharge of any environmental pollutant in excess of the prescribed standards occurs or is apprehended to occur due to any accident or other unforeseen act or event, the person responsible for such discharge and the person in charge of the place at which such discharge occurs or is apprehended to occur shall be bound to prevent or mitigate the environmental pollution caused as a result of such discharge and shall also forthwith--

(a) intimate the fact of such occurrence or apprehension of such occurrence; and

(b) be bound, if called upon, to render all assistance, to such authorities or agencies as may be prescribed.

(2) On receipt of information with respect to the fact or apprehension on any occurrence of the nature referred to in sub-section (1), whether through intimation under that sub-section or otherwise, the authorities or agencies referred to in sub-section (1) shall, as early as practicable,

cause such remedial measures to be taken as necessary to prevent or mitigate the environmental pollution.

(3) The expenses, if any, incurred by any authority or agency with respect to the remedial measures referred to in sub-section (2), together with interest (at such reasonable rate as the Government may, by order, fix) from the date when a demand for the expenses is made until it is paid, may be recovered by such authority or agency from the person concerned as arrears of land revenue or of public demand.

10. POWERS OF ENTRY AND INSPECTION

(1) Subject to the provisions of this section, any person empowered by the Central Government in this behalf¹² shall have a right to enter, at all reasonable times with such assistance as he considers necessary, any place--

- (a) for the purpose of performing any of the functions of the Central Government entrusted to him;
- (b) for the purpose of determining whether and if so in what manner, any such functions are to be performed or whether any provisions of this Act or the rules made thereunder or any notice, order, direction or authorisation served, made, given or granted under this Act is being or has been complied with;
- (c) for the purpose of examining and testing any equipment, industrial plant, record, register, document or any other material object or for conducting a search of any building in which he has reason to believe that an offence under this Act or the rules made thereunder has been or is being or is about to be committed and for seizing any such equipment, industrial plant, record, register, document or other material object if he has reason to believe that it may furnish evidence of the commission of an offence punishable under this Act or the rules made thereunder or that such seizure is necessary to prevent or mitigate environmental pollution.

(2) Every person carrying on any industry, operation or process of handling any hazardous substance shall be bound to render all assistance to the person empowered by the Central Government under sub-section (1) for carrying out the functions under that sub-section and if he fails to do so without any reasonable cause or excuse, he shall be guilty of an offence under this Act.

(3) If any person wilfully delays or obstructs any persons empowered by the Central Government under sub-section (1) in the performance of his functions, he shall be guilty of an offence under this Act.

(4) The provisions of the Code of Criminal Procedure, 1973, or, in relation to the State of Jammu and Kashmir, or an area in which that Code is not in force, the provisions of any corresponding law in force in that State or area shall, so far as may be, apply to any search or seizures under this section as they apply to any search or seizure made under the authority of a warrant issued under section 94 of the said Code or as the case may be, under the corresponding provision of the said law.

11. POWER TO TAKE SAMPLE AND PROCEDURE TO BE FOLLOWED IN CONNECTION THEREWITH

(1) The Central Government or any officer empowered by it in this behalf, shall have power to take, for the purpose of analysis, samples of air, water, soil or other substance from any factory, premises or other place in such manner as may be prescribed.

(2) The result of any analysis of a sample taken under sub-section (1) shall not be admissible in evidence in any legal proceeding unless the provisions of sub-sections (3) and (4) are complied with.

(3) Subject to the provisions of sub-section (4), the person taking the sample under sub-section (1) shall--

- (a) serve on the occupier or his agent or person in charge of the place, a notice, then and there, in such form as may be prescribed, of his intention to have it so analysed;
- (b) in the presence of the occupier or his agent or person, collect a sample for analysis;
- (c) cause the sample to be placed in a container or containers which shall be marked and sealed and shall also be signed both by the person taking the sample and the occupier or his agent or person;
- (d) send without delay, the container or the containers to the laboratory established or recognised by the Central Government under section 12.

(4) When a sample is taken for analysis under sub-section (1) and the person taking the sample serves on the occupier or his agent or person, a notice under clause (a) of sub-section (3), then,--

- (a) in a case where the occupier, his agent or person wilfully absents himself, the person taking the sample shall collect the sample for analysis to be placed in a container or containers which shall be marked and sealed and shall also be signed by the person taking the sample, and
- (b) in a case where the occupier or his agent or person present at the time of taking the sample refuses to sign the marked and sealed container or containers of the sample as required under clause (c) of sub-section (3), the marked and sealed container or containers shall be signed by the person taking the samples, and the container or containers shall be sent without delay by the person taking the sample for analysis to the laboratory established or recognised under section 12 and such person shall inform the Government Analyst appointed or recognised under section 12 in writing, about the wilful absence of the occupier or his agent or person, or, as the case may be, his refusal to sign the container or containers.

12. ENVIRONMENTAL LABORATORIES

(1) The Central Government may, by notification in the Official Gazette,--

- (a) establish one or more environmental laboratories;
- (b) recognise one or more laboratories or institutes as environmental laboratories to carry out the functions entrusted to an environmental laboratory under this Act.

(2) The Central Government may, by notification in the Official Gazette, make rules specifying--

- (a) the functions of the environmental laboratory;
- (b) the procedure for the submission to the said laboratory of samples of air, water, soil or other substance for analysis or tests, the form of the laboratory report thereon and the fees payable for such report;
- (c) such other matters as may be necessary or expedient to enable that laboratory to carry out its functions.

13. GOVERNMENT ANALYSTS

The Central Government may by notification in the Official Gazette, appoint or recognise such persons as it thinks fit and having the prescribed qualifications to be Government Analysts for the purpose of analysis of samples of air, water, soil or other substance sent for analysis to any environmental laboratory established or recognised under sub-section (1) of section 12.

14. REPORTS OF GOVERNMENT ANALYSTS

Any document purporting to be a report signed by a Government analyst may be used as evidence of the facts stated therein in any proceeding under this Act.

15. PENALTY FOR CONTRAVENTION OF THE PROVISIONS OF THE ACT AND THE RULES, ORDERS AND DIRECTIONS

(1) Whoever fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued thereunder, shall, in respect of each such failure or contravention, in addition to the liability determined pursuant to orders of the authority established under sub-section (3) of section 3, be punishable with imprisonment for a term which may extend to five years, with fine which may extend to ten crore rupees, or with both, and in case the failure or contravention continues, with additional fine which may extend to twenty five thousand rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

Provided that in case a company fails to comply with or contravenes any of the provisions of this Act, or the rules made or orders or directions issued thereunder, shall, in respect of each such failure or contravention, be punishable with fine which may extend to twenty five crore rupees, and in case the failure or contravention continues, with additional fine which may extend to one lakh rupees for every day during which such failure or contravention continues after the conviction for the first such failure or contravention.

(2) If the failure or contravention referred to in sub-section (1) continues beyond a period of one year after the date of conviction, the offender shall be punishable with imprisonment for a term which may extend to seven years.

15-A. REMEDIATION OF POLLUTED SITE BY RESPONSIBLE PERSONS

(1) In any case where a polluted site is designated as such in terms of this Act, the Central Government shall in accordance with such procedure as may be prescribed assess cost of measures for remediation of a polluted site, determine the person responsible for the same and direct such person to do such acts and activities by way of remediation and the period within which the remediation is to be carried out.

Provided that where two or more persons are jointly and severally responsible for remediation, the notice served upon each of them shall, to the extent possible, state the proportion of the cost of remediation which each of them respectively is liable to bear and the share of responsibility of remediation.

(2) All persons who prima facie (a) caused or permitted or handled the hazardous substances, or any of the hazardous substances whose discharge or threat of discharge may be the reason because of which the polluted site gets designated as such, and (b) owns or occupies or owned or occupied the polluted site are responsible person(s) within the terms of sub-section (1) above.

Provided that a person shall be excluded from being a responsible person within the terms of sub-section (1) above if:

(i) subject to the provisions of sub-section (3) below, the person under sub-section (2)(a) proves that he did not cause or permit or handle any hazardous substance or the person under sub-section (2)(b) proves that he owned or occupied the site prior to the time of discharge; and

(ii) a different person or persons are solely responsible within the terms of sub-section (1) above.

(3) A person,

(a) who has by contract outsourced any industry, operation or process to a person that is covered within the terms of sub-section (1) above, shall be a responsible person within the terms of sub-section (1) above;

(b) who is the parent company or the promoter of a company that is covered within the terms of sub-section (1) above, shall be a responsible person within the terms of sub-section (1) above;

(c) who has management and control over the person that is covered within the terms of sub-section (1) above, shall be a responsible person within the terms of sub-section (1) above;

(d) who is the result of one or more reorganization, amalgamation, reconstruction, acquisition, merger or demerger of a company that may have become a person covered

within the terms of sub-section (1) above but for the reorganization, amalgamation, reconstruction, acquisition, merger or demerger, shall be a responsible person within the terms of sub-section (1) above

(4) A person who is responsible for remediation of a polluted site is absolutely, retroactively and jointly and separately liable to any person or government body for reasonably incurred costs of remediation of the polluted site, whether incurred on or off the polluted site.

16. OFFENCES BY COMPANIES

(1) Where any offence under this Act has been committed by a company, every person who, at the time the offence was committed, was directly in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation--For the purpose of this section,--

- (a) "company" means any body corporate and includes a firm or other association of individuals;
- (b) "director", in relation to a firm, means a partner in the firm.

17. OFFENCES BY GOVERNMENT DEPARTMENTS

(1) Where an offence under this Act has been committed by any Department of Government, the Head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly.

Provided that nothing contained in this section shall render such Head of the Department liable to any punishment if he proves that the offence was committed without his knowledge or that he exercise all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a Department of Government and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any officer, other than the Head of the Department, such officer shall also be deemed to be guilty of

that offence and shall be liable to be proceeded against and punished accordingly.

CHAPTER IV MISCELLANEOUS

18. PROTECTION OF ACTION TAKEN IN GOOD FAITH

No suit, prosecution or other legal proceeding shall lie against the Government or any officer or other employee of the Government or any authority constituted under this Act or any member, officer or other employee of such authority in respect of anything which is done or intended to be done in good faith in pursuance of this Act or the rules made or orders or directions issued thereunder.

19. COGNIZANCE OF OFFENCES

No court shall take cognizance of any offence under this Act except on a complaint made by--

- (a) the Central Government or any authority or officer authorised in this behalf by that Government, or
- (b) any person who has given notice of not less than sixty days, in the manner prescribed, of the alleged offence and of his intention to make a complaint, to the Central Government or the authority or officer authorised as aforesaid.

20. INFORMATION, REPORTS OR RETURNS

The Central Government may, in relation to its function under this Act, from time to time, require any person, officer, State Government or other authority to furnish to it or any prescribed authority or officer any reports, returns, statistics, accounts and other information and such person, officer, State Government or other authority shall be bound to do so.

21. MEMBERS, OFFICERS AND EMPLOYEES OF THE AUTHORITY CONSTITUTED UNDER SECTION 3 TO BE PUBLIC SERVANTS

All the members of the authority, constituted, if any, under section 3 and all officers and other employees of such authority when acting or purporting to act in pursuance of any provisions of this Act or the rules made or orders or directions issued thereunder shall be deemed to be public servants within the meaning of section 21 of the Indian Penal Code (45 of 1860).

22. BAR OF JURISDICTION

No civil court shall have jurisdiction to entertain any suit or proceeding in respect of anything done, action taken or order or direction issued by the Central Government or any other authority or officer in pursuance of any power conferred by or in relation to its or his functions under this Act.

23. POWERS TO DELEGATE

Without prejudice to the provisions of sub-section (3) of section 3, the Central Government may, by notification in the Official Gazette, delegate, subject to such conditions and limitations as may be specified in the notifications, such of its powers and functions under this Act except the powers to constitute an authority under sub-section (3) of section 3 and to make rules under section 25 as it may deem necessary or expedient, to any officer, State Government or other authority.

24. EFFECT OF OTHER LAWS

(1) Subject to the provisions of sub-section (2), the provisions of this Act and the rules or orders made therein shall have effect notwithstanding anything inconsistent therewith contained in any enactment other than this Act.

(2) Where any act or omission constitutes an offence punishable under this Act and also under any other Act then the offender found guilty of such offence shall be liable to be punished under the other Act and not under this Act.

25. POWER TO MAKE RULES

(1) The Central Government may, by notification in the Official Gazette, make rules for carrying out the purposes of this Act.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely--

- (a) the standards in excess of which environmental pollutants shall not be discharged or emitted under section 7;
- (b) the procedure in accordance with and the safeguards in compliance with which hazardous substances shall be handled or caused to be handled under section 8;
- (c) the authorities or agencies to which intimation of the fact of occurrence or apprehension of occurrence of the discharge of any environmental pollutant in excess of the prescribed standards shall be given and to whom all assistance shall be bound to be rendered under sub-section (1) of section 9;
- (d) the manner in which samples of air, water, soil or other substance for the purpose of analysis shall be taken under sub-section (1) of section 11;

- (e) the form in which notice of intention to have a sample analysed shall be served under clause (a) of sub section (3) of section 11;
- (f) the functions of the environmental laboratories, the procedure for the submission to such laboratories of samples of air, water, soil and other substances for analysis or test; the form of laboratory report; the fees payable for such report and other matters to enable such laboratories to carry out their functions under sub-section (2) of section 12;
- (g) the qualifications of Government Analyst appointed or recognised for the purpose of analysis of samples of air, water, soil or other substances under section 13;
- (h) the manner in which notice of the offence and of the intention to make a complaint to the Central Government shall be given under clause (b) of section 19;
- (i) the authority of officer to whom any reports, returns, statistics, accounts and other information shall be furnished under section 20;
- (j) any other matter which is required to be, or may be, prescribed.

26. RULES MADE UNDER THIS ACT TO BE LAID BEFORE PARLIAMENT

Every rule made under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or both Houses agree that the rule would not be made, the rule shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

Appendix D – Proposed Remediation of Polluted Sites Rules, 20XX

In exercise of the powers conferred by sections 6, 8, 8A and 15A of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules, namely:-

CHAPTER-I

PRELIMINARY

1. SHORT TITLE AND COMMENCEMENT:-

- (1) These rules may be called the Remediation of Polluted sites Rules, 20xx.
- (2) They shall come into force on the date of their publication in the official Gazette.

2. APPLICATION:-

- (3) These Rules shall apply to remediation of polluted sites from hazardous substances notified by the Central Government and such other substances as notified from time to time and shall not apply to:
 - (a) sites polluted by radio-active wastes as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and the rules made thereunder;
 - (b) sites polluted by bio-medical wastes covered under the Bio-Medical Wastes (Management and Handling) Rules, 1998 made under the Act; and
 - (c) rehabilitation of abandoned mines, sites contaminated by mining waste, damage to environment caused by mining covered under Mines and Minerals (Development and Regulation Act) 1957 (67 of 1957) and the rules made thereunder.
- (4) In the event that any hazardous substance is notified by the Central Government is also present in the sites and circumstances stated in Rule 2(1)(a), 2(1)(b) or 2(1)(c) or vice versa, the remediation shall be undertaken under the said acts and/or the rules made thereunder.

3. DEFINITIONS:-

- (5) In these rules, unless the context otherwise requires,-
 - (aa) "Act" means the Environment (Protection) Act, 1986 (29 of 1986);

- (bb) “advisor” means a person that meets the qualification criteria designed by the Authority in accordance with Rule 32(105) to assist in matters set out in Rule 32(102) of these Rules;
- (cc) “Authority” means an authority notified under sub-section (3) of section 3 of the Act for the purpose of remediation of polluted sites;
- (dd) “Central Pollution Control Board” means the Central Pollution Control Board constituted under sub-section (1) of section 3 of the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974);
- (ee) “contaminant” means hazardous substances notified by the Central Government in relation to soil standards under sub-section 2(a) of section 6 of the Act;
- (ff) “contamination” means discharge of contaminant at a site or migration of contaminant to a site;
- (gg) “contaminated site” is a delineated area consisting of aggregation of contamination sources, the areas between contamination sources, and areas that may contain contaminants due to migration from contamination sources so determined in accordance with Rule 4 of these Rules ;
- (hh) “detailed site investigation and risk assessment order” means an Order under Rule 19 of these Rules that directs a person to carry out detailed site investigation and risk assessment in accordance with the Guidelines;
- (ii) “discharge” means any act of spilling, releasing, leaking, dumping, pouring, pumping, emitting, emptying, injecting, escaping, leaching or disposing contaminants into the environment including drums, barrels, containers containing such contaminants;
- (jj) “facility” means any establishment, vehicle, ship or premise wherein the processes incidental to handling of a hazardous substance are carried out;
- (kk) “financial security” means deposits or bank guarantees in the format and for the amount as directed by the Authority;
- (ll) “Guidelines” means guidelines issued by the Central Pollution Control Board for remediation related activities as amended from time to time in accordance with Rule 33;
- (mm) “handling”, in relation to any substance, means the manufacture, processing, treatment, package, storage, transportation, use, collection, reception, recycling, recovery, reuse, destruction, conversion, disposal, offering for sale, transfer or the like of such substance;
- (nn) “investigated site” mean a site so determined in accordance with Rule 4 of these Rules;

- (oo) "land use and site activity" means any generic land use including residential, agricultural, industrial, commercial or public use and any site specific activity, whether designate in a plan in force by law or the actual use of such land or site, that may expose a receptor to a contaminant including but not limited to use of or contact with soil, use of or contact with surface water or municipal water supply and abstraction and use of or contact with ground water and related activities including construction, excavation, drilling, demolition, industry, operation, process, residence, commerce, trade, entertainment, recreation, education, cultivation and movement of vehicles and people;
- (pp) "notification" means a notification published in the Gazette of India or, as the case may be, the Gazette of a State and the expression "notify" shall be construed accordingly;
- (qq) "occupant", includes (i) in relation to any facility or part of facility, means a person who has authority, control, oversight, responsibility or influence over the facility or part of facility or has the capacity to impose any requirements or influence any practices directly or indirectly relating to any environment, health, safety and security aspects, and in case of land and building, includes a tenant (ii) in relation to any substance, the person in possession of the substance (iii) in relation to transport of a substance, a person engaged in the off-site transportation of the substance by air, rail, road or water;
- (rr) "person" means a person defined in The National Green Tribunal Act, 2010;
- (ss) "petition" means a petition made in accordance with the Rule 6 of these Rules;
- (tt) "polluted site" means a polluted site defined in the Act;
- (uu) "polluted site notice" means a notice issued in accordance with Rule 4 of these Rules;
- (vv) "post remediation order" means an Order under Rule 144 of these Rules that directs a person to carry out post remediation planning and post remediation measures in accordance with the Guidelines;
- (ww) "preliminary site assessment order" means an Order under Rule 7 of these Rules that directs a person to carry out preliminary site assessment in accordance with the Guidelines;
- (xx) "preliminary site investigation order" means an Order under Rule 7 of these Rules that directs a person to carry out preliminary site investigation in accordance with the Guidelines;
- (yy) "probably contaminated site" is an area (whether or not delineated) where the presence of contaminants is suspected but not conclusively determined or where contaminants exceed specified standards but the threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property with regard to present or future land use and site activity is not conclusively

established. A probably contaminated site may require further investigation to establish whether it is a contaminated site that requires remediation. The area may consist of aggregation of contamination sources, the areas between contamination sources, and areas that may contain contaminants due to migration from contamination sources;

- (zz) “public authority” means in any government authority or agency or department that is entrusted with the responsibility industrial development related matters, urban development related matters, ground water related matters, water and sanitation related matters, public health related matters, animal health related matters, agriculture related matters, environment related matters, safety related matters, administration related matters and law and order (including traffic) related matters in the context of a site and includes town planning authority (by whatever name called) set up under any law for the time being in force, a Panchayat as defined in article 243 and a Municipality as defined in article 243P, of the Constitution, land and land revenue departments of State Government;
- (aaa) “remediated site” means a site where remediation and post remediation measures have been implemented and there is no residual contamination;
- (bbb) “remediation completion order”, means an Order under Rules 23(74), 24(76) and 25 of these Rules upon completion of remediation and post remediation measures in accordance with the Guidelines;
- (ccc) “remediation contractor” means a person that meets the qualification criteria designed by the Authority in accordance with Rule 32(105) to assist in matters set out in Rule 32(103) of these Rules;
- (ddd) “remediation design and detailed project report order” means an Order under Rule 21 of these Rules that directs a person to prepare remediation design and detailed project report in accordance with the Guidelines;
- (eee) “remediation execution order” means an Order under Rule 23 of these Rules that directs a person to execute, supervise and verification remediation works in accordance with the Guidelines;
- (fff) “remediation objectives, requirements and options order” means an Order under Rule 20 of these Rules that directs a person to establish remediation objectives, remediation requirements and remediation options in accordance with the Guidelines;
- (ggg) “remediation preparation order”, means an Order under Rule 22 of these Rules that directs a person to carry out preparation, authorization and contracting for remediation execution in accordance with the Guidelines;
- (hhh) “remediation scheme” means a scheme for remediation containing such details, data and description as contained in Rule 21(70) of these Rules;

- (iii) “residual contamination” means, after completion of remediation and post remediation measures, contaminants exist in excess of screening level or there may be existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property, that may be mitigated or eliminated with land use and site activity restrictions;
- (jjj) “response level” are generic levels of hazardous substances in soil and sediments in at or above which it is very likely there is threat to human health or the environment, that may be imminent, provided in Schedule 4 of the Rules;
- (kkk) “responsible person” means one or more persons jointly and severally responsible for remediation of polluted sites and responsible for bearing the remediation cost and other related claims as determined in chapter 3 of these Rules;
- (lll) “responsible person order” means an order issued by the Authority and in accordance with Rules 11, 12, 13 and 14 of these Rules;
- (mmm) “restricted site” means a site where remediation and post remediation measures have been implemented and there is residual contamination requiring land use and site activity restrictions;
- (nnn) “restricted site notice” means a notice issued in accordance with Rule 26 of these Rules;
- (ooo) “screening level” are generic concentrations of hazardous substances in soil and sediments ground water and surface water distinguished by land use at or below which potential risks to human health or the environment are not likely to occur and where no further investigation and assessment is needed, provided in Schedule 4 of the Rules;
- (ppp) “site” means any area, place, premise, establishment, land and related structures including well, pit, pond, lagoon, landfill, groundwater, sediments, building, structure, pipeline and container and any facility, factory, industry, operation, process or equipment located over such area;
- (qqq) “site administration order” means an Order under Rule 8 of these Rules;
- (rrr) “site investigator” means a person that meets the qualification criteria designed by Authority in accordance with Rule 32(105) to assist in matters set out in Rule 32(104) of these Rules;
- (sss) “site registry” means a registry established and maintained in accordance with Rule 10 of these Rules;
- (ttt) “source” in relation to a contaminant means the location from which a contaminant has entered or may enter the environment and the soil, water, sediments that have been

contaminated at the point of entry of the contaminant but excludes contamination through migration;

(uuu) “specified industrial activity” means an industry, operation or process contained in Schedule 1 of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and such other industry, operation or process as may be notified from time to time;

(vvv) “State Government” in relation to a Union territory means, the Administrator thereof appointed under article 239 of the Constitution;

(www) “State Pollution Control Board” means the State Pollution Control Board or the Pollution Control Committee constituted under sub-section (1) of section 4 of the Water(Prevention and Control of Pollution) Act, 1974 (6 of 1974);

(xxx) “voluntary remediation” means certain type of remediation carried out in accordance with Rule 18 of these Rules.

Words and expressions used in these rules and not defined but defined in the Act shall have the meanings respectively assigned to them in the Act.

CHAPTER-II

IDENTIFICATION, PRELIMINARY INVESTIGATION, CONFIRMATION AND PRIORITIZATION OF POLLUTED SITES

4. NOTIFICATION OF POLLUTED SITE:-

(6) The Authority may determine if a site is contaminated site or a probably contaminated site. The Authority may make the determination based on the preliminary site assessment or preliminary site investigation or detailed site investigation:

(a) if on the basis of such assessment or investigation, the constituents and characteristics of contaminants discharged or otherwise come to be located at the site, exist at or above response levels and in conditions including possible combination of contaminants and interaction between contaminants and/or environmental constituents which pose existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property with regard to present or future land use and site activity, in such case the site may be determined as contaminated site;

- (b) if on the basis of such assessment or investigation, the contaminants exist at or below screening levels and there is no existing or imminent threat to health, safety, welfare, comfort or life of human beings, other living species, water quality or the environment in general or to property with regard to present or future land use and site activity, in such case the site may be determined as investigated site;
- (c) if on the basis of such assessment or investigation the level of contaminants found does not meet the criteria under (a) or (b) above, the site may be determined as probably contaminated site.

provided that such determination in sub-Rule 1(b) or 1(c) above shall not preclude further assessment or investigation of such site in future as and when circumstances merit such further assessment or determination;

- (7) In case of a probably contaminated site, the Authority may consider location factors and land use and site activity factors and may direct detailed site investigation to receive further information and make the determination.
- (8) All sites determined by the Authority as contaminated sites shall be classified as polluted sites requiring remediation. Any site subject to voluntary remediation shall also be classified as polluted sites requiring remediation.
- (9) The Authority shall delineate the site to the extent possible and notify a polluted site, through a polluted site notice, along with the following details:
 - (a) the site boundaries and features;
 - (b) the nature and level of contamination and the likely sources of contamination;
 - (c) the existing or imminent threat of harm to human health, environment or property with respect to land, ground water and surface water;
 - (d) land use and site activity restrictions and safety measures;
 - (e) such other information that the Authority considers necessary and appropriate.
- (10) The Authority shall provide a copy of the polluted site notice to the relevant public authorities, State Government and State Pollution Control Board and display the polluted site notice or cause the polluted site notice to be prominently displayed at the site.

5. MANDATORY PRELIMINARY SITE ASSESSMENT:-

- (11) A preliminary site assessment shall be carried out by any person at its own cost (a) under conditions specified in sub-Rules (2), (4) and (5) below, and (b) on a receipt of a preliminary site assessment order in accordance with Rule 7.

- (12) A person shall conduct a preliminary site assessment at its own cost and submit the report to the State Pollution Control Board, where any specified industrial activity was or is being carried out, under the following circumstances:
- (g) at least 30 days prior to filing application for land use change, by the owner of the land;
 - (h) at least 10 days prior to the signing agreement for sale or lease of land (including land that is part of establishment or facility), by the owner of the land with a copy to the purchaser or lessee of the land;
 - (i) at least 60 days prior to filing application for removal of soil from land, by the person carrying out such activity;
 - (j) at least 30 days prior to applying for a permit to construct on such land, by the owner or occupant of the land;
 - (k) at least 30 days prior to applying for a consent to establish for new or expansion projects, by the owner or occupant of the facility;
 - (l) at least 30 days prior to the commencement of demolishing any property, building or structure and decommissioning any industry, operation or process, by the owner or occupant of the facility;
 - (m) within 60 days from signing of any agreement for change in ownership of a company that owns or leases such land or is owner or occupant of the facility, by the company.
- (13) The Central Government may, by notification, amend or add to the list of circumstances set out in sub-Rules 2(a) to 2(g) above. The Central Government may exempt or provide for exemption of any person or class of persons, any premise or class of premises, any area or class of areas and any activity or class of activities in such circumstances and subject to such conditions as notified.
- (14) A trustee, receiver or liquidator or any person who takes possession or control of land for the benefit of lenders or creditors shall carry out site assessment at its own cost and submit the report to the State Pollution Control Board within 30 days of taking possession or control, if the land has been or is being used for specified industrial activity.
- (15) Any person whose act or omission to act causes or threatens to cause contamination or who detects the presence of contaminants on a site or who becomes aware of any of the above actions is bound by duty to report, in the format specified in Schedule 1 of these Rules, to the State Pollution Control Board, as soon as practicable, if any of the following conditions are met:
- (a) contaminants have been discharged or likely to be discharged;

(b) contaminants are present in the soil, sediments, surface water or ground water above the screening level;

(c) any other criteria as notified by the Authority.

(16) A public authority owning or having jurisdiction over land and facilities susceptible to contamination shall establish and carry out such processes and procedures that facilitate early detection and prevention of contamination in consultation with the State Pollution Control Board.

6. PUBLIC COMPLAINTS:-

(17) Any person may submit a petition relating to contamination or presence of contaminants in a site with such details as may be available in a format specified in Schedule 1 of these Rules along with fees specified in Schedule 3 of these Rules. A public authority is exempt from paying fees under this sub-Rule (1) while submitting a petition.

(18) Upon receiving a petition, the State Pollution Control Board shall take appropriate action by carrying a review of the petition and conducting such procedures to determine whether a preliminary site assessment or a preliminary site investigation is warranted or if it has already been already carried out.

(19) The State Pollution Control Board shall respond within reasonable time in writing to the petitioner stating the decision it has taken and provide reasons for its decision to the petitioner.

7. PRELIMINARY INVESTIGATION:-

(20) The State Pollution Control Board may, by a preliminary site assessment order, direct any owner or occupant of the site to conduct a preliminary site assessment at its own cost and within the time frame specified and submit a report to the State Pollution Control Board for review within a time frame specified if the State Pollution Control Board suspects that there is existing or threat of contamination or presence of contaminants in a site.

(21) Based on the review of the results of preliminary site assessment, the State Pollution Control Board may, by a preliminary site investigation order, direct any owner or occupant of the site to conduct a preliminary site investigation at its own cost and within the time frame specified and submit a report to the State Pollution Control Board for review within a time frame specified.

(22) In issuing a preliminary site assessment order or a preliminary site investigation order, the State Pollution Control Board shall be guided by the following factors and shall be under an obligation to act on such information:

- (a) any petitions received or any incident reported in public;
- (b) analysis of handling and management of hazardous waste in the state;
- (c) review during renewal of consent to operate, if there are any discrepancies on the amount of hazardous waste handled or managed or if there are any discrepancies on the storage period or manner of storage of hazardous waste on site;
- (d) prior studies or investigations done by any agency;
- (e) location factors that increase the risk of contamination such as vicinity of a previously contaminated site;
- (f) such other factors as it considers appropriate.

(23) The State Pollution Control Board shall prepare a review report based on the preliminary investigation report and forward its recommendation to the Authority within 60 days of receiving the preliminary investigation report.

8. SITE ADMINISTRATION:-

(24) Upon the direction of the Authority, the State Government may, by one or more site administration order(s), take temporary custody of the site or direct the site owner and occupant:

- (a) to not carry out such land use and site activity that may be restricted;
- (b) to carry such land use and site activity as may be permitted;
- (c) to provide full cooperation, assistance and access for remediation of polluted site including any health and safety measures;
- (d) to transfer temporary custody and control of the site to a person authorized by State Government on such terms and conditions and for such periods as may be specified;
- (e) to temporary relocate from the site on such terms and conditions and for such periods as may be specified;
- (f) any other matter that it may consider appropriate.

(25) Nothing shall prevent the State Government to issue a site administration order if a site owner or occupant is not known or cannot be traced after making reasonable efforts.

(26) Transfer of temporary custody and control may be enforced if in the opinion of the Authority, remediation may be significantly impacted or there may be threat to human health and environment in the absence of such transfer of temporary custody and control. The

State Government shall provide a reasonable notice of at least 90 days to the site owner or occupant to hand over the site.

- (27) If temporary relocation of persons is involved, the State Government may make or direct a person to make alternate reasonable living arrangements including but not limited to temporary accommodation, shelter, transportation, water and utilities and/or provide reasonable compensation for the temporary relocation and the duration of temporary relocation.
- (28) Upon receiving a copy of the polluted site notice, the land authorities shall add a remark in the land record that the particular land is polluted and
- (a) the permission of the Authority shall be required to change the land use;
 - (b) the permission of the Authority shall be required to carry out any land use and site activity including but not limited to construction, excavation, transportation of material to / from the site, use of surface water and withdrawal of ground water;
 - (c) the remark shall be removed only upon receiving a direction from the Authority.
- (29) Notwithstanding anything contained in any other law for the time being in force, no authority, government, agency or person shall or shall cause to
- (e) change the land use of a polluted site;
 - (f) transfer or change in the ownership of any portion or all of land or building of a polluted site;
 - (g) transfer or change in the ownership of any facility at the polluted site including any transfer or change in ownership of the company that owns such facility at the polluted site;
 - (h) carry out any activity or cease an activity on the polluted site including transfer or transport of any material to or from the site;

without the permission of the Authority.

9. PRIORITIZATION OF POLLUTED SITES:-

- (30) The Authority shall prepare and keep updated the priority of remediation of polluted sites based on such factors as it considers appropriate including the risks and hazards to human health and environment. The Authority may proceed for remediation of the highest priority polluted sites.
- (31) The Central Government may direct the Authority to select other sites in the priority list or change the priority listing based on such factors as it considers appropriate. The Central Government shall record its decision to change the order of priority of any site.

10. MAINTAINING A SITE REGISTRY:-

(32) Upon the direction of the Authority, the Central Pollution Control Board may establish and, in consultation with the State Pollution Control Board, keep updated a site registry that contains all information on sites including

(h) site description and location;

(i) extent and level of contaminant and threat to human health and environment damage;

(j) all information on the site including but not limited to records, documents, maps, petitions, reports, orders, notices, approvals, decisions, communication, plans evidences, court proceedings and noting in land register;

(k) land use and site activity restrictions;

(l) status of remediation process;

(m) contact details of all persons associated or involved with the site or remediation;

(n) such other information that the Authority may deem appropriate.

(33) The Central Pollution Control Board may provide for public access to such information in the site registry as it may consider appropriate. The Central Board may charge a fee for making available such additional details of a site as it may consider appropriate, subject to confidentiality requirements, to an interested person. It shall publish and follow a procedure for keeping the public informed on polluted sites and for making an application along with fees for providing additional details.

CHAPTER-III

RESPONSIBLE PERSON, PENALTY AND LIABILITY

11. DETERMING RESPONSIBLE PERSONS:-

(34) The Authority shall establish the procedure for the determination of responsible persons, determination of remediation costs, determination of environmental damages and determination of liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder.

(35) The Authority may allow multiple responsible persons to designate a lead party that shall conduct and pay for remediation of polluted sites on behalf of all responsible persons if it is

satisfied that this does not jeopardize the remediation activities in any way and the liability of a responsible person is not diminished.

- (36) Any person shall be automatically and immediately become a responsible person and shall not be subject to any exemption under the Act who (i) in any way, delays or obstructs the remediation of polluted site or exercise of any powers by any authority or agency under the Act (ii) does not provide full cooperation, assistance and access for remediation of polluted site, (iii) does not follow any order, notice, or direction under the Act and these Rules (iv) does not comply with any information request sought under the Act and these Rules, (v) where relevant, obstructs or delays or prevents the hand-over of temporary custody and control of the polluted site or identification of responsible person, (vi) does not follow or fails to take such safeguards and restrictions on land use and site activity during and after completion of remediation of polluted site (vii) fails to take any step as directed to stop any continuing discharge or prevent future contamination or prevent exposure of contaminants.
- (37) A responsible person shall not be in any way be exempted or excluded from its liability on account of the following factors:
- (a) whether the activity causing contamination and effects of contamination occurred at different points in time, including before coming of the Act;
 - (b) whether the requirement of a site investigation was neither mandatory nor expected as part of normal business practice and the person cannot be expected to carry out such investigations or examinations;
 - (c) whether the contaminants were not notified prior to the commencement of Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 or Hazardous Wastes (Management and Handling) Rules, 1989 or were caused by substances that were not notified as hazardous substances;
 - (d) whether each and every source of discharge of hazardous substance or each and every responsible person has been identified;
 - (e) whether it is possible to separately identify each contamination source when there are multiple sources of contamination (e.g., an industrial cluster or contamination of ground water);
- (38) The Central Government may by notification exempt certain class or categories of persons, activities or areas from the determination of responsible person. The Central Government may consider factors such as public interest, undue hardship, disproportionate impact on employment and prohibitive cost of identification for grant of such exemptions and such exemptions shall apply prospectively to all determination of responsible person.

12. PENALTY:-

- (39) The Authority may determine and impose penalty for violation or non-compliance of the Act and the rules, directions and orders therein. Submitting false or misleading information, suppressing material information or not responding to information requests shall also attract penalty.
- (40) The Authority may impose penalty for any matter related to contamination and discharge of hazardous substances, whether or not such acts caused site to become polluted site, and consider such factors as appropriate including
- (a) the amount of disproportionate gain or unfair advantage being such amounts that has allowed a person to do such acts that may not have been possible if it complied with the provisions of the Act, rules, orders or directions thereunder including but not limited to increase in performance or outputs, selling banned products, saving in interest and operating costs, avoiding capital and operating costs, avoiding costs of testing, reduction in waste management, handling, storage, treatment and transport costs;
 - (b) increase the amount so determined under sub-Rule 2(a) above based on the history of non-compliances or violations by the person including past non-compliances, repetitive nature of non-compliance or violations and the seriousness of the offence (actual or possible harm), such increase being one to three times the amount;
 - (c) increase the amount so determined under sub-Rule 2(a) and 2(b) above so as to act as an effective deterrent, such increase being one to three times the amount;
- (41) The amount of penalty determined by the Authority shall be credited to the National Environmental Restoration Fund.

13. LIABILITY FOR REMEDIATION COST AND DAMAGE TO ENVIRONMENT

- (42) The Authority may determine the costs of remediation. The remediation cost shall mean all costs of remediation including but not be limited to:
- (a) all costs associated with engaging third parties including contractors, consultants, specialists, experts, lawyers, laboratories, research institutes and public authorities;
 - (b) all costs associated with investigation, survey, assessment, preparation, management, supervision, verification, reporting, review, approval, evaluation, corrective measures, project management, permitting, licensing, tendering and insurance;
 - (c) all costs associated with remediation and post remediation measures including site access measures, establishing project offices, excavation, removal, transport, filling,

treatment, paving, repaving, replanting, boring, digging, pumping, operation, maintenance, supplies, utilities, equipment, material and vehicles;

- (d) all costs associated with temporary or permanent relocation and rehabilitation of affected person and providing aid or relief to affected persons, property and environment;
 - (e) all costs associated with restoring the quality of the environment and the ecological services;
 - (f) all costs associated with organizing stakeholder, co-ordination, communication and conflict resolution;
 - (g) all fees imposed under the Act and the Rules;
 - (h) all costs associated with securing and enforcing compliance with land use and site activity restrictions, obtaining and releasing temporary custody and control of site and cost recovery;
 - (i) all costs associated with redevelopment of the site including demolishing, repairing or rebuilding of any building and structure;
 - (j) all costs associated with promoting site reuse;
 - (k) all taxes, duties and levies and interest from the date of a demand being raised and payment.
- (43) The Authority may determine the liability on account of natural resource damage, loss of ecological services and damage to flora and fauna. The Authority may establish a framework for estimating the damage to environment, natural resources, flora and fauna and give due consideration to the interim damage, i.e., from the time of contamination to completion of remediation as well as to any permanent damage that may have occurred.

14. RESPONSIBLE PERSON ORDER

- (44) The Authority may, in a responsible person order, cover all aspects related to determination of responsible person, determination of remediation costs, determination of penalty and determination of environmental damage including but not limited to directing the responsible person to
- (a) undertake any or all responsibility of remediation, the manner in which remediation shall be carried out and the time frame for such remediation;
 - (b) provide such financial securities, make such payments including advance payments and in such time as directed;

- (c) create mortgage and hypothecation over assets, property, land and building as directed;
 - (d) deposit such additional amounts and bank guarantees from time to time as directed;
 - (e) take prior consent of any change to the ownership of responsible person or its business;
 - (f) deposit such sums of money as may be specified;
 - (g) work under the direction and supervision and subject to such monitoring, reporting, verification and audit requirements as may be specified.
- (45) The liability and responsibility set out in these Rules shall be in addition and not in derogation to the responsibility or liability of a person under any other law.
- (46) A responsible person shall not do or fail to do anything that impacts its capability to remediate a site and pay for all costs associated with remediation. The Authority may direct creation of mortgage and hypothecation on all assets, properties, land and building of the responsible person. Such mortgage and hypothecation shall have priority over every other mortgage or other interest whether created or to be created.
- (47) If at any time the Authority becomes aware of any event or activity where a responsible person acted or intends to act in a way so as to diminish, dilute or reduce its responsibility to remediate a polluted site or pay for all costs associated with remediation, it may by order require the responsible person to deposit such additional amounts or financial securities as it may consider appropriate.
- (48) The Authority may initiate one or more proceedings for determining responsible person, determining the remediation cost and liability for violating the Act or the rules made thereunder and may serve one or more orders on the responsible person. The Authority may review its earlier orders if additional information becomes available, changes in scope and remediation cost or if new responsible persons are identified.

CHAPTER-IV

ORPHAN SITES, FINANCING, COST RECOVERY, VOLUNTARY REMEDIATION

15. ORPHAN SITES:-

- (49) An orphan site is defined as a polluted site where responsible persons cannot be traced or all the responsible persons together cannot pay for the remediation cost and for that reason it is necessary to use public funds for remediation.

(50) If an orphan site has been so determined by the Authority and if the Authority has determined that the site owner or occupant is not a responsible person, it may direct creation of mortgage on land of such site owner or occupant. Such mortgage shall have priority over every other mortgage or other interest whether created or to be created.

(51) The site owner or occupant shall owe an amount that is lower of

(a) the difference in value of the land on the site as on the date of issue of remediation completion order and as on the date of issue of polluted site notice, adjusted for inflation as provided in the income tax regulations for indexation;

(b) the unrecovered remediation cost.

(52) The mortgage under sub-Rule (3) shall be in place until the

(a) the site owner offers alternate financial security or pays the unrecovered costs;

(b) the unrecovered remediation cost is recovered from a responsible person;

(c) the site owner sells the land and building, with the permission of the Authority, and reimburses the costs.

16. FINANCING FROM NATIONAL ENVIRONMENTAL RESTORATION FUND:-

(53) The Authority may apply for financing to the National Environmental Restoration Fund under the following categories:

(a) Category – I (Annual plan) for financing preparatory activities including but not limited to identification of polluted sites, preliminary investigation and identification of responsible persons and financing support activities including program management and implementation, technical assistance, training and development, up-gradation of labs, establishing new labs, research and development, knowledge centres, solution exchanges, updating standards and guidelines, establishing and updating site registry, communication and outreach and legal costs.

(b) Category – II (DPR) for financing DPR related activities including remediation investigation, remediation design and preparation of DPR.

(c) Category – III (Remediation works) for financing remediation works including implementation of remediation and post remediation plan and action;

(54) Proposal for financing under Category – I (Annual Plan) may be submitted three months prior to the beginning of the new financial year and contain schedule of activities proposed during the following year, milestones and deliverables, roles and responsibilities and budgeted costs. Proposals for financing under Category – II (DPR) would be accompanied by site investigation reports, priority listing of the site, polluted site notice and budgetary

estimate of costs. Proposals for financing under Category – III (Remediation Works) would be accompanied by (a) detailed project report, costing of remediation measures, costing of redevelopment measures, implementation plan and environment and social impact assessment report; (b) responsible person orders and provision of financial securities; (c) share of financing from State Government, if any, and requirement of balance financing.

(55) An appraisal committee and approval forum would be designated for appraising and approving financing from the Fund in line with the Delegation of Financial Powers Rules, 1978 as amended from time to time. The appraisal committee may appoint external experts for appraising the proposals. An outsourced activity is eligible for financing. All financing proposals would be prepared by the Authority and submitted in a standard form and follow such time lines as set out by the Appraisal Committee.

(56) The appraisal committee would forward its recommendation to the approval forum. The appraisal committee and approval forum would endeavour to make its recommendation to the Approval Forum or return the financing proposal to the Authority within 90 days of receiving a proposal.

(57) The appraisal committee would receive regular reports on use of funds and on the progress of the activities and programs.

17. COST RECOVERY:-

(58) Any unrecovered costs along with interest at such reasonable rate as the Central Government may, by order, fix from the date when a demand for the unrecovered costs is made until it is paid shall be recovered by

(a) enforcing financial securities;

(b) enforcing interests created through mortgage and hypothecation;

(c) arrears of land revenue or of public demand.

(59) Where a person enters into a bankruptcy or winding up proceeding, the Authority may recover the remediation cost incurred along with interest at such reasonable rate as the Central Government may, by order, and all associated administrative or other costs and expenses so incurred in priority to any holder of a financial security over the land and property of the person.

18. VOLUNTARY REMEDIATION:-

(60) A voluntary remediation may be suitable for sites:

(a) that are not contaminated sites;

- (b) that are currently not being investigated by the State Pollution Control Board or the Authority;
- (c) where the person proposing voluntary remediation is competent to manage or procure the management of remediation and related environment and social aspects and local community requirements;
- (d) where the person proposing voluntary remediation can demonstrate sufficient funds for carrying out remediation.

(61) A person may submit an application for voluntary remediation for review by the Authority. Such application may contain preliminary assessment report, preliminary investigation report, voluntary agreement between all owners and occupants, evidence of sufficient capacity to pay for remediation and an undertaking to comply with Authority's directions and orders during remediation.

(62) The Authority may approve the voluntary remediation proposal if it is satisfied that:

- (a) it meets the criteria set out in sub-Rule (1) above;
- (b) the voluntary proposal has been agreed and accepted by all site owners and occupants;
- (c) all persons together have demonstrated that they have sufficient capacity to pay the remediation cost and there is no requirement of public funding to pay for remediation;
- (d) all persons agree to abide by the orders, directions and notices issued by the Authority;
- (e) it has followed the process laid out under Rule (19), (20) and (21) and the Guidelines

Provided the Authority may waive one or more conditions specified and/or impose one or more conditions.

(63) If at any stage, the person undertaking voluntary remediation does not follow any order or directive or notice or contravenes the provisions of the Act or Rules, there shall be no refund of any costs already incurred by the person and the Authority shall take all steps to enforce the orders as if there was no voluntary remediation proposal.

(64) Approval of voluntary remediation shall not impact the imposition or otherwise of damages or loss to environment and liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder.

CHAPTER-V

REMEDIATION INVESTIGATION

19. DETAILED SITE INVESTIGATION AND RISK ASSESSMENT:-

- (65) The Authority may, by a detailed site investigation and risk assessment order, direct a person to carry out one or more of the following:
- (a) carry out scoping study, define scope and investigation strategy and submit to the Authority for approval;
 - (b) carry out detailed site investigation to establish the nature, extent and concentration of contaminants and conditions on the site, including but not limited to
 - (i) relevant fieldwork, laboratory testing, analysis and interpretation of exploratory data;
 - (ii) consultation with stakeholders including site owner and occupant, public authorities, civil society institutions and community based organizations;
 - (iii) establish and follow appropriate health and safety procedures;
 - (c) preparation and submission of detailed investigation report for review and approval;
 - (d) carry out risk assessment to determine whether and how the contamination causes or may cause harm to human health and environment, including but not limited to
 - (i) assessment of contaminant concentration levels whether they exceed screening and/or response levels;
 - (ii) identification of the applicable source, pathway, receptor combinations to assess risks to human health;
 - (iii) assessment of quantitative risks for human health where the source-pathway-receptor combination poses risks for human health;
 - (iv) assessment of risk to environment;
 - (e) preparation and submission of risk assessment report for review and approval;
 - (f) maintain and submit all records, reports, data, maps, logbooks, registers and related information;
 - (g) such activities as may be directed by the Authority upon review.

20. REMEDIATION OBJECTIVES, REQUIREMENTS AND OPTIONS:-

(66) The Authority shall establish the order of preference of the remediation objectives. Such objectives include:

- (a) total threat reduction, that means complete removal or treatment of the contaminants such that the site is available for any land use and any site activity, that is likely to entail little or no restrictions for any land use and any site activity or monitoring and maintenance requirements post remediation;
- (b) threat reduction for generic fitness of land use, that means considering present and alternate land use, removal or treatment of the contaminants to a level appropriate for the generic level of land use and includes severing of the pathway from the source of contamination to receptors and protecting or removing the receptors, that is likely to entail little or no restrictions on generic land use but may restriction certain site activities and impose monitoring and maintenance requirements post remediation;
- (c) threat reduction for site specific fitness of site use: that means considering present and alternate site specific activity, removal or treatment of the contaminants to a level appropriate for the specific site activity and includes severing of the pathway from the source of contamination to receptors according to the specific site activity and protecting or removing the receptors, that is likely to entail extensive restrictions on specific site activity and monitoring and maintenance requirements post remediation.

(67) In approving the remediation objective and remediation requirements, the Authority shall have due regard to the following:

- (a) eliminating or minimizing the threat to human health, safety and environment keeping in view the current or alternate land use and site activity;
- (b) sustainable development or redevelopment of polluted site focusing on efficient use of land resource, restoration of the quality of environment, flora and fauna to an acceptable level and wellbeing of local community, considering any temporary or permanent relocation;
- (c) use of proven methods for remediation that minimize the risk of exposure and effectiveness of post remediation requirements of monitoring, maintenance and restrictions;
- (d) cost benefit analysis;

(68) The Authority may, by a remediation objectives, requirements and options order, direct a person to carry out one or more of the following:

- (a) define the scope and submit to the Authority for approval;

- (b) establish remediation objectives and requirements covering the following aspects, including but not limited to:
 - (i) target concentration levels in soil, groundwater, surface water and air (in case of volatile substances) as applicable;
 - (ii) acceptable level of quality of environment, flora and fauna to be restored;
 - (iii) degree of robustness, maturity and effectiveness of remediation techniques to be employed and contingency planning requirements;
 - (iv) land use and site activity restrictions, monitoring requirements and maintenance requirements including temporary custody and control requirement, temporary or permanent relocation requirement, relevant stakeholder groups that may or are impacted that need to be consulted;
 - (v) impact of remediation on the economic value of the site including post remediation land use and site activity and related environment and social aspects;
 - (vi) constraints or otherwise on the timing of commencement of remediation and/or completion of implementation;
 - (vii) any other requirements relevant to the context or required by the Authority;
- (c) prepare and submit remediation objectives and requirements report, for review and approval;
- (d) develop and select remediation options through the following activities, including but not limited to:
 - (i) identifying applicable constraints including availability of storage and disposal facilities that may impact any remediation technique, specifications applicable to the techniques or the implementation of the remediation techniques;
 - (ii) consulting relevant stakeholders including but not limited site owner and occupant, public authorities, civil society institutions and community based organizations;
 - (iii) identifying applicable remediation techniques taking into account the effectiveness and relevance of the techniques when used in isolation or in combination;
 - (iv) identifying remediation options, as combination of applicable remediation techniques, considering good practices in remediation options, field experience and modelling;
 - (v) establishing criteria for comparison and appraisal of remediation options appropriate to the context including but not limited to remediation level, technical risks, costs and benefits, sustainability, time taken for remediation, post remediation land use and site activity and social aspects;

- (vi) establishing method for comparison and appraisal appropriate descriptive, qualitative or quantitative methods or a combination thereof;
- (vii) evaluate remediation options and consult relevant stakeholders including but not limited to site owner and occupant, public authorities, civil society institutions and community based organizations;
- (e) prepare and submit remediation options report, including the stakeholder consultation results, for review and approval;
- (f) maintain and submit all records, reports, data, maps, logbooks, registers and related information.
- (g) such activities as may be directed by the Authority upon review.

21. REMEDIATION DESIGN AND DETAILED PROJECT REPORT:-

- (69) The Authority may, by one or more remediation design and detailed project report order, direct a person to carry out one or more of the following:
- (a) define the scope and submit to the Authority for approval;
 - (b) carry out activities required for the preparation of detailed project report based on the remediation objective, remediation requirements and selection remediation option;
 - (c) carry out activities required for the preparation of costing of remediation measures and redevelopment measures;
 - (d) carry out activities required for the preparation of implementation plan;
 - (e) carry out an environment impact assessment and a social impact assessment along with consultation with the relevant stakeholders;
 - (f) prepare and submit detailed project report, costing of remediation measures, costing of redevelopment measures, implementation plan and environment and social impact assessment report for review and approval;
 - (g) maintain and submit all records, reports, data, maps, logbooks, registers and related information;
 - (h) such activities as may be directed by the Authority upon review;
- (70) The Authority may approve the remediation scheme comprising detailed project report, costing of remediation measures and redevelopment measures, evidence of financing, implementation plan and environment and social impact assessment report. The Authority

shall provide the approval or rejection with reasons recorded in writing within 60 days of receiving the request for approval.

- (71) The Authority may make an application to the National Environmental Restoration Fund if there is a requirement for public funds. The Authority may direct execution of remediation works once it has obtained the approval from the National Environmental Restoration Fund as applicable.

CHAPTER-VI

REMEDIATION IMPLEMENTATION AND POST REMEDIATION

22. PREPARATION, AUTHORISATION AND CONTRACTING:-

- (72) The Authority may, by a remediation preparation order, direct a person to carry out one or more of the following:
- (a) prepare an inventory of required permits, licenses and consents required;
 - (b) apply and obtain the required permits, licenses and consents required;
 - (c) prepare tender documents for implementation of remediation works and invite bids for remediation contractors;
 - (d) prepare and submit the tender evaluation report and remediation preparation report for review and approval;
 - (e) maintain and submit all records, reports, data, maps, logbooks and registers;
 - (f) such activities as may be directed by the Authority upon review.

23. EXECUTION, SUPERVISION AND VERIFICATION OF REMEDIATION WORKS:-

- (73) The Authority may, by a remediation execution order, direct a person to carry out one or more of the following:
- (a) allow or require issuance of notice to proceed to mobilize and prepare for remediation measures, execute and manage remediation measures;
 - (b) submit management reports provided by remediation contractor;

- (c) prepare and submit periodic verification reports on preparation of remediation measures against contract and specifications for review;
- (d) prepare and submit periodic verification reports on execution of remediation measures against contract and specifications for review;
- (e) prepare and submit for approval any variations to the contract and specifications and modifications to the remediation measures for review and approval;
- (f) prepare and submit for approval remediation evaluation report for review and approval;
- (g) maintain and submit all records, reports, data, maps, logbooks, registers and related information;
- (h) such activities as may be directed by the Authority upon review.

(74) In approving the remediation evaluation report, the Authority may decide that

- (a) the remediation objectives have not been met and direct additional or modified remediation measures to be implemented;
- (b) the remediation objectives contained in the contract and specifications have been met and
 - (i) the level of contamination is reduced below screening level and there is no threat of harm to human health and environment, in which case the Authority may issue a remediation completion order recording such aspects as it considers appropriate;
 - (ii) the level of contamination is not reduced below screening level, the Authority may direct post remediation measures.

24. POST REMEDIATION PLAN AND ACTION:-

(75) The Authority may, by a post remediation order, direct a person to carry out one or more of the following:

- (a) prepare, in consultation with the relevant stakeholders, a post remediation plan that includes management measures, technical measures including monitoring and maintenance measures, deviation points and reporting plan and submit for review and approval;
- (b) prepare, in consultation with the relevant stakeholders, a post remediation implementation programme that includes monitoring, inspection, maintenance, replacement and management measures and submit for review and approval;

- (c) prepare tender documents for implementation of post remediation activities and invite bids, if required;
 - (d) prepare and submit the tender evaluation report for review and approval;
 - (e) report any critical deviation and suggest measures to be taken for review and approval;
 - (f) report non critical deviation for review;
 - (g) prepare and submit periodic post remediation verified reports for review and approval of any variations or modifications or completion of post remediation measures report;
 - (h) maintain and submit all records, reports, data, maps, logbooks, registers and related information;
 - (i) such activities as may be directed by the Authority upon review.
- (76) In approving the completion of post remediation measures report, the Authority may decide that
- (a) the post remediation objectives have not been met and direct additional or modified post remediation measures;
 - (b) the post remediation objectives have been met and issue a remediation completion order.

25. REMEDIATION COMPLETION ORDER:-

- (77) The Authority by a remediation completion order direct the site owner and occupant such measures as it deems appropriate including but not limited to:
- (a) carry out permitted activities on the site and to use the site for permitted purposes and not carry out restricted activities on the site and to not use the site for restricted purposes;
 - (b) not allow any other person to carry out restricted activities on the site and to not allow any other person to use the site for restricted purposes;
 - (c) inform any change or transfer of ownership or control of site;
 - (d) allow access to site for carrying out any assessment or investigations in future;
 - (e) follow such health and safety measures as advised;
 - (f) such other matters as it deems appropriate.

- (78) The Authority may provide a copy of the remediation completion order to the State Government, Central Pollution Control Board, State Pollution Control Board, relevant public authorities and responsible persons.
- (79) The Central Pollution Control Board may mark the status of the site in the site registry as remediated site or restricted site based on whether there is residual contamination.

26. SITE REUSE:-

- (80) Upon the direction of the Authority, the State Government may hand-over of temporary custody and control and arrange for return of persons relocated.
- (81) For a restricted site, the Authority shall issue a restricted site notice to reflect the appropriate land use and site activity restriction and instruct the land authorities to amend remark in land records according to the restricted site notice. For a remediated site, the Authority shall instruct the land authorities to remove the remark in the land records. In the absence of a mechanism for restricting land use and site activity, the Authority shall direct the State Government to establish the land use and site activity restriction for the restricted site.
- (82) The State Government may direct relevant planning and development agencies and land authorities to take steps to promote the reuse of the remediated site and restricted site. If the remediation envisaged a change in land use, the State Government may direct the planning and development and land authorities to effect the change in land use.
- (83) The State Government may develop and disseminate such information to such persons as it considers appropriate to promote the reuse of site including awareness programs on contamination, remediation and reuse.

CHAPTER-VII

MISCELLANEOUS

27. RESPONSIBILITY OF AUTHORITIES

- (84) The authority specified in column 2 of the Schedule 2 shall perform the duties as specified in column 3 of the Schedule 2 subject to the provisions of these rules.

28. ADDITIONAL OR MODIFIED MEASURES

- (85) To prevent any impact on contamination, spread of contamination, harm to human health or damage the environment, the Authority may, by one or more orders, direct any person

- (a) to cease any activity, industry, operation or process or handling, management, transport and disposal of any substance or any land use and site activity at any site including neighbouring sites;
 - (b) to refrain from carrying out any activity that have not been approved by the Authority;
 - (c) to allow entry and access to site to a person authorized by the Authority;
- (86) The Authority may require a person to:
- (a) prompt start the remediation based on the imminent threat to human health and environment or migration of contaminants;
 - (b) delay the start of remediation or defer remediation in such circumstances and subject to such terms as it may deem appropriate;
 - (c) follow a staged remediation approach with phases being separated by such time intervals as it may deem appropriate;
 - (d) address any immediate exposure threats and restrict land use and site activity until such time that the remediation may be cost effective, particularly in case of orphan sites;
- (87) The Authority shall make all efforts to complete polluted site determination and identify the responsible person before issuing a remediation order. However, nothing shall prevent the Authority to issue a remediation order at any stage and commence remediation activities.
- (88) Any remediation related activity must be under the direction and supervision of the Authority. Any remediation related activity undertaken without the approval or supervision of the Authority shall be a contravention of these Rules.
- (89) The Authority may, at any time, perform or direct such additional checks and verifications including taking and testing samples, such additional monitoring and supervision activities and such additional investigations as it may consider necessary.
- (90) In reviewing an activity, report, plan, works, tests, investigations or according an approval or issuing an order, the Authority may require any person to carry out such changes, do such additional activities and provide such additional information and the person required shall comply with such requirements diligently to the satisfaction of the Authority.
- (91) The Authority may issue one or more orders relating to the same activity, combine orders relating to two or more activities, review the orders and issue amended orders, cancel or suspend an order.
- (92) If additional information becomes available at any stage or there is a change in circumstance or information, the Authority may review any decision, order, direction or notification and impose additional or different requirements and exercise power to direct a

person on any matter which has been previously dealt with and such action cannot be challenged on this ground.

(93) The Authority may initiate an action *suo motu*.

29. RIGHT TO INTERVENE

(94) The Authority may intervene and undertake any activity that is properly the responsibility of a person or has been entrusted to a person including a State Pollution Control Board or Central Pollution Control Board. The Authority may carry out the activity itself or appoint another person to carry out the activity or request the Central Government or State Government to appoint an agency, authority or public sector organisation to carry out the activity and recover all costs from the appropriate person. The Authority may intervene where it considers necessary and appropriate to do so, including but not limited to:

- (a) in an emergency situation;
- (b) where a responsible person does not act or does not act in a reasonable time frame;
- (c) where a responsible person is or has suffered from technical, institutional, financial or legal deficiency to undertake the activity;
- (d) where any work product or outcome is deficient and has not been corrected to the satisfaction of the Authority;
- (e) where a responsible person cannot be located.

30. FEES:-

(95) Fees is payable for carrying out its activities under the Rules in accordance with Schedule 3. The fees payable shall be adjusted for inflation, based on the wholesale price index, from the date of notification of these Rules, every five years.

(96) The Authority may appoint qualified advisors and qualified site investigators to assist it with any activity and the cost of such qualified advisors and site investigators shall be payable in addition to the fees in sub-Rule (1).

(97) Fees is payable with each submission of a report or document or a matter under review. The Authority may require further information or clarifications and give reasonable time for responding to directions. Nothing contained in these Rules shall restrict the Authority to reject the matter under review, after recording reasons in writing and giving the person concerned a reasonable time for rectification. Fees and costs of third parties engaged by Authority shall not be refunded under any circumstance. Resubmission of a report following rejection shall entail additional fees.

(98) Where no rate is notified in Schedule 3, the Authority may require a person to pay at a reasonable rate for any or all costs incurred by the Authority in connection with the activity.

31. EFFECT OF OTHER RULES, DISPUTES

(99) If any provision of this Rule and the orders, notices and directions issued therein conflict with any provision contained in any other rules or notification or orders or directions at any time under the Act and the matter relates substantially to remediation of polluted site, the provisions of these Rules and the orders, notices and directions issued therein shall prevail.

(100) If a dispute arises between the Authority and any public authority in relation to any decision, order, directive or notice issued by the Authority, the matter may be referred by either party to the Central Government. The Central Government may nominate an officer, not below the rank of secretary, to hold an enquiry and make a report to the Central Government with respect to the dispute. The Central Government may make such decision as it deems fit with respect to the dispute and issue an order to the authorities. The order shall be final and binding on the authorities.

32. USE OF THIRD PARTIES

(101) The Authority may authorize any person to undertake any activity or under these Rules on its behalf assist it with any activity provided it is satisfied that it is appropriate to do so.

(102) The Authority may retain a qualified advisor for the purpose of assisting it with any activity including but not limited to:

- (a) preparing or reviewing any reports, costing, valuations, risk assessments, remediation options, opinions, filings, approvals, communications, documents, test results, plans, design, specifications and returns;
- (b) preparing or implementing community involvement and stakeholder engagement programs, outreach and communication programs, monitoring and evaluation programs;
- (c) gathering evidence, court filings, preparation or view of documentation, litigation and implementation of awards.

(103) The Authority may retain a qualified remediation contractor for the purpose of assisting it with any activity related to implementation and execution of remediation works and post remediation works including engineering and design, permitting, planning, mobilization, construction, civil works, remediation action and post remediation action.

- (104) The Authority may retain a qualified site investigator for the purpose of assisting it with any assessment, investigation, sampling and laboratory analysis activity including preliminary site assessment, preliminary site investigation, detailed site investigation, investigations during remediation and investigations post remediation.
- (105) The Authority may designate criteria for advisor, remediation contractor and site investigator. Such criteria may include adequate expertise and experience in the relevant area and access to specific experience and expertise as required, adequate availability of manpower and resources, high standards of ethics and integrity, insurance and any other matters considered appropriate by the Authority.
- (106) The Authority may establish and keep updated a panel of advisors, remediation contractors and site investigators who are qualified to carry out any or all perform any or all activities required for remediation of polluted sites. The Authority may add or modify the panel or suspend a person performing from performing any or all activities.

33. GUIDELINES, STANDARDS AND CHECKLISTS:-

- (107) For any matter connected with these Rules, the Central Pollution Control Board may publish Guidelines including but not limited to protocols, tools, manuals, methodologies and checklists in accordance with the provisions of the Act, Rules and good industry practices for the use of Authority and for the use of any person engaged in the remediation of polluted site. Unless otherwise directed by the Authority and recorded in writing, a person shall substantially comply with the guidelines, protocols, tools, methodologies and checklist requirements.
- (108) The Central Pollution Control Board may publish Guidelines for community engagement and stakeholder consultation required under these Rules. Such manual shall cover the requirements of publishing and disseminating notice, identification of relevant stakeholder groups and communities, conduct of stakeholder consultation and community engagement, requirements of expertise of persons conducting consultations and engagements and record of discussions.
- (109) The Central Pollution Control Board may publish Guidelines for assessing the quality of environment, flora and fauna that has been damaged or lost due to contamination and setting the restoration levels with respect to environment, flora and fauna.

34. RESEARCH AND DEVELOPMENT:-

- (110) The Central Pollution Control Board may prepare a list of top contaminants found in polluted sites and expand the list from time to time and engage with the public health

authorities and research institutions for preparation of toxicological profile, identification of signs of health impacts and appropriate treatment.

- (111) The Central Pollution Control Board may prepare a list of remediation techniques that are most commonly required for polluted sites and engage with the research institutions to develop appropriate low cost remediation techniques, conduct field trials and establish the use of such techniques.

35. RECORDS:-

- (112) Any person who destroys, mutilates, erases or loses a record of information (including electronic record) in relation to any activity described in the Rules shall be in violation of the Rules. A person shall maintain the record of information for a period of 30 years.

SCHEDULE 1

FORM FOR MAKING PETITION [SAME AS APPENDIX A]

SCHEDULE 2

LIST OF AUTHORITIES AND CORRESPONDING RESPONSIBILITIES

#	Authority	Corresponding Responsibilities
1.	Ministry of Environment and Forests under the Environment (Protection) Act, 1986	<ul style="list-style-type: none"> • Establish a national level steering committee under the chairmanship of Secretary, Ministry of Environment and Forests to monitor and provide overall guidance to the implementation of state level remediation plan • Establish a Section 3(3) authority – Remediation of Polluted Sites Authority
2.	Remediation of Polluted Sites Authority (“Authority”) established under sub-section (3) of section (3) of the Environment (Protection) Act, 1986	<ul style="list-style-type: none"> • Plan and cause to be executed and monitor and report on national program on remediation of polluted sites to Central Government • Notify polluted sites, site activity restrictions, site management measures • Establish priority of polluted sites for remediation • Identify responsible persons, assess, adjudicate and impose remediation costs, loss and damages and penalties • Prepare and propose remediation scheme for appraisal and approval by the National Environmental Restoration Fund, where there is requirement of public funding • Propose financing of DPR and annual plan to the National Environmental Restoration Fund • Appraise and approve remediation schemes (including voluntary remediation) that do not require public funding • Develop a national resource accounting framework for calculation of loss and damage to natural resource and environment • Prepare and submit annual progress report on the activities undertaken during the previous year to Central Government • Appoint site investigators and advisors, including legal and financial advisors and monitor, supervise and verify the work of site investigators and advisors • Appoint remediation contractors and monitor, supervise and verify the activities of remediation contractors • Adjudicate on determination and imposition of remediation costs and order thereon, determination and imposition of loss and damage to environment and order thereon, determination and imposition of liability for failure to comply with or contravention of any of the provisions of this Act, or the rules made or orders or directions issued thereunder and order thereon • Approve remediation objective, remediation requirement and remediation option for a polluted site • Enforce remediation and post remediation activities, review and approve reports submitted and review and approve variations during remediation works • Establish committees as may be required for the tasks related to identification of polluted sites, remediation planning and implementation, responsible person determination and co-ordination with State Governments, State Pollution Control Boards and local authorities • To perform such other functions entrusted to it by the Central Government
3.	Central Pollution Control Board	<ul style="list-style-type: none"> • Advise the Central Government on any matters concerning remediation of

Development of National Program for Remediation of Polluted Sites
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	constituted under the Water (Prevention and Control of Pollution) Act, 1974	<p>polluted sites</p> <ul style="list-style-type: none"> • Establish and maintain site registry and inventory of sites • Co-ordinate the activities of State Pollution Control Boards on activities relating to remediation • Identify polluted sites, inspect sites and keep updated information on sites in the site registry • Review site investigation reports and make recommendation on whether a site is polluted to the Authority • Carry out site surveys, investigation, laboratory analysis and monitoring of sites during the remediation process in accordance with the instructions of Authority • Prepare criteria for selection of third parties including site investigators, advisors (including legal and financial advisors) and remediation contractors • Provide technical assistance and guidance to Authority and State Pollution Control Boards, carry out and sponsor investigations and research relating to hazards of polluted sites and remediation of polluted sites • Plan and organise the training of persons engaged or to be engaged in programs of remediation of polluted sites • Conduct training courses and capacity development programs for authorities regulating and managing polluted sites and related aspects • Collect, compile and publish technical and statistical data relating to hazards of polluted sites and remediation techniques • Organise through mass media a comprehensive program regarding the remediation of polluted sites • Establish a solutions exchange to share experiences on remediation • Prepare manuals, codes, protocols or guidelines relating to remediation and disseminate information connected therewith • Lay down, modify or annul the soil standards including screening and response levels • Upgrade the laboratory infrastructure • Co-ordinate with insurance companies and insurance regulator to develop suitable insurance products for remediation • To perform such other functions entrusted to it by the Central Government
4.	National Environment Restoration Fund	<ul style="list-style-type: none"> • Appraise the proposals for financing from Fund • Approve the proposals for financing from Fund • Monitor and review progress on projects financed from Fund
5.	State Government/ Union Territory Government	<ul style="list-style-type: none"> • Issue policy statement to incentivize reuse of remediated site • Establish a state level steering committee under the chairmanship of Chief Secretary to provide overall guidance and remove difficulties in the implementation of remediation of polluted sites in the state • Contribute the state share in remediation related activities
6.	State Pollution Control Boards or Pollution Control Committees constituted under the Water (Prevention and Control of Pollution) Act, 1974	<ul style="list-style-type: none"> • Advise the State Government on any matters concerning remediation of polluted sites • Identify polluted sites, inspect sites and keep updated information on sites in the site registry maintained by the Central Pollution Control Board • Modify and make more stringent soil standards including screening and response levels laid down by Central Pollution Control Board • Collect and disseminate information relating to hazards of polluted sites and remediation of polluted sites • Encourage, conduct and participate in investigations and research relating to all matters connected with polluted sites

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		<ul style="list-style-type: none">• To perform such other functions entrusted to it by the Remediation of Polluted Sites Authority, Central Pollution Control Board or the State Government
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SCHEDULE 3

SCHEDULE OF FEES

#	Activity	Fee (INR)
1)	Submission of preliminary site assessment report submitted under Rule 5 or Rule 7	10,000
2)	Submission of complaint under Rule 6	100,000
3)	Submission of proposal for voluntary remediation under Rule 18	200,000
4)	Submission of detailed site investigation report under Rule 4(2) and Rule 19	50,000
5)	Submission of risk assessment report under Rule 19	100,000
6)	Submission of remediation objectives and requirements report under Rule 20	100,000
7)	Submission of remediation options report under Rule 20	100,000
8)	Submission of remediation design and detailed project report under Rule 21	100,000
9)	Submission of tender evaluation and remediation preparation report under Rule 22	10,000
10)	Submission of each management report, each periodic verification report or each request for variation to contract and specifications under Rule 23	20,000
11)	Submission of remediation evaluation report under Rule 23	200,000
12)	Submission of each periodic post remediation verified report, each request for variation or modification under Rule 24	20,000
13)	Submission of completion of post remediation measures report under Rule 24	200,000

SCHEDULE 4

SCREENING AND RESPONSE LEVELS [SAME AS APPENDIX A]

Appendix E – Proposed notification of Remediation of Polluted Sites Authority

REMEDICATION OF POLLUTED SITES AUTHORITY

THE MINISTRY OF ENVIRONMENT & FORESTS

ORDER

New Delhi, [date]

Whereas there is existing or imminent risk to human health, environment, flora and fauna and property from soil and water contamination caused by toxic and hazardous substances at several sites in the country;

And whereas international experience has shown that the incidence of polluted sites may increase unless there is a strong and co-ordinated technical, institutional, financial and regulatory response to prevent polluted sites from occurring and remediate the polluted sites;

And whereas there is an urgent need to remediate the polluted sites and implement the polluter pays principle, precautionary principle and sustainable development principle in the context of polluted sites by significantly upgrading the legal and regulatory framework, establishing standards and enforcement procedures, building institutional capacity, ensuring public participation and securing sufficient financing for remediation;

And whereas it is required to have a planning, financing, monitoring, coordinating, investigating, adjudicating and regulatory authority for dealing with the issue of polluted sites;

Now, therefore, in exercise of the powers conferred by sub-sections (1) and (3) of Section 3 of the Environment (Protection) Act, 1986 (29 of 1986) (hereinafter referred to as the said Act), the Central Government hereby constitutes the authority mentioned below for taking measures for remediation of polluted sites.

- 1. Name and term of the authority:-** The authority so constituted by the Central Government shall be known as the “Remediation of Polluted Sites Authority” for a period of twenty years on and from the date of publication of this notification in the Official Gazette.

2. **Headquarters and offices of the authority:-** The headquarters of the authority shall be at New Delhi. The authority may decide to set up regional offices or may direct creation of cells in the regional offices of Ministry of Environment and Forests and the Central Pollution Control Board.

3. **Composition of the authority:-** (1) The authority shall consist of the following members, namely:-

- | | |
|---|-------------------|
| (a) Secretary, Ministry of Environment & Forests | - Chairperson |
| (b) Chairman, Central Pollution Control Board | - Member |
| (c) A representative of Ministry of Finance | - Member |
| (d) A representative of Ministry of Chemicals & Fertilizers | - Member |
| (e) A representative of Ministry of Petroleum and Natural Gas | - Member |
| (f) A representative of Ministry of Urban Development | - Member |
| (g) A representative of Ministry of Commerce and Industry | - Member |
| (h) A person to be appointed by the Central Government | -Member-Secretary |

(2) The authority would have the following departments:

(a) Technical services, having an expert (full time) each heading the fieldwork and assessment unit, remediation planning unit, remediation supervision unit and emergency response unit. The technical services experts will be supported by up to 20 full-time experts in remediation related field, including hydro-geology, microbiology, chemistry, civil engineering and chemical engineering. In addition, the fieldwork and assessment unit may retain up to 20 field staff for carrying out field work, site surveys and sampling.

(b) Program management services, having

(i) up to 2 experts in contract management (for managing contracts of site investigators, remediation contractors, advisors, etc.),

(ii) up to 2 experts for program monitoring and reporting,

(iii) up to 3 experts for program management and co-ordination with different agencies including state governments, local authorities, pollution control boards, etc.

(iv) up to 3 experts in GIS and database management

(c) Non-technical services, having an economic unit with up to 3 experts (full time) in environmental economics, a legal unit with up to 3 experts (full time) in environmental law and social unit, with up to 2 communication experts and up to 2 community engagement and social work experts.

(d) The support services would include appropriate full time staff for internal functions including HR, administration, finance and accounts, establishment, computer section, etc.

(3) The authority would have an independent adjudication panel having the following members:

- (a) A retired judge of High Court or Supreme Court, as Chairperson of the Adjudication Panel;
- (b) A retired judge of High Court or Supreme Court, as judicial member of the Adjudication Panel;
- (c) 3 experts in the field of environmental economics, hazardous waste and remediation as technical members of the Adjudication Panel.

(4) The terms and conditions of the appointment of the Chairperson, Members and experts shall be as determined by the Central Government from time to time.

4. **Powers and functions of the authority:-** (1) Subject to the provisions of the said Act, the authority shall have the powers to take all measures and discharge functions as it deems necessary or expedient for remediation of polluted sites in keeping with polluter pays principle, precautionary principle and sustainable development principle.

(113) In particular, and without prejudice to the generality of the provisions of sub-paragraph (1), such measures may include measures with respect to all or any of the following matters namely:

- a) Exercise of powers and functions under sections 5, 9, 10, 11, 15, 15A, 19 and 20 of the said Act with respect to all matters referred to in sub-section (2) (including sub-section (2) (xiii-c)) of section 3 of the said Act that relate to remediation of polluted sites
- b) Exercise of powers and functions under the Remediation of Polluted Sites Rules, 20XX
- c) Deal with any other relevant environment issues pertaining to remediation of polluted sites including those which may be referred to it by the Central Government in the Ministry of Environment & Forests

(114) The authority shall have same powers as are vested in a civil court under the Code of Civil Procedure, 1908 while trying a suit. The authority shall not be bound by the procedure laid down in the Code of Civil Procedure, 1908 but shall be guided by the principles of natural justice and subject to the other provisions of the said Act and of any rules made thereunder and shall have the power to regulate its own procedure. All proceedings of the authority shall be deemed to be judicial proceedings within the meaning of sections 193, 196, 219 and 228 of the Indian Penal Code and the authority shall be deemed to be a civil court for the purposes of sections 195 and Chapter XXVI of the Code of Criminal Procedure, 1973. The authority shall,

- a) while determining and imposing remediation costs, consider the reasonableness, appropriateness and affordability of the remediation scheme and no limitation shall be applicable on the liability for remediation costs;
- b) while determining and imposing compensation for environmental damage, have due regard to the accepted principles of environmental damage and natural

resource valuation and no limitation shall be applicable on the liability for environmental damage;

- c) while determining and imposing liability for failure to comply with or contravention of any of the provisions of the said Act, or the rules made or orders or directions issued thereunder, have due regard to the amount of disproportionate gain or unfair advantage, wherever quantifiable, made as a result of the failure to comply with the provisions of the said Act along with the repetitive nature and the gravity of the non-compliance of the said Act;

Provided that such liability for failure to comply with or contravention of any of the provisions of the said Act, or the rules made or orders or directions issued thereunder may extend to half of the limits specified under section 15 of the said Act.

(115) Where a person fails to make the payment or deposit the amount directed by the authority in an order or award within the time period so specified in the award or order, such amount, without prejudice to the filing of complaint for prosecution for an offence under the said Act or any other law for the time being in force, shall be recoverable, together with interest (at such reasonable rate as the Government may, by order, fix) from the date when a demand for the is made until it is paid, may be recovered from the person concerned as arrears of land revenue or of public demand.

(116) The powers and functions of the authority shall be without prejudice to any of the powers conferred upon the States under any Central or State Act, being not inconsistent with the provisions of the Environment (Protection) Act, 1986 (29 of 1986).

(117) The authority shall combine the investigative, regulatory, adjudicatory and developmental functions as stated in sub-paragraphs (1) to (4), keeping in view of the powers vested with the State Governments and their institutions.

5. **Conduct of business of the authority:-** The authority may regulate its own procedures for transacting its business including its meetings.

6. **Jurisdiction of the authority:-** The jurisdiction of the authority shall be whole of India.

7. **Corpus of the authority:-** There shall be corpus of funds provided from the National Environmental Restoration Fund for the day-to-day functioning of the authority and for preparing and implementing remediation related activities as may be decided by the authority.

8. **Administrative and technical support to the authority:-** The authority shall be provided administrative and technical support including financial and logistics support by the Ministry of Environment and Forests, which would be the nodal ministry and would also act as the secretariat of the authority.

9. **Reporting:-** The authority shall furnish a progress report about its activities at least once in three months to the Central Government in the Ministry of Environment & Forests.

10. **Use of advisors:-** The authority may appoint advisors for facilitating work assigned to it.

11. **Ongoing matters:-** Any matter which relates to remediation of polluted sites and pending with any authority or department or pollution control (with the exception of tribunals and courts) shall stand transferred to the Remediation of Polluted Sites Authority.

Development of National Program for Rehabilitation of Polluted Sites

Output of Task 5- “Stakeholder consultation”

Report on stakeholder consultation

December 2015

Abbreviations

Act	Environment (Protection) Act, 1986
Assignment 1	Assignment – Inventory and mapping of probably contaminated sites in India
Assignment 2	Assignment – Development of methodologies for national program
Assignment 3	Assignment – Development of legal, institutional and financial framework of national program
CPCB	Central Pollution Control Board
CBIPMP	Capacity Building for Industrial Pollution Management Project
DPR	Detailed Project Report
ERF	Environment Restoration Fund under the Public Liability Insurance Act, 1991
HW Rules	Hazardous Wastes (Management, Handling & Transboundary Movement) Rules, 2008
MoEFCC	Ministry of Environment, Forest and Climate Change
NGT	National Green Tribunal
NGT Act	The National Green Tribunal Act, 2010
RPS Authority	Remediation of Polluted Sites Authority (proposed)
RPS Rules	Remediation of Polluted Sites Rules (proposed)
SPCB	State Pollution Control Board
TSDF	Treatment, storage and disposal facility
PPP	Public Private Partnership

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1 Introduction

The Government of India, through the Ministry of Environment, Forest and Climate Change (“MoEFCC”) is implementing Capacity Building for Industrial Pollution Management Project (“CBIPMP”) with financial assistance from the World Bank. The two-fold objective of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites and to support the development of a national program for remediation of polluted sites (National Program).

CBIPMP has three components. Component 1 deals with strengthening of environment institutions and capacity building to undertake remediation in states. This has three sub-components, development of national program, establishment of Environmental Compliance Assistance Centres in Andhra Pradesh and West Bengal and institutional capacity building of State Pollution Control Boards (“SPCBs”)¹. As part of developing the National Program under Component 1, three studies are being carried out –

- Inventory and mapping of probably contaminated sites in India (“Assignment 1”),
- Development of methodologies for national program (“Assignment 2”) and
- Development of legal, institutional and financial framework of national program (“Assignment 3”).

Component 2 supports remediation of legacy dump sites in Andhra Pradesh and West Bengal.

Component 3 of CBIPMP is Project Management. A Project Director at MoEFCC has been appointed and entrusted with overall supervision of the project, development and establishment of the National Program.

This report presents the records of the two national stakeholder consultations carried out jointly by PricewaterhouseCoopers Private Limited (PwC, consultant for Assignment 3) and Grontmij Netherlands B.V (Grontmij, consultant for Assignment 1) on 3rd February 2015 in Ahmedabad and 5th February 2015 in Chennai in India to obtain inputs from the stakeholders on the outputs/deliverables of Assignment 2 and Assignment 3. This report discusses the comments received from the stakeholders on Assignment 3 and how the comments have been addressed in the final deliverables from Assignment 3.

¹ Reference to State Pollution Control Board includes Pollution Control Committee

2 Details of National Consultations in Ahmedabad and Chennai

2.1 Objective

The objective of the two national stakeholder consultations was to obtain inputs from the stakeholders on the draft deliverables of Assignment 3 for discussion and subsequent incorporation in the final deliverables as appropriate.

2.2 Participation

A total of ten states participated along with representatives from NGOs and academia.

The Stakeholder Consultation in Ahmedabad was attended by 25 persons, representing CPCB, four SPCBs (Goa, Gujarat, Madhya Pradesh and Punjab), an NGO (Toxics Link) and MoEFCC. The attendance sheet is included in Appendix 1.

The Consultation in Chennai was attended by 24 persons, representing CPCB, five SPCBs (Andhra Pradesh, Karnataka, Tamil Nadu, Telangana and West Bengal), a State Government (Kerala), an NGO (Centre for Science and Environment), a research institute (Indian Institute of Technology, Madras), a consultant (Stratus Environmental) and World Bank. The attendance sheet is included in Appendix 2.

2.3 Records of the discussion

Presentation was made on main findings and recommendations of Assignment 3 followed by discussion, generating detailed comments from all participants, both general as well as on certain specifically addressed issues. The specific issues discussed were:

- Centre led remediation / state led remediation approach
- Administrative adjudication
- Policy Context
- Liability Regime
- Enforcement led and implementation led approach
- Soil regulatory regime
- Financing Mechanism- Public fund & cost recovery
- Penalty

Detailed comments received in each of the areas listed above are delineated in the sub-section below.

2.3.1 Detailed comments and responses- Salient Points

Table 1: List of detailed comments received and responses provided

Area	Records of Discussion	Comments Received	Response to the comments
Centre led remediation / state led remediation	<p>The pros and cons of having a centre led and a state led remediation approach were presented. It was explained that it might be justified to have a central authority as Centre is responsible for formulation of environmental legislations and there might be a need for central supervision of remediation of sites across the country. On the other hand, land being a state subject and that remediation has to deal with local site issues, a state led approach may also be considered.</p>	<p>Though many SPCBs in past had highlighted lack of resource and expertise, existing workload of SPCBs as challenges to be overcome before taking up additional responsibility of remediation, majority of the stakeholders in these consultations opined for a state led remediation mechanism and with greater role for SPCBs. The recommendations included:</p> <ul style="list-style-type: none"> • Empower states in terms of legal mandate, fund, and institutional capacity so that they can take up remediation on their own and do not have to depend on the centre • Having a specific remediation cell in SPCBs who will be equipped with right manpower skill and laboratory capacity to execute/supervise execution of remediation • Constitution of section 3(3) authorities in all states (in addition to centre) to deal with remediation. 	<p>A state led remediation mechanism is proposed in for the short term approach.</p> <p>In the long term a central section 3(3) authority is proposed with offices in the states.</p> <p><i>Deliverable Reference: Task 4- A Report on NPRPS</i></p>
Administrative adjudication	<p>It was explained that administrative adjudication was increasingly being used in India in the legal frameworks for nuclear damage, electricity regulations, oil & gas regulations etc., it might be appropriate to bring the concept in environmental legislations. It was also explained that as the competent authority would be vested with adequate technical, financial and legal capabilities for matters relating to contaminated sites, it might be appropriate to provide for</p>	<p>Generally, there was agreement on introducing a faster, administrative adjudication (vis-à-vis criminal prosecution) to determine and impose remediation costs and environmental damage on responsible parties. Stakeholders emphasized on the requirement of bringing in the aspect of civil penalty while dealing with remediation</p>	<p>Administrative adjudication is included as an amendment to the Act.</p> <p><i>Deliverable Reference: Task 4- A Report on NPRPS</i></p>

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Area	Records of Discussion	Comments Received	Response to the comments
	<p>administrative adjudication under the authority and it would cover determination of responsible person, remediation costs, compensation for damage to environment, and penalty for violation of the provisions of the Environment (Protection) Act, 1986 (Act)</p>		
<p>Policy Context</p>	<p>It was proposed that the policy framework would be based on the objective of threat reduction (to environment and public health), appropriate land use (i.e. all lands cannot be remediated to zero contamination) and site restrictions post remediation, minimum use of public funds, prioritizing remediation and remediation levels according to the capacity to pay and there would be incentives and promotion for reuse of remediated sites.</p>	<p>There was general agreement to this proposal. The stakeholders added that timeframe for completion of remediation of sites already identified in the initial database needs to be indicated.</p>	<p>The timeframe for completion of remediation of sites already identified in the initial database has been indicated in the implementation plan.</p> <p><i>Deliverable Reference: Task 6- Report on implementation plan for the NPRPS</i></p>
<p>Liability regime</p>	<p>The concept of establishing liability regime based on polluter pays principle, absolute liability (i.e. if responsible persons are ordinarily engaged in hazardous activity or are aware of such activity), vicarious and extended liability (i.e., responsible by contract or by ownership), joint and several liability (based on the concept of onus of proof if it is not possible to trace the exact activity or unit) was explained in detail.</p>	<p>There was general agreement on introducing the concept of absolute liability. Concerns were expressed on using the concept of absolute liability on SMES and their capacity to pay for remediation if they are held liable (in those cases where other bigger entities cannot be held liable through vicarious or extended liability). There was discussion around the concept of retroactive liability and if it would work in India.</p>	<p>The only option where SMEs would not be able to pay is use of public fund. The financial mechanism developed under Assignment 3 proposes detailed structure, procedure, size of the public fund to be set up under the amendment of the Act in the long term approach.</p> <p>Assignment 3 concludes that National Green Tribunal (NGT) in their various judgements have described environmental laws as socio-beneficial legislation enacted to protect the environment for the benefit of the public at large and hence interpreted them as being compensatory and retroactive in nature. As a</p>

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Area	Records of Discussion	Comments Received	Response to the comments
			<p>consequence liability imposed on the responsible persons for recovering cost of remediation of polluted sites would be retroactive in nature even in the existing form of the environmental legislations.</p> <p><i>Deliverable Reference: Task 4- A Report on NPRPS</i></p>
<p>Enforcement led and implementation led approach</p>	<p>The two concepts, enforcement led and implementation led approach towards remediation were explained.</p> <p>Enforcement led: the competent authority takes every effort to identify the person responsible and force them to undertake remediation under the authority's oversight;</p> <p>Implementation led- the authority takes over the site and contracts and supervises remediation activities without any involvement of person responsible (other than paying for remediation activities)</p>	<p>Most of the stakeholders opined that there should be a combination of both the approaches and the approach should be site specific.</p>	<p>A combination of both has been proposed in the final NPRPS framework developed under Assignment 3.</p> <p><i>Deliverable Reference: Task 4- A Report on NPRPS</i></p>
<p>Soil regulatory regime</p>	<p>A soil regulatory regime was presented which would have features similar to that for air and water and would include mandatory site investigation and reporting regime, duty-bound reporting of contamination, and a framework for making complaints to the competent authority.</p>	<p>All stakeholders agreed to the approach of delineating contaminated sites with reference to soil and water standards.</p>	<p>This has been addressed by introduction of screening and response levels in Assignment 1</p>
<p>Financing Mechanisms</p>	<p>The presentation covered creation of a National Environmental Restoration Fund as per National Environment Policy, 2006 as a public fund and levying of cess on duty of excise of 2% on activities involving hazardous substances from crude and petroleum, cement, chemical, plastics, pharmaceuticals, raw hide,</p>	<p>There was general agreement on the concept of creation of National Environmental Restoration Fund. Suggestions were made by certain SPCBs on inclusion of all Schedule- I industries for levying of cess. Concerns were expressed on the feasibility of implementing yet</p>	<p>It was concluded in Assignment 3 that creation of a public fund is essential to address the cases of remediation of orphan sites (sites where responsible persons cannot be identified, or where responsible persons are unable to</p>

Area	Records of Discussion	Comments Received	Response to the comments
	<p>leather, pulp, paper, textiles, Metals (ferrous, non-ferrous), electrical and non-electrical machinery, motor vehicles as one of the inputs to the fund. The aspect of cost recovery based on polluter pays principle, polluter's capacity to pay, increase in land value (after remediation), and development of insurance market was also presented.</p>	<p>another cess by a few individuals.</p> <p>In terms of cost recovery, the two major comments were a) emphasis may be put on recovery of cost from those who would benefit from the remediated land b) the framework may be developed keeping in mind the limited capacity of MSMEs to repay the cost of remediation.</p>	<p>pay like SMEs). Without applying a cess the large sum required for remediation of orphan sites cannot be met. However, this has been kept as a long term option.</p> <p>The concept of land value finance has been discussed in detail in the final deliverable of Assignment 3.</p> <p><i>Deliverable Reference: Task 4- A Report on NPRPS</i></p>
Penalty	<p>It was discussed that the current limit of penalty under the Environment (Protection) Act, 1986 is not enough deterrent to for preventing violations of the Act and it might be realigned to the limits prescribed under NGT Act 2010.</p>	<p>All agreed that the current limit of penalty is very low. There were discussions around the penalty limit to be prescribed under the Act and if limits in line with NGT Act would be appropriate.</p>	<p>It was concluded in Assignment 3 that current penalty limits will be aligned to that in the NGT Act in the longer term as a part of amendment of the Act. NGT Act has been successfully applied in several cases of cost recovery and hence</p>

2.3.2 Additional Points

In addition to the above salient points, the following minor points were raised by a few stakeholders which were relevant to Assignment 3.

A few stakeholders recommended that there should be a penal clause in the contractual agreement with the third party consultants (for site investigation, preparation of Detailed Project Report etc.) to ensure quality of work. It was explained that a penalty clause is present in any contract between two parties for goods/works/services. The same procedure will be applied in this case.

On the 14 step remediation framework proposed by all the three assignments, a few stakeholders commented that there should a step on de-notification of sites after remediation and a few opined that step 12 on cost recovery should be at the beginning or planning stage. It was explained that de-notification takes place in Step-13 – “Priority list deletion”. It was further clarified that effort on cost recovery starts at step 3 with notification of a polluted site and runs parallel to all steps till step 12 when, at the end of remediation, it is ensured that all recoverable costs incurred for a particular remediation activity have been recovered and nothing remains to be recovered from the responsible persons.

A few of them enquired about the expertise, qualifications of the third party consultants/advisors to be involved at different stages of the remediation process. It was explained that these aspects have been covered in detail in the Task 4 – “A Report on NPRPS” of Assignment 3.

3 Previous Stakeholder Consultations

3.1 Face to face consultations

In addition to the two national stakeholder consultations that we discussed above, various stakeholders were consulted, at different stages of Assignment 3, to have a complete understanding of the current systems and practices related to management of polluted sites in India, the gaps, the requirements and the expectations to be fulfilled to remediate a polluted site to the desired level. Our approach was to cover multiple relevant sources of information, which included interviews with officials at various agencies at national, state and the local level. These include:

- Institutions that have direct responsibilities of identifying and dealing with contaminated/polluted sites; these would include regulators, urban local bodies, etc.
- Institutions that have responsibilities for related aspects such as health, urban development and town planning
- Institutions that are given the responsibility and the financial arrangements in areas where there is no specific agency or department with a prescribed mandate for addressing problems of polluted or contaminated sites

For consultations, stakeholders were categorized as per the justification set out in the table below:

Table 2: Stakeholder Categories Consulted

Stakeholder Category	Justification
State and Central Pollution Control Boards (Including Pollution Control Committees for Union Territories)	Primary responsible for abatement of pollution from both a preventive and remediating perspective. Examples of these are the Central Pollution Control Board, Karnataka State Pollution Control Board, Gujarat Pollution Control Board etc.
District Administration and Urban Local Body (Local)	Jurisdiction over land use and revenue. Responsible for citizen welfare (including health and sanitation concerns). Frequently impacted due to contamination of land and waste streams (especially Municipal Solid Waste). These agencies offer a specific local perspective. Examples of these are District Collector and Town Planning Officer, the Director for Solid Waste Management, the Chief Engineer for Solid Waste Management at Bruhat Bangalore Mahanagar Palike etc.
State Health and Environment Departments	These agencies have a state-wide responsibility and are part of both policy making and policy enforcement. They are also expected to handle coordination between various other agencies within the purview of these topics of Health and Environment. Examples of these are the Environment Secretary for the government of West Bengal
Generators of hazardous waste	These organizations have business activities that produce large quantities of waste that need proper handling. We examined the processes followed by them to address their waste issues. Examples are

Stakeholder Category	Justification
	paint, dye, pharmaceuticals, leather goods, and battery manufacturing organisations.
Operators of TSDFs	As a stakeholder, such an organisation provides a deeper insight into the economics around hazardous waste management, present infrastructure capacities, and a view of the future for waste management. The TSDFs operated on PPP basis are examples of this.
Industries Department of the state government (including Industrial Development Board and SEZ)	Inputs from Industries department include information on policy and enforcement, and features such as inter-industry waste symbiosis, notification of industrial sites and promotion of group TSDFs
Industry Associations	Meeting these associations provides a view of a particular industry as a whole. Also these associations have local chapters that help us obtain a specific perspective on polluted sites in the area
Ministerial Bodies	Central Public Health & Environmental Engineering Organization (under MoUD), Town and Country Planning Organisation (under MoUD) JNNURM under MoUD, provide their perspective on polluted sites in the country
Non-governmental organisations (NGOs)	Several NGOs are working in this arena. They are responsible for bringing issues to public attention, tracking polluted sites and assisting the impacted parties for redressal and remediation.

In addition a specific set of central agencies and national level organisations that were consulted in order to review their roles, responsibility, influence and secondary impact. These are listed in table below.

Table 3: List of organizations and their relevance:

Organization	Relevance
CPCB	Responsible for remediation of sites as per regulations
MoEF	Direct Project Stakeholder
MoUD (Town and Country Planning Organisation [TCPO])	Responsible for urban infrastructure and planning
MoUD (JNNURM)	To get the information on municipal solid waste sites and potential contamination of municipal sites
MoWR (Ministry of Water Resources)	Responsible for managing the ground water and therefore impacted by contamination of ground water
ASSOCHAM	Industry Associations, provide sectoral as well as regional views on site management

Organization	Relevance
ICMR	For studies conducted on health impact of hazardous waste
National Green Tribunal	Handles legal cases on hazardous waste contaminated sites
Ministry of Commerce and Industries	To get an understanding of the legal framework for addressing hazardous waste issues at the level of industrial bodies
NHAI	Land related issues pertaining to contaminated sites

3.2 Obtaining questionnaire based inputs over letter/mail

In addition to face to face meetings with stakeholders, preliminary draft of Task 4 - A Report on NPRPS of Assignment 3 was shared with all stakeholders (SPCBs, Technical Expert Panel/TEP) requesting specific inputs (based on a questionnaire) on the proposed legal, institutional and financial mechanisms during September 2013- March 2014. Useful inputs were received from CPCB and the SPCBs of Andhra Pradesh, Gujarat, Tamilnadu and West Bengal.

3.3 Review meetings

In addition to the stakeholder consultations, all key aspects of the legal, financial and institutional mechanisms were discussed in detail and inputs were obtained from the TEP and stakeholders present in the review meetings conducted by MoEFCC at their office throughout the engagement period of Assignment 1, 2 and 3.

Appendix 3 contains the detailed list of stakeholders consulted, inputs received over email and review meetings held.

Appendix 1- Attendance Sheet of Ahmedabad Consultation on 3 February 2015

SL No.	Name of the organization	Person Name	Designation	Signature
1.	CPCB, Delhi	Bharat Kr. Sharma	SEE	
2.	Kadam Environmental Consultants, Vadodra	JA RATHI	Sr. VP.	
3.	"	Mehul Pethkar	Consultant Hydrogeologist	
4.	MOEF & CC	Dr. B. L. Rai Bhanja	Joint Director	
5.	Pb. Pollution Control Board	Rajesh Kumar Garg	Env. Engineer	
6.	Pb. Pollution Control Board	Rajesh Kumar	Sr. Scientific Officer	
7.	Advocate (Part of PWC team)	Vidya Upadhyay	lawyer.	
8.	Gujarat Pollution Control Board, GMR	KARZI M. G.	DCC	
9.	G.P.C.B.	P.J.VACHANI	Sr. Env. Engg	
10.	SE CPCB zonal office (w), Vadodra	PRASOON GARGAVA	Sr. Env. Eng.	
11.	Grantrij / Technochem	HEMANT RANE	TECH. CONSULTANTS	
12.	G.P.C.B.	R.B. TRIVEDI	Regional Officer - Ahmedabad	
13.	GPCB Gandhinagar	G.H. TRIVEDI	SN emv eng	
14.	GPCB Vidarbha	A.D. Bhimani	Vigilance Officer, Vadodra	
15.	GPCB - SURAT	J.D. KALYANI	Vigilance Officer Environmental Engg	
16.	GPCB Gandhinagar	D.M. THAKER	Env. Engineer	
17.	SAITSA STAFF TOXIC LINK	SAITISH SNIHA	SAITISH@toxicslink.org	

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SL No.	Name of the organization	Person Name	Designation	Signature
18	Cryolite Pollution Control Board	V.R. Patel	Sr. Env Engineer & RO (B.D)	W...
19	Granting	Paul Guck Boerigter	Sr. consultant	B.
20	Granting	Arthur de Groot	Sr. consultant	A.
21	M.P. PBB			
21	M.P. Pollution Control Board	H.S. Malviya	EE	H...
22	Madhya PWC	Madhura Mibra	Manager	le...

hsmo
@gn

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SL No.	Name of organization	Person name	Designation	Email	Mobile phone	Signature
10	A.P.P.C.B	K.V.Rao	JCEE	Kayveerao@gmail.com	09866776750	K. Rao
11	TSPCB	M. Praveen Kumar	EE, RO-II, RPD	m2-ro.ee@tpb.ap.gov.in	09866776747	M. Praveen 512/15
12	TS PCB	Dr. Ch. Srinivasa	Analyst, Govt. RO-II	drchats@tpb.ap.gov.in	09177303318	Ch. Srinivasa
13	TS PCB	M. Venkanna	EE, RO-I, RPD	m1-ro.ee@tpb.ap.gov.in	9866776746	M. Venkanna
14	CPCB	B. Vinod Babu	SEE, JCHWMP (PCB)	bobab@cpb.gov.in	9910061599	B. Vinod Babu
15	WBPCB	D. Sarika	SEE, EIMGM	debasarikar@wbpcb.gov.in	09434031887	D. Sarika
16	PNTC	Kaduna Babu	Manager	kaduna.babu@pntc.ap.gov.in	9830532385	Kaduna Babu
17						
18						
19						
20						

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SL No.	Name of organization	Person name	Designation	Email	Mobile phone	Signature
21	Tamil Nadu Pollution Control Board	P.S. LIVINGSTON	District Environmental Engineer	psseeslivingston@gmail.com	8056042185	
22	Tamil Nadu Pollution Control Board	DR. V. CHANDRA SEKARAN	Deputy Director (L&S)	ddairtnpcb@gmail.com	8056042115	
23	Karnataka State Pollution Control Board	C.D. Kumar	Senior Environmental officer	cdkumar60@gmail.com	09845380070	
24	— do —	K.M. Nagaraj	— do —	nagarajkm1@gmail.com	9845395956	
25	— do —	S. Venkatesh Shekar	— do —	venkateshshekar@yahoo.co.in	919845496861	
26	— do —	V. Ananda	E.O	vananda70@gmail.com	9449008137	
27	TNIPCB	Vanitha Mangayam	AE	VanithaMangayam@gmail.com	8056042453	
28						
29						
30						
31						

Appendix 3- Details of Previous Stakeholder Meetings

Table 4: List of Stakeholder Consulted

Stakeholder Category	Stakeholder Consulted
Central and State Pollution Control Boards (Including Pollution Control Committees for Union Territories)	Andhra Pradesh Pollution Control Board, Central Pollution Control Board Central Pollution Control Board Zonal office , Gujarat Pollution Control Board, Haryana State Pollution Control Board, Karnataka State Pollution Control Board, Madhya Pradesh Pollution Control Board, Maharashtra Pollution Control Board, Odisha Pollution Control Board, Rajasthan Pollution Control Board, Tamil Nadu State Pollution Control Board, Uttar Pradesh Pollution Control Board, West Bengal Pollution Control Board
District (Local) Administration and Urban Local Body	Ahmedabad Municipal Corporation, Bruhat Bangalore Mahanagara Palike (BBMP), District Magistrate, Hooghly District of West Bengal, Greater Hyderabad Municipal Corporation, Kolkata Metropolitan Development Authority (KMDA), Kolkata Municipal Corporation (KMC), Ludhiana Municipal Corporation, Municipal Corporation Greater Mumbai, The Collectorate, Udaipur Urban Improvement Trust (UIT) [Under the Urban Development and Housing Department, Government of Rajasthan]
State Health and Environment Departments	Department of Environment, West Bengal
Generators of hazardous waste	Berger Paints India Ltd, Exide Industries Ltd.
Operators of TSDFs	Ramky Enviro Engineers (p) Ltd., Mumbai Waste Management Ltd., Tamil Nadu Waste Management Ltd., UPIL
Industries Department of the state government (including Industrial Development Board and SEZ)	Maharashtra Industrial Development Corporation, Delhi State Industrial and Infrastructure Development Corporation Ltd.
Industry Associations	Confederation of Indian Industry
Ministerial Bodies	Hazardous Substances Management Division (MoEF), Planning Commission, Gol
Non-governmental organisations (NGOs)	ToxicsLink, Hazard Center
Funding Agencies	Gesellschaft für Internationale Zusammenarbeit (GIZ)
Other Government Agencies or Authorities	National Highway Authority of India
Technical Institutions and Experts	Indian Institute of Toxicology Research, Lucknow, National Environmental Engineering Research Institute

Table 5: Details of pervious stakeholder consultations

Stakeholder Name	Date	Stakeholder representatives met
Central Pollution Control Board (CPCB)	16/05/2012	<ul style="list-style-type: none"> Mr. B. Vinod Babu, Senior Environmental Engineer & I/c HWMD, CPCB Dr. Umakant, Support Staff Dr. Saroj , Director, HSMD, MoEF Mr. Bharat K Sharma, Senior Environmental Engineer, HWMD
Kolkata Municipal Corporation (KMC)	16/05/2012	<ul style="list-style-type: none"> Mr. Arnab Roy, Commissioner of Kolkata Municipal Corporation (KMC) Mr. Arun Sarkar ,Principal Chief Engineer of the Municipal Solid Waste (MSW) Management cell
West Bengal Pollution Control Board (WBPCB)	18/05/2012	<ul style="list-style-type: none"> Mr. Sandipan Mukherjee, MS-WBPCB
Waste Management Cell, WBPCB	25/05/2012	<ul style="list-style-type: none"> Mr. Shyamal Adhikari, Senior Environmental Engineer Ms. Sharmistha Kundu, Environmental Engineer
Berger Paints	06/06/2012	<ul style="list-style-type: none"> Mr. Aniruddha Sen, Sr. Vice president & Company Secretary Mr. Dipankar Nag, Manager – Corp. EH&S and TQM
Exide Industries	11/06/2012	<ul style="list-style-type: none"> Mr. S. Coomer, Company Secretary Dr. Anjan Ghosh, Manager, EHS
M/s Ramky	12/06/2012	<ul style="list-style-type: none"> Alabh Anand, General Manager, Corporate Business Development, Industrial Waste Management Vivekananda Reddy M, EA to National Head, Industrial and Bio-medical Waste Management
Maharashtra Pollution Control Board (MPCB)	12/06/2012	<ul style="list-style-type: none"> Dr. Y B Sontakke, Regional Officer (H.Q) Hazardous Waste section
National Highways Authority of India/NHAI	12/06/2012	<ul style="list-style-type: none"> Shri V K. Sharma – Chief General Manager, Maintenance and Environment Dr. B. Mukhopadhyay – Dy. General Manager, Environment
Greater Hyderabad Municipal Corporation	13/06/2012	<ul style="list-style-type: none"> Mr. Lavana Kumar, Additional Commissioner, Health and Sanitation
Bruhat Bangalore Mahanagara Palike (BBMP)	13/06/2012	<ul style="list-style-type: none"> Shri B.V. Satish, Chief Engineer (Environment Cell)
Environmental Expert	13/06/2012	<ul style="list-style-type: none"> Mr. NK Verma
Karnataka State Pollution Control Board (KSPCB)	13/06/2012	<ul style="list-style-type: none"> Shri M.D.N. Simha, Chief Environmental Officer

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Stakeholder Name	Date	Stakeholder representatives met
Municipal Corporation of Greater Mumbai	13/06/2012	<ul style="list-style-type: none"> Mr. R.G. Sharma (Executive Engineer / Civil at Environment Department (Air Division))
Andhra Pradesh Pollution Control Board (APPCB)	14/06/2012	<ul style="list-style-type: none"> Dr. K.V. Ramani, JCES & PIU Head of CBIPMP, APPCB Ms. Janki Kondapi, Chairman, APPCB
Gujarat Pollution Control Board (GPCB)	14/06/2012	<ul style="list-style-type: none"> Mr. Hardik Shah (Member Secretary - GPCB) Mr. A. V. Pandiya (Legal Officer - GPCB)

Table 6: Inputs over email/letter based on questionnaire shared by PwC

Stakeholder Name	Date of inputs obtained
CPCB	24/09/2013
APPCB	22/10/2013
TNPCB	20/12/2013
GPCB	30/01/2014
WBPCB	27/02/2014

Table 7: Review meetings:

Meeting conducted by MoEFCC	Date
Inception meeting	10/04/2012
4 th TEP meeting	28/06/2012
6 th TEP meeting	13/08/2012
Stakeholder Consultation Workshop	29/11/2012
Review meeting	30/11/2012
Review meeting	14/02/2013 and 15/02/2013
Review meeting	16/05/2013
Stakeholder Consultation Workshop	13/08/2013
14 th TEP meeting	21/04/2014

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Meeting conducted by MoEFCC	Date
Review meeting	19/12/2014
Review meeting	06/02/2015
Review meeting	11/02/2015
Review meeting	24/06/2015
Review meeting	15/07/2015
Project Oversight Committee Meeting	15/09/2015
17 th TEP meeting	20/11/2015

Development of National Program for Rehabilitation of Polluted Sites

Output of Task 6- “Prepare a plan for the
implementation of NPRPS”

Report on implementation plan for the
NPRPS

Revised Version

November 2016

Abbreviations

Act	Environment (Protection) Act, 1986
Assignment 1	Assignment – Inventory and mapping of probably contaminated sites in India
Assignment 2	Assignment – Development of methodologies for national program
Assignment 3	Assignment – Development of legal, institutional and financial framework of national program
CPCB	Central Pollution Control Board
CBIPMP	Capacity Building for Industrial Pollution Management Project
DPR	Detailed Project Report
ERF	Environment Restoration Fund under the Public Liability Insurance Act, 1991
HW Rules	Hazardous and Other Wastes (Management and Transboundary Movement) Rules (2016)
MoEFCC	Ministry of Environment, Forest and Climate Change
NGT	National Green Tribunal
NGT Act	The National Green Tribunal Act, 2010
RPS Authority	Remediation of Polluted Sites Authority (proposed)
RPS Rules	Remediation of Polluted Sites Rules (proposed)
SPCB	State Pollution Control Board
TSDF	Treatment, storage and disposal facility
PPP	Public Private Partnership

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1 Introduction

The Government of India, through the Ministry of Environment, Forest and Climate Change (“MoEFCC”) is implementing Capacity Building for Industrial Pollution Management Project (“CBIPMP”) with financial assistance from the World Bank. The two-fold objective of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites and to support the development of a national program for remediation of polluted sites (National Program).

CBIPMP has three components. Component 1 deals with strengthening of environment institutions and capacity building to undertake remediation in states. This has three sub-components, development of national program, establishment of Environmental Compliance Assistance Centres in Andhra Pradesh and West Bengal and institutional capacity building of State Pollution Control Boards (“SPCBs”)¹. As part of developing the National Program under Component 1, three studies are being carried out –

- Inventory and mapping of probably contaminated sites in India (“Assignment 1”),
- Development of methodologies for national program (“Assignment 2”) and
- Development of legal, institutional and financial framework of national program (“Assignment 3”).

Component 2 supports remediation of legacy dump sites in Andhra Pradesh and West Bengal.

Component 3 of CBIPMP is Project Management. A Project Director at MoEFCC has been appointed and entrusted with overall supervision of the project, development and establishment of the National Program.

This report sets out the implementation plan of the legal, institutional and financial framework of the National Program and forms Task 6 of Assignment 3. It draws upon the legal, institutional and financial frameworks developed under of Task 4 of Assignment 3.

¹ Reference to State Pollution Control Board includes Pollution Control Committee

2 Implementation Plan

2.1 Short Term Implementation ²

Table 1: Timeline for implementation of various measures for short term legal framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
<p>A notification by the Central Government to delegate its authority under the following sections of the Environment (Protection) Act , 1986 ("Act"):</p> <ul style="list-style-type: none"> Section 3(2)(ii) of the Act for planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution in the state (to the State Pollution Control Board or "SPCB") and at the national level (to the Central Pollution Control Board or "CPCB"); Section 5 of the Act for issuing directions relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental 	6 months from the date of approval of National Program by MoEFCC ³	MoEFCC	<ul style="list-style-type: none"> Drafting the notifications Obtaining necessary approvals Publication of notification in the Gazette of India 	<p>Law Consultant - 1</p> <p>Scientist of Hazardous Substance Management (HSM) Department – 0.25</p> <p>Project Director of NPRPS- 0.1</p> <p>Administrative Officers- 2</p>	0.20 ⁴

² Please note all estimates on timeline, staff month and costs are tentative and indicate a broad range

³ All timelines from hereon are considered from the date of approval of the National Program by MoEFCC

⁴ The estimate includes consultant's fee, administrative overheads, salary proportions of Ministry staff, cost of workshops/consultations etc.

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
<p>pollution in the state (to SPCBs) and at the national level (to CPCB);</p> <ul style="list-style-type: none"> Section 20 of the Act to require any person, State Government or authority to furnish information relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental pollution (to the SPCBs). 					
<p>Notification of a separate set of rules called “Contaminated Sites (Identification and Management) Rules, 20xx” issued under section 3(2)(iii), 6(2)(a) and 25 of the Act that provides for standards for soil and water pollution, carrying out mandatory site assessment and reporting, determination of a contaminated site and related matters.</p>	12-15	MoEFCC	<ul style="list-style-type: none"> Drafting the notifications Incorporating comments (from Ministry of Finance, Prime Minister’s Office, Public Stakeholder Consultations) Obtaining necessary approvals Drafting cabinet note Publication of notification in the Gazette of India 	<p>Law Consultant - 6 Scientist of HSM Department – 1 Project Director of NPRPS- 0.5 Procedural activities by Administrative Officers- 6</p>	1.50 ⁴
<p>Adoption of a procedure manual called “Enforcement Policy (Contaminated Sites)” by the State Governments that would cover various aspects relating to polluters, remediation costs,</p>	8-10	CPCB MoEFCC	<ul style="list-style-type: none"> Drafting the procedure manual Stakeholder consultations 	<p>Technical Consultant – 3 Senior Environmental Scientist at CPCB- 0.5</p>	0.80 ⁴

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
apportionment of costs, actions to be taken by various government authorities, directions to be given, co-ordination amongst government authorities, linkages with existing consents, clearances and authorizations.			<ul style="list-style-type: none"> • Obtaining and incorporating review comments • Notification of the procedure manual 	Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	
Notification of the technical guidelines for remediation prepared under Assignment 2 by the Central Government in exercise of its power under section 3(2) (xiii), 6 and 25 of the Act.	8 -10	CPCB MoEFCC	<ul style="list-style-type: none"> • Finalising the technical guidelines • Obtaining necessary approvals • Stakeholder consultations • Notifying the technical guidelines 	Senior Environmental Scientist at CPCB- 0.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	0.20 ⁴
Inclusion of conditions on periodic site assessment and budgeting for prevention technology in the following: a) Consents under section 25 and 26 of the Water Act, 1974 b) Environmental Clearance under the Environment Impact Assessment Notification 2006 c) Authorisation under rule 6, permission for import of hazardous waste under rule 13 of Hazardous and Other Wastes (Management and Transboundary Movement) Rules (2016)	12-15	MoEFCC	<ul style="list-style-type: none"> • Drafting amendments • Obtaining necessary approvals • Stakeholder consultations • Notifying the amendments 	Law Consultant - 3 Scientist HSM Department – 0.5 Project Director of NPRPS- 0.1 Administrative Officers- 6	1.50 ⁴

Table 2: Timeline for implementation of various measures for short term institutional framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Notifying the State Government Department of Environment as the Nodal Agency for a short term state led remediation program in states where most of the polluted sites identified under Assignment 1 are located - Uttar Pradesh, West Bengal, Orissa, National Capital (Delhi), Karnataka, Gujarat, Jharkhand, Tamil Nadu, Kerala, Andhra Pradesh and Punjab.	5-6	MoEFCC	<ul style="list-style-type: none"> Drafting and publication of the notification 	Law Consultant - 1 Scientist of HSM Department – 0.2 Project Director of NPRPS- 0.05 Administrative Officers- 3	0.20 ⁴
Formation of a committee comprising of the SPCB, District Collector, Central Ground Water Board and other relevant academia for assessment of contamination, review of reports of remediation investigation, Detailed Project Report (DPR), monitoring progress of remediation implementation, review of post remediation plan under the supervision of the Nodal Agency in the states mentioned above.	5-6	State Departments of Environment (DoE)	<ul style="list-style-type: none"> Procedures to set up the state level committee 	Environment Officer- 1 Law Officer- 1 Senior Environment Officer – 0.5 Secretary – 0.2	0.20 ⁴

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Empanelment, appointment of competent third parties for carrying out preliminary site investigation, remedial investigation, DPR, remediation of sites identified in the initial inventory (320) in Assignment 1	6-8	State Committee SPCB State DoE	State Committee: <ul style="list-style-type: none"> • Review of Terms of Reference for the work • Evaluation of technical and financial bids from interested third parties in a time bound manner • Selection of competent third parties SPCB: <ul style="list-style-type: none"> • Preparation of Terms of Reference for the work • Contracting with competent third parties once selected State DoE: <ul style="list-style-type: none"> • Supervision of progress of work 	State committee- 2 SPCB: Junior Environmental Engineer- 2 Senior Environmental Engineer- 1 State DoE: Chief Environment Officer- 0.25 Senior Environment Officer- 0.5	0.20
Commencement of DPR preparation for 39 sites found as polluted as per the site investigation conducted in Assignment 1 (out of 100 sites selected for	8-10	State Committee SPCB	State Committee: <ul style="list-style-type: none"> • Supervision of progress of work 	Third Party Consultant- 18 ⁵ SPCB:	195 ⁶

⁵ The consultant's estimate is per site basis, other estimates for SPCB, State Committee, DoE are per state basis

⁶ Considering Rs 5 Crore/site for DPR preparation which includes consultant's fee plus other overheads in terms of work supervision, DPR evaluation etc.

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
preliminary site assessment and investigation in Assignment 1)		State DoE Third Party Consultant	<ul style="list-style-type: none"> Review and approval of DPR SPCB: <ul style="list-style-type: none"> Periodic on-site monitoring of third party work Regular follow up with third parties, state committee and DoE State DoE: <ul style="list-style-type: none"> Intervene if there is any land related issue Third Party Consultant: <ul style="list-style-type: none"> Carry out on-site work and report to SPCB on a timely manner 	Junior Environmental Engineer- 2 Senior Environmental Engineer- 0.5 State Committee: 3 State DoE: Chief Environment Officer- 0.1 Senior Environment Officer- 0.25	
Commencement of preliminary site investigation for rest 61 sites which could not be confirmed as polluted in Assignment 1 (out of 100 sites selected for preliminary site assessment and investigation in Assignment 1)	6-8	State Committee SPCB State DoE Third Party Consultant	State Committee: <ul style="list-style-type: none"> Supervision of progress of work Review and approval of preliminary investigation report SPCB:	Third Party Consultant- 3 SPCB: Junior Environmental Engineer- 1 Senior Environmental Engineer- 0.25 State Committee: 1 State DoE:	15 ⁷

⁷ An average of Rs 20 lacs per site is considered for onsite work plus administrative overheads

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> • Periodic on-site monitoring of third party work • Regular follow up with third parties, state committee and DoE <p>State DoE:</p> <ul style="list-style-type: none"> • Intervene if there is any land related issue <p>Third Party Consultant:</p> <ul style="list-style-type: none"> • Carry out on-site work and report to SPCB on a timely manner 	<p>Chief Environment Officer- 0.05</p> <p>Senior Environment Officer- 0.25</p>	
<p>Commencement of preliminary site assessment and investigation in the 220 sites identified as probably contaminated in Assignment 1 (which were not selected as a part of 100 sites for preliminary site assessment and investigation in Assignment 1)</p>	<p>8-10</p>	<p>State Committee</p> <p>SPCB</p> <p>State DoE</p> <p>Third Party Consultant</p>	<p>State Committee:</p> <ul style="list-style-type: none"> • Supervision of progress of work • Review and approval of preliminary investigation report <p>SPCB:</p> <ul style="list-style-type: none"> • Periodic on-site monitoring of third party work 	<p>⁸Third Party Consultant- 3</p> <p>SPCB:</p> <p>Junior Environmental Engineer- 3</p> <p>Senior Environmental Engineer- 1</p> <p>State Committee: 3</p> <p>State DoE:</p> <p>Chief Environment Officer- 0.25</p>	<p>50⁷</p>

⁸ The consultant's estimate is per site basis, other estimates for SPCB, State Committee, DoE are per state basis. State wise estimates may vary depending on the number of sites/state

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> Regular follow up with third parties, state committee and DoE <p>State DoE:</p> <ul style="list-style-type: none"> Intervene if there is any land related issue <p>Third Party Consultant:</p> <ul style="list-style-type: none"> Carry out on-site work and report to SPCB on a timely manner 	Senior Environment Officer- 1	
Commencement of remediation for 39 sites found as polluted as per the site investigation conducted in Assignment 1	12-15	<p>State Committee</p> <p>SPCB</p> <p>State DoE</p> <p>Third Party Consultant</p>	<p>State Committee:</p> <ul style="list-style-type: none"> Supervision of progress of work Review and approval of completion of remediation <p>SPCB:</p> <ul style="list-style-type: none"> Periodic on-site monitoring of third party work Regular follow up with third parties, state committee and DoE 	<p>⁹Third Party Consultant- 100-120</p> <p>SPCB:</p> <p>Junior Environmental Engineer- 6</p> <p>Senior Environmental Engineer- 2</p> <p>State Committee: 6</p> <p>State DoE:</p> <p>Chief Environment Officer- 0.5</p> <p>Senior Environment Officer- 1</p>	2000 ¹⁰

⁹ The consultant's estimate is per site basis, other estimates for SPCB, State Committee, DoE are per state basis. State wise estimates may vary depending on the number of sites/state

¹⁰ On an average Rs. 50 Cr per site plus cost of supervision, administrative overheads

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			State DoE: <ul style="list-style-type: none"> • Intervene if there is any land related issue Third Party Consultant: <ul style="list-style-type: none"> • Carry out on-site work and report to SPCB on a timely manner 	Junior Environment Officer- 2	

Table 3: Timeline for implementation of various measures for short term financial framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up a trust fund by the Central Government in similar lines with Clean Ganga Fund for utilizing CSR money for remediation purposes.	6-8	MoEFCC	<ul style="list-style-type: none"> Determining the fund characteristics (objective, purpose, source, size, administration etc.) Obtaining necessary approvals from Ministry of Finance (MoF) 	Law and Finance Consultants – 1.5 Scientist of HSM Department – 1.5 Project Director of NPRPS- 0.25 Administrative Officers- 2	0.30 ⁴
Budgetary allocation (by Centre and State) for carrying out initial activities (preliminary site investigation, DPR etc.) for the site inventory (320) identified as per Assignment 1 , training program, laboratory upgrade, outreach and communication, research & development	Next budget session – 6 months	MoEFCC State DoE MoF State Governments	MoEFCC & State DoE: <ul style="list-style-type: none"> Preparation of estimation of budgetary allocation required at centre and state Obtaining necessary approvals MoF, State Governments: <ul style="list-style-type: none"> Determination of state contribution Carrying out necessary procedures for budget allocation at Centre and State. 	Finance Consultant – 1.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.2 State DoE- 1.5 Administrative Officers – 2 (each at Centre and State)	0.30 ⁴

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
<p>Developing procedures for</p> <p>(i) setting the amount of bank guarantees required for (a) normal course of business, (b) suspected pollution</p> <p>(ii) submission of bank guarantee by industries</p> <p>(iii) determining the conditions and situations for revoking bank guarantee from polluters</p>	12-15 (as a part of the "Contaminated Sites (Identification and Management) Rules, 20xx"	CPCB MoEFCC	<ul style="list-style-type: none"> Drafting the procedures Obtaining necessary approvals Stakeholder consultations Notifying the procedures 	<p>Junior Environmental Scientist/Engineer at CPCB- 3</p> <p>Law Officer at CPCB- 3</p> <p>Senior Environmental Scientist at CPCB- 0.5</p> <p>Scientist of HSM Department – 0.5</p> <p>Project Director of NPRPS- 0.1</p>	0.50 ⁴
Developing a waste exchange program around reusing the residual heat, chemicals in the hazardous wastes from one industry in useful manner in other industries	12-15	CPCB MoEFCC	<ul style="list-style-type: none"> Drafting the guidelines Obtaining necessary approvals Stakeholder consultations Notifying the guidelines 	<p>Junior Environmental Scientist/Engineer at CPCB- 3</p> <p>Senior Environmental Scientist at CPCB- 0.5</p> <p>Scientist of HSM Department – 0.5</p> <p>Project Director of NPRPS- 0.1</p>	0.50 ⁴
Identification of Public Private Partnership ("PPP") models for financing remediation of the initial site inventory prepared under Assignment 1	8-12	State DoE State Committee Third party consultant	<p>State Committee:</p> <ul style="list-style-type: none"> Drafting Terms of Reference for third party PPP consultant Selection of PPP consultants based on technical and financial bids Supervision of work carried out by PPP consultant 	<p>State Committee- 2</p> <p>Third party PPP consultant - 12</p> <p>Staff month for negotiation and implementation of PPP models will be same as in case of all other PPP</p>	100 ¹¹

¹¹ 30 lacs/site for 320 sites initially till a private party is selected /contracted

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> • Evaluation of Terms of Reference for private parties prepared by PPP consultant • Decision making on private partners, PPP structures • Selection of private parties <p>State DoE:</p> <ul style="list-style-type: none"> • Negotiation with private parties • Memorandum of Understanding with private parties • Implementation of PPP models <p>Third party consultant:</p> <ul style="list-style-type: none"> • Drafting the Terms of Reference for private parties • Assistance to State Committee in evaluating techno-financial bids received from interested private parties till a party is selected 	models implemented by the State Government.	
Recovery of remediation cost from arrears of land revenue from the site owner (for the first 39 sites if polluter/responsible person cannot be identified)	12-15	Central Government State Government	State Government to follow legal procedures for recover arrears of land revenue as directed by the Central Government.	Standard effort as in case of all matters related to recovery of arrears of land revenue	Standard legal cost as in case of all matters related to recovery of arrears of land revenue

2.2 Long Term Implementation

Table 4: Timeline for implementation of various measures for long term legal framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Approval from Cabinet, Ministry of Finance	6	Ministry of Finance	Review of NPRPS program and provide approval	Standard effort as in case of all matters related to approval of a national program	Standard cost as in case of all matters related to approval of a national program
Notification of national policy on remediation of polluted sites	10-12	MoEFCC	<ul style="list-style-type: none"> Drafting the policy Stakeholder consultations Obtaining and incorporating review comments Notification of the policy 	Scientist of HSM Department – 4 Law Consultant – 2 Project Director of NPRPS- 0.25 Administrative Officers- 3	0.30 ⁴
Notification of state policy on reuse of remediated sites	12-15	State DoE	<ul style="list-style-type: none"> Drafting the policy in line with the objectives of the national policy Stakeholder consultations Obtaining and incorporating review comments Notification of the policy 	Junior Environment Officer- 3 Law Consultant - 1 Senior Environment officer – 1 Chief Environment Officer- 0.25 Administrative Officers- 3	0.30 ⁴

Development of National Program for Remediation of Polluted Sites
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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Notification of amendments to the Environment (Protection) Act, 1986 and National Green Tribunal Act , 2010	18-24	MoEFCC	<ul style="list-style-type: none"> • Finalise drafting the amendments • Following all procedures, approvals prior to notification • Stakeholder consultations • Incorporation of comments • Notification in the Gazette of India 	Law Consultant - 6 Scientist of HSM Department – 3 Project Director of NPRPS- 1 Administrative Officers- 10	0.50 ⁴
Notification of Remediation of Polluted Sites Rules, 20XX under the amended Act	24-32	MoEFCC	<ul style="list-style-type: none"> • Finalise drafting the rules • Following all procedures, approvals prior to notification • Stakeholder consultations • Incorporation of comments • Notification in the Gazette of India 	Law Consultant - 6 Scientist of HSM Department – 3 Project Director of NPRPS- 1 Administrative Officers- 10	0.50 ⁴
Notification of Central Remediation of Polluted Sites Authority (RPS Authority) under section 3(3) of the amended Act	24-27	MoEFCC	<ul style="list-style-type: none"> • Finalise drafting the notification • Following all procedures, approvals prior to notification • Stakeholder consultations • Incorporation of comments • Notification in the Gazette of India 	Law Consultant - 2 Scientist of HSM Department – 1 Project Director of NPRPS- 0.25 Administrative Officers- 6	0.30 ⁴

Table 5: Timeline for implementation of various measures for long term institutional framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Establishment of RPS Authority	32-36	MoEFCC	<ul style="list-style-type: none"> Setting up office for the RPS Authority Hiring resources as per the structure of the RPS Authority 	Scientist of HSM Department – 2 Project Director of NPRPS- 0.5 Administrative officers- 6	Standard cost as in case of all matters related to setting up an authority under section 3(3) of the E(P) Act
Establishing regional offices of the RPS Authority in States with most number of polluted sites or depending upon progress of various stages of remediation in different states	40-48	MoEFCC State DoE	MoEFCC: <ul style="list-style-type: none"> Selection of the states Directing the State DoE to set up regional authorities State DoE: <ul style="list-style-type: none"> Setting up office for the RPS Authority Hiring resources as per the structure of the RPS Authority 	MoEFCC: Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1 State DoE: Junior Environment Officer- 3 Senior Environment Officer- 1 Chief Environment Officer- 0.5 Administrative Officer- 6	Standard cost as in case of all matters related to setting up a regional authority

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up of national priority site registry	24-27	RPS Authority and its regional offices Third party consultant	<p>RPS Authority:</p> <ul style="list-style-type: none"> • Selection of an appropriate software platform for the registry • Setting up the procedures to input accurate information in the registry • Allocation of responsibilities to regional offices, SPCBs for reporting information to the registry on time • Review of information received from regional offices on polluted sites before inputting it in the registry <p>Regional Offices:</p> <ul style="list-style-type: none"> • Setting up the procedure in the states for collection of information on polluted sites, status of pollution, priority/ risk score, status of remediation etc. • Review of information collected before reporting to RPS Authority • Reporting to RPS authority on a polluted site with all relevant 	<p>For initial development and installation of software: Third party consultant- 6 IT team of RPS Authority – 3</p> <p>Once installed, continuous effort will be required by the resources of the RPS authority and the regional offices to collect data and input data into the registry and update the registry from time to time. In addition, periodic maintenance and upgradation of the software will be needed. Effort for these ongoing activities are not considered here.</p>	0.75 ¹²

¹² This considers cost of development of the software, consultant's fee, time-cost of the resources of the RPS Authority for initial installation of the software. It does not consider the running cost of the registry in terms of resources time for operating and updating the registry, effort towards data collection and inputting in the registry, cost maintenance and upgradation of software, etc.

Development of National Program for Remediation of Polluted Sites
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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			information as per the structure of the registry Third party consultant: <ul style="list-style-type: none"> • Development of the software platform in consultation with the IT department of the RPS authority • Installation and validation of the software platform developed 		
Preparation of training plan and budget on new rules, technical guidelines for SPCBs, site investigators, remediation contractors and other third parties by CPCB	6-8	CPCB	Preparation of training plan and budget as per the requirements of different group of stakeholders such as SPCBs, site investigators, remediation contractors etc.	Junior Environmental Engineer- 3 Senior Environmental Engineer- 1	0.10 ⁴
Commencement of accreditation program for third parties	12-15	MoEFCC and CPCB	CPCB: <ul style="list-style-type: none"> • Preparation of accreditation guidelines for the third parties (qualification criteria, procedure, budget, timeline etc.) • Carry out the necessary procedure for accreditation of competent third parties • Completion of empanelment • Updating the list of accredited third parties from time to time MoEFCC:	CPCB: <ul style="list-style-type: none"> Junior Environmental Engineer- 3 Senior Environmental Engineer- 1 Administrative officers- 6 MoEFCC: <ul style="list-style-type: none"> Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1 	0.15 ⁴

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> • Supervision of the entire process • Review of accreditation guidelines for finalisation • Review of the list of empanelled third parties for finalisation 		
Commencement & continuation of training program	8-24	CPCB and SPCB	<p>CPCB: Supervision of the trainings carried out in different states</p> <p>SPCB:</p> <ul style="list-style-type: none"> • Hiring training consultants as and when required as per the plan • Conducting the training sessions in the respective states as per the plan • Reporting to CPCB on number of trainings completed, attendance, feedback received, results of pre and post training knowledge check 	This will be an ongoing activity	This will depend on the number of trainings that need to be carried out as per the plan

Development of National Program for Remediation of Polluted Sites
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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Preparation of laboratory infrastructure upgrade plan and budget by CPCB	6-8	CPCB	<ul style="list-style-type: none"> • Preparation of the plan and the budget taking into account the existing lab capacities and capabilities at CPCB, SPCB and private sector and the new requirements on the basis of initial inventory of sites prepared under Assignment 1 • Review of the requirement from time to time. 	Junior Environmental Engineer- 3 Senior Environmental Engineer- 1	0.10 ⁴
Commencement and continuation of laboratory infrastructure upgrade program for CPCB and SPCBs	6-24	CPCB, SPCB, Private laboratories	Developing the infrastructure including: <ul style="list-style-type: none"> • Technology and equipment sourcing • Skill building of laboratory technicians 	This will be an ongoing activity	This will depend on the extent of the upgrade to be required in future
Preparation of research and development program and budget by CPCB	6-8	CPCB	<ul style="list-style-type: none"> • Preparation of a plan and a budget keeping in mind the requirement of engaging with research institutes for technology innovation, developing toxicological profile and identifying health impacts of hazardous substances already found and to be found in the polluted sites 	Junior Environmental Engineer- 3 Senior Environmental Engineer- 1	0.10 ⁴
Commencement & continuation of research and development program	8-48	CPCB	<ul style="list-style-type: none"> • Preparation of a list of top hazardous substances found in 	This will be an ongoing activity	This will depend on

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<p>the polluted sites based on the results of the site investigation of the 100 sites in Assignment 1 and updating the list from time to time</p> <ul style="list-style-type: none"> • Engaging with public health authorities and research institutions for preparation of toxicological profile, identification of signs of health impacts and appropriate treatment for the identified substances • Preparation of a list of remediation techniques that are most commonly required for polluted sites in India • Engaging with the research institutions to develop appropriate low cost remediation techniques • Conducting field trials and establish the use of such techniques. 		<p>the extent of research required, type of technology innovation, requirement of procurement equipment from international technology providers</p>
Expansion of the initial inventory prepared in Assignment due to mandatory reporting regime	24-48	RPS Authority & regional offices	<ul style="list-style-type: none"> • Supervision of compliance with mandatory reporting regime as a part of new regulatory mechanism • Regular update of the site registry 	This will be an ongoing activity	Depending on number of sites to be identified in future

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Scheduling of new sites for preliminary investigation, site registry, remedial investigation, DPR etc.	36	RPS Authority & regional offices	<p>RPS Authority:</p> <ul style="list-style-type: none"> Review and decision making on status of a site (i.e. if it is a polluted site) <p>Regional Office:</p> <ul style="list-style-type: none"> Based on petitions/ complaints of suspected pollution carry out necessary site visits, investigations to determine the status of the site. Report to RPS Authority 	This will be an ongoing activity	Depends on number of sites to be suspected for pollution
Commencement of remediation of sites found as polluted out of 220 remaining sites in the initial inventory	24-36	RPS Authority & regional offices Third Party Consultant (accredited)	<p>RPS Authority:</p> <ul style="list-style-type: none"> Supervision of progress of work Intervene if there is any land related issue Review and approval of completion of remediation <p>Regional office:</p> <ul style="list-style-type: none"> Periodic on-site monitoring of third party work and report to RPS Authority <p>Third Party Consultant:</p> <ul style="list-style-type: none"> Carry out on-site work and report to regional office on a timely manner 	¹³ Third Party Consultant- 100-120 Regional office of RPS authority: 24 RPS Authority: 12	12000 ¹⁰

¹³ All estimates are per site basis

Development of National Program for Remediation of Polluted Sites
Task 6- Report on implementation plan for the NPRPS

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Commencement of remediation of new sites (not in the initial inventory)	36-48	RPS Authority & regional offices Third Party Consultant (accredited)	<p>RPS Authority:</p> <ul style="list-style-type: none"> • Supervision of progress of work • Intervene if there is any land related issue (in consultation with State Government) • Review and approval of completion of remediation <p>Regional office:</p> <ul style="list-style-type: none"> • Periodic on-site monitoring of third party work and report to RPS Authority <p>Third Party Consultant:</p> <ul style="list-style-type: none"> • Carry out on-site work and report to regional office on a timely manner 	<p>¹⁴Third Party Consultant- 100-120 Regional office of RPS authority: 24 RPS Authority: 12</p>	Depends on number of sites to be identified in future
Marking completion of remediation in the 39 sites found as polluted in Assignment 1	32-36	RPS Authority & regional offices	<p>RPS Authority:</p> <ul style="list-style-type: none"> • Review and decision making on completion of remediation as per DPR <p>Regional office:</p> <ul style="list-style-type: none"> • Review of on-site remediation work • Review of post remediation laboratory results 	<p>Technical team of RPS Authority: 3¹⁵ Technical team of regional office: 3¹⁶</p>	No additional cost other than staff salary

¹⁴ All estimates are per site basis

¹⁵ Total for all 39 sites

¹⁶ Per state

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> Report to RPS Authority 		
Commencement of reuse of 39 sites	36-48	RPS Authority & regional offices	<ul style="list-style-type: none"> Promotion of site Stakeholder engagement on prospective use of the remediated site Liaise with land developers/interested parties <p>RPS Authority will supervise the above actions carried out by their regional offices in different states.</p>	¹⁷ RPS Authority – 1.5 Regional Office- 4	0.20 ¹⁸

¹⁷ This is per site estimate for both staff month and cost

¹⁸ Includes staff salary, costs towards stakeholder consultation costs, promotional activities

Table 6: Timeline for implementation of various measures for long term financial framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up the National Environment Restoration Fund under the Amended Act	18-24	MoEFCC	<ul style="list-style-type: none"> Determining the fund characteristics (objective, purpose, structure source, size, administration etc.) Obtaining necessary approvals from MoF 	Law and Finance Consultants – 1.5 Scientist of HSM Department – 1.5 Project Director of NPRPS- 0.25 Administrative Officers- 2	0.30 ⁴
Estimation of cost of National Program for next 10 years	6-8	MoEFCC	<ul style="list-style-type: none"> Finalising the cost estimation and assessment of percentage of cess Obtaining necessary approvals from MoF 	Law and Finance Consultants – 1.5 Scientist of HSM Department – 1.5 Project Director of NPRPS- 0.25 Administrative Officers- 2	0.30 ⁴
Application of cess as duty of excise	18-24	MoF	<ul style="list-style-type: none"> Following necessary procedures for application of cess 	Standard as in case of all other cess	Standard as in case of all other cess
Setting up the administrative structure for National Environmental Restoration Fund – appraisal committee, approval forum etc.	24-32	MoEFC, MoF	<ul style="list-style-type: none"> Determining the composition for fund administration Hiring resources if required MoEFCC will carry out the responsibilities in consultation with MoF	Scientist of HSM Department – 2 Project Director of NPRPS- 0.5 Administrative Officers- 3	0.15 ¹⁹
Development of a procedure/methodology for	12-15	RPS Authority	Development of procedures for identification of polluters ,	Technical team of RPS Authority- 6	Only staff salary

¹⁹ Internal costs – staff salary, administrative overheads

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
identification of polluters , assessment of paying capacity of polluters			assessment of paying capacity of polluters in line with the requirement of the new regulatory mechanism	Non- Technical team of RPS Authority- 6	
Identification of buyers/real estate developers , private parties for financing remediation activities	12-48	RPS Authority	<ul style="list-style-type: none"> • Promotion of site (post remediation benefits and use) • Engaging with prospective buyers • Negotiation with buyers 	²⁰ Technical team of RPS Authority- 3 Non- Technical team of RPS Authority- 3	Will depend number of sites to be remediated in future
Development of insurance mechanism	36-48	Insurers & polluters	Once remediation becomes an established practice in India, insurers need to play a vital role in developing a market around it.	Not applicable	Not applicable

²⁰ Estimate is per site

Development of National Program for Rehabilitation of Polluted Sites

Final report on development of NPRPS

Revised Version

November 2016

Abbreviations

Act	Environment (Protection) Act, 1986
Air Act	The Air (Prevention and Control of Pollution) Act, 1981
Assignment 1	Assignment – Inventory and mapping of probably contaminated sites in India
Assignment 2	Assignment – Development of methodologies for national program
Assignment 3	Assignment – Development of legal, institutional and financial framework of national program
CPCB	Central Pollution Control Board
CBIPMP	Capacity Building for Industrial Pollution Management Project
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act (USA)
CLM Act	Contaminated Land Management Act (Australia)
DPR	Detailed Project Report
ERF	Environment Restoration Fund under the Public Liability Insurance Act, 1991
EPA	Environment Protection Agency
EQA	Environment Quality Act (Germany)
HW Rules	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
MoEFCC	Ministry of Environment, Forest and Climate Change
NGT	National Green Tribunal
NGT Act	The National Green Tribunal Act, 2010
PPP	Public Private Partnership
RPS Authority	Remediation of Polluted Sites Authority (proposed)
RPS Rules	Remediation of Polluted Sites Rules (proposed)
SPCB	State Pollution Control Board
SARA	Superfund Amendments and Reauthorization Act (USA)
TSDF	Treatment, storage and disposal facility
Water Act	The Water (Prevention and Control of Pollution) Act, 1974

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1 Introduction

The Government of India, through the Ministry of Environment, Forest and Climate Change (“MoEFCC”) is implementing Capacity Building for Industrial Pollution Management Project (“CBIPMP”) with financial assistance from the World Bank. The two-fold objective of this project is to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites and to support the development of a national program for remediation of polluted sites (National Program).

CBIPMP has three components. Component 1 deals with strengthening of environment institutions and capacity building to undertake remediation in states. This has three sub-components, development of national program, establishment of Environmental Compliance Assistance Centres in Andhra Pradesh and West Bengal and institutional capacity building of State Pollution Control Boards (“SPCBs”)¹. As part of developing national program under Component 1, three studies are being carried out –

Inventory and mapping of probably contaminated sites in India (“Assignment 1”),

Development of methodologies for national program (“Assignment 2”) and

Development of legal, institutional and financial framework of national program (“Assignment 3”)

Component 2 supports remediation of legacy dump sites in Andhra Pradesh and West Bengal. Pilot sites chosen under this component were a part of the sites identified by SPCBs across the country as a response to the Menon Committee report.

Component 3 of CBIPMP is Project Management. A Project Director at MoEFCC has been appointed and entrusted with overall supervision of the project, development and establishment of the national program, capacity building, outreach and communications, progress reporting and liaison with participating states and agencies.

This report summarises the findings of all Tasks carried out under Assignment 3 and sets out the policy framework of national program of rehabilitation of polluted sites in India. It draws upon the reviews of national and international remediation practices carried out in Task 1, 2, gap assessment and options for legal and institutional strengthening in Task 3 the legal, institutional and financial frameworks developed in Task 4 and its implementation plan in Task 6, comments received during consultation with State Governments, SPCBs, experts, academia, NGOs during stakeholder consultations conducted as part of Task 5 and work done under Assignment 1 and Assignment 2.

¹ Reference to State Pollution Control Board includes Pollution Control Committee

2 Approach

During inception of Assignment 1, 2 and 3, a “framework” is developed for facilitating the review of the remediation process in India and abroad. This framework takes the form of a structured process with 14 steps (as described in Figure 1 below) and each step in the process having implications towards legal, institutional and financial aspects. The framework has been developed considering the practices amongst the developed countries that have an established framework for dealing with the issues of rehabilitation of contaminated sites. The framework is further refined during the course of the review. The requirements of each step of this framework have been evaluated from legal, institutional and financial perspective to understand the strengths and gaps of the current practices in India in the light of international perspectives. We continue to use the framework for developing the options for legal and institutional strengthening and finally for the development of the policy, regulatory, institutional and financial frameworks for the National Program.

Figure 1: 14 step remediation process:

Identification	Planning	Implementation	Post remediation
<ul style="list-style-type: none"> • Step 1: Identification of probably contaminated site • Step 2: Preliminary investigation • Step 3: Notification of polluted site • Step 4: Priority list addition 	<ul style="list-style-type: none"> • Step 5: Remediation investigation • Step 6: Remedial Design, DPR • Step 7: DPR approval and financing 	<ul style="list-style-type: none"> • Step 8: Implementation of remediation • Step 9: Approval of remediation completion 	<ul style="list-style-type: none"> • Step 10: Post remediation plan • Step 11: Post remediation action • Step 12: Cost recovery • Step 13: Priority list deletion • Step 14: Site reuse

3 Review of national and international practices – findings

The review starts with the current system with regard to legal, institutional and financial frameworks to deal with rehabilitation of polluted sites in India and abroad through a) Document review and b) stakeholder interaction.

Document review for current practices in India has covered all relevant policies, acts and rules, Central Pollution Control Board's (CPCB) guidelines, publications, updated information on hazardous waste generation, recycling, incineration, state-wise availability of Common Hazardous Waste Treatment, Storage & Disposal Facility (TSDF), relevant court cases, latest available inventory of contaminated sites in India, planning commission reports, information from web sites and annual reports of SPCB etc. The table below provides the detail of documents reviewed:

Table 1: Review-National References:

Type of documents	References
Policies	National Environment Policy, 2006 , National Policy on Resettlement, Rehabilitation, 2007, National Policy on Disaster Management 2009
Acts	The Environment (Protection) Act, 1986 (Act) ² , The National Green Tribunal Act, 2010 (NGT Act) , The Water (Prevention and Control of Pollution) Act, 1974 (Water Act), The Air (Prevention and Control of Pollution) Act, 1981 (Air Act), The Civil Liability for Nuclear Damage Act, 2010, The Land Acquisition Act, 1894 amended 1984, Forest (Conservation) Act, 1980, The Industries (Development & Regulation) Act, 1951, Atomic Energy Act, 1962, The Indian Forest Acts, 1927
Rules	Environmental (Protection) Rules, 1986 and amendments thereof, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (HW Rules) , Bio-Medical Waste (Management and Handling) Rules, 2016, The Batteries (Management & Handling) Rules, 2010 , E-Waste (Management) Rules, 2016, Dumping & disposal of Fly-ash Rules, 1999 , The Mineral Conservation and Development Rules, 1988 , Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987 , Solid Waste Management Rules (SWM), 2016, The Public Liability Insurance Act and Rules, 1991
By-laws	West Bengal Municipal Act, 1993 (Functionally the same as Kolkata Municipal Act, 1980), The East Kolkata Wetlands (Conservation and Management) Act, 2006, East Kolkata Wetlands (Conservation & Management) Rules, 2006, The Forest (Conservation) Act, 1980 with 1988 Amendments and Rule, 2003 (with amendments made in 2004), Maharashtra Non-biodegradable Garbage (Control) Act, 2006, Maharashtra Groundwater Development and Management Act, 2009, Municipal Corporation of Greater Mumbai Bylaws, 2006, Karnataka Shops and Commercial Establishments Act, 1961 Karnataka Municipal Corporations Act, 1976, The Himachal Pradesh Municipal Act, 1994, The Uttar Pradesh Municipalities Act, 1916, The Uttar Pradesh Municipal Corporation Act, 1959
Publications	CPCB Publication – Hazardous Waste Management Series (HAZWAMS), Computation of Societal Risk Abatement Cost and Long Run Marginal Financial Cost with regard to Dioxin and Furan Emission Standards for Common Hazardous Waste Incinerator, Evaluation Study of

² From here onwards, the words “The Act”, “E(P) Act” and Environment (Protection) Act are used to denote Environment (Protection) Act, 1986

Type of documents	References
	Functioning of State Pollution Control Boards, Planning Commission, Government of India, September 2000, Findings of Menon Committee Report of Supreme Court of India, H.P.C, Report of the High Powered Committee on Management of Hazardous Wastes, Volume I, Volume II and Volume III (2001), National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India February 2009 Central Pollution Control Board Hazardous Waste management Division Delhi, Action Plan for Abatement of Pollution in Critically Polluted Area of Ludhiana City, Punjab Pollution Control Board, June 2010, State-wise Availability of Common Hazardous Waste Treatment, Storage & Disposal Facility (TSDF), LIST OF HAZARDOUS WASTE CONTAMINATED DUMP SITES IN THE COUNTRY (Having Preliminary Information)
Guidelines	CPCB, Inventorisation of Hazardous Waste Generating Units in Orissa, Hazardous Waste Management Series: Hazwams / 21/ 2002-03, CPCB Publication – Hazardous Waste Management Series (HAZWAMS), CPCB Guidelines for Conducting EIA: Site Selection for Common Hazardous Waste Management Facility, CPCB Guidelines for Proper functioning and Upkeep of Disposal Sites, CPCB Guidelines for the Selection of site for Land-filling, CPCB Guidelines for Transportation of Hazardous Wastes, Guidelines For Evaluation And Recognition Of Environmental Laboratories (Revised & Updated Version)
Reports	Report of the Working Group on Environment & Environmental Regulatory Mechanisms, Report of the Sub-Group on “Environment” for 12th Five Year Plan, 19. Pilot project on HW management in Karnataka for carrying state wide survey of industries on quantities and qualities of HW, by GIZ (ASEM), Hazardous Waste MGT Project Formulation Study in GUJARAT, INDIA, Environmental and Social Assessment (ESA) Study by ICT for MoEFCC, Overview Of The Current Situation On Brownfield Remediation And Redevelopment In China, the World Bank, Annual Reports of Karnataka, West Bengal, Andhra Pradesh, Madhya Pradesh, Punjab, Meghalaya, Tamil Nadu, Kerala, Rajasthan, Gujarat, Maharashtra Pollution Control Boards.

The international review is conducted primarily through desktop research. The following are reviewed from different countries:

Table 2: Review- International References:

Country	References
USA	Legal, institutional and financial mechanisms related to Superfund Programme, Brownfield Redevelopment Programme, The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA)
Canada	Legal, institutional and financial mechanisms Environment Quality Act (EQA), Canadian Environmental Protection Act (CEPA), Federal Contaminated Action Plan (FCSAP)
Australia	Legal, institutional and financial mechanisms related to Contaminated Land Management Act (CLM Act)
Germany	Legal, institutional and financial mechanisms related to Soil Protection Act
Netherlands	Legal, institutional and financial mechanisms related to Soil Protection Act, New Soil Development Policy, Soil Quality Decree
Romania	National Waste Management Strategy, Environment Protection Law, Environment Fund

Korea, Japan, China	Soil Environment Conservation Act, Soil Monitoring Policy of Korea, Japan's Soil Pollution Control Law and Japan Soil Contamination Counter-measure Law (SCCL), China's progress reports on review of national and international frameworks
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Stakeholder interaction covers face to face meetings, interaction over e-mail and telephone to get a real time understanding of the current practices related to rehabilitation of contaminated sites in the country. The table below provides a detailed list of stakeholders interacted:

Table 3: Detailed list of interactions with institutions in India:

Stakeholder Category	Stakeholder Consulted
Central and State Pollution Control Boards (Including Pollution Control Committees for Union Territories)	Andhra Pradesh Pollution Control Board, Central Pollution Control Board Central Pollution Control Board Zonal office , Gujarat Pollution Control Board, Haryana State Pollution Control Board, Karnataka State Pollution Control Board, Madhya Pradesh Pollution Control Board, Maharashtra Pollution Control Board, Odisha Pollution Control Board, Rajasthan Pollution Control Board, Tamil Nadu State Pollution Control Board, Uttar Pradesh Pollution Control Board, West Bengal Pollution Control Board
District (Local) Administration and Urban Local Body	Ahmedabad Municipal Corporation, Bruhat Bangalore Mahanagara Palike (BBMP), District Magistrate, Hooghly District of West Bengal, Greater Hyderabad Municipal Corporation, Kolkata Metropolitan Development Authority (KMDA), Kolkata Municipal Corporation (KMC), Ludhiana Municipal Corporation, Municipal Corporation Greater Mumbai, The Collectorate, Udaipur Urban Improvement Trust (UIT) [Under the Urban Development and Housing Department, Government of Rajasthan]
State Health and Environment Departments	Department of Environment, West Bengal
Generators of hazardous waste	Berger Paints India Ltd, Exide Industries Ltd.
Operators of TSDFs	Ramky Enviro Engineers (p) Ltd., Mumbai Waste Management Ltd., Tamil Nadu Waste Management Ltd., UPIL
Industries Department of the state government (including Industrial Development Board and SEZ)	Maharashtra Industrial Development Corporation, Delhi State Industrial and Infrastructure Development Corporation Ltd.
Industry Associations	Confederation of Indian Industry
Ministerial Bodies	Hazardous Substances Management Division (MoEFCC), Planning Commission, Gol
Non-governmental organisations (NGOs)	ToxicsLink, Hazard Center
Funding Agencies	Gesellschaft für Internationale Zusammenarbeit (GIZ)
Other Government Agencies or Authorities	National Highway Authority of India

Stakeholder Category	Stakeholder Consulted
Technical Institutions and Experts	Indian Institute of Toxicology Research, Lucknow, National Environmental Engineering Research Institute

Based on the review carried out, following are the observations made at each step of the 14 step remediation process described in Figure 1:

Table 4: Findings from review:

Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
1. Identification of probably contaminated sites	<p>A draft definition of “contaminated” and “probably contaminated” site is being worked upon that may serve as the basis of identification of a probably contaminated/contaminated site.</p> <p>As per the current institutional structure provided by the legal framework, CPCB and SPCBs are authorized to investigate suspected cases of non-compliance with respect to the HW Rules (schedule VII), the Air Act (section 24, 25, 26, 27) and the Water Act (section 20, 21, 22, 23). This is a part of monitoring industrial compliance where non-compliance may lead to contamination, environmental damages and health hazards.</p> <p>Any party, media report, health department complaints may be considered by SPCBs for suspected cases of non-compliance.</p> <p>No obligation on SPCBs, large government agencies (railways, port trust etc) to conduct land survey and report contamination within their jurisdiction, no involvement of other relevant ministries such as ministry of urban development, agriculture, irrigation, health etc., no formal procedure for NGOs, general public to report contamination to SPCBs.</p> <p>No formal procedure of listing of the sites as and when complaints are received.</p> <p>No legal authority on any institution to be the custodian of the list of all sites, screen received complaints and declare a site as “probably contaminated”.</p> <p>No obligation on entities abandoning a site or changing land use of a site to conduct preliminary assessment and report to the managing entity.</p>	<p>In USA sites are discovered by regional Environmental Protection Agency (EPA) offices, state agencies, and citizens who file a Preliminary Assessment (PA) petition to EPA as per. Section 105(d) of SARA. Whenever a petition is received, it enters into EPA's computerized inventory of potential hazardous waste sites for further actions.</p> <p>As per sections 31.33, 31. 43, 31.51 of Canadian EQA a person or municipality that has the custody of the land/anyone who is ceasing a property /changing land use need to report land contamination status and rehabilitation plan to Ministry of Environment.</p> <p>According to Part 5, Section 60 of the Australian CLM Act, “Duty to report contamination” requires land owners and persons who carry on “contaminating activities” to notify the Environment Protection Authority of the contamination of land. If they fail to do so a penalty will be imposed.</p> <p>Article 8 of the German Soil Protection Act provides trigger values, action values and precautionary values of soil contamination to determine if further investigation is required or if clean up measure is required or if it is a real concern and clean up measure is required urgently.</p> <p>Section 29 of Dutch Soil Protection Act provides criteria for "serious" and "non-serious" contamination based on detailed soil survey</p> <p>Section 37 includes criteria for urgent and non-urgent site remediation based on location specific current and future land use.</p>

Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
<p>2. Preliminary investigation</p>	<p>Under the Act (section 11), the Air Act (section 24) and the Water Act (section 23), the enforcing agency (CPCB, SPCBs) has the authority to enter “any place” for the purpose of assessment and taking samples for analysis. The word “any place” does not define if it is a source site or a receptor site. A contaminated site is usually a receptor site.</p> <p>It does not explicitly clarify if entry is allowed to all private lands for the purpose of collection of samples i.e. ownership of the land is not clarified.</p> <p>Under the Act (Chapter II) the central government can create new procedures for assessment and investigation of environmental damages.</p> <p>HW Rules schedule II provide HW constituent and concentration level to be complied with for soil, air, water samples collected.</p> <p>CEPI also provides pollution index used to rank sites according to the level of risk present due to pollution. However, there is no legal mandate to use this index for prioritization.</p> <p>The current enforcing agencies i.e. CPCB, SPCBs lack in institutional capacity – most SPCBs do not have NABL certifications for the parameters to be monitored by their laboratories, all SPCB regional offices do not have laboratories, all SPCBs have about 35-40% vacant seats under different technical and scientific posts. Firms to which the work is currently being tendered out are mostly international.</p>	<p>In US, Section 104(e) (1) of SARA explicitly grants EPA the authority to enter a property to conduct investigations, studies, and also clean ups.</p> <p>In Australia, Section 32 of the CLM Act states that any entity/person authorized by Environment Protection Authority can enter a land under only if he has permission from the land occupier. If the occupier refuses entry then EPA would issue an order on the occupier to carry out the requirements under the order and the occupier may recover this cost under part 3 division no 6 of the CLM Act.</p> <p>Section 31.63 of EQA in Canada explicitly grants any person authorized by the Minister of Environment under this Act to enter private property for site investigation and clean up purposes.</p> <p>In USA, the scope of the preliminary assessment is defined in Section 420 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) CERCLA refers to this section of the NCP.</p>
<p>3. Notification of polluted site</p>	<p>Provisions to notify a site under a certain category and to warrant further activities at a site as a means of pollution abatement are present in the Coastal Regulated Zones (CRZ) notification under Act’s powers and in East Kolkata Wetlands (Conservation and Management) Act, 2006 applicable for wetlands.</p> <p>CEPI, though not a legal provision, has so far been applied successfully by CPCB to notify a critically polluted industrial site. Under the Act section 9 the expenses incurred by an agency toward remedial measures may be</p>	<p>As per Canadian EQA Section 31.58, for a contaminated land, the entity who had the study performed shall apply for registration in the land register through a notice of contamination containing a description of the land, the name and address of the applicant for registration and of the owner of the land, the name of the municipality in which the land is situated and a summary of the characterization study.</p> <p>EPA in USA also publishes notices in the Federal Register, listing which sites are being proposed for listing. As per Section 105(a) (8) (B) of CERCLA, EPA publishes</p>

Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
	<p>recovered from the person responsible for the pollution.</p> <p>NGT Act Section 15 and 20 have provisions of providing compensation to the victims of environmental damages and for restoration of damages using the polluter pays principles.</p> <p>Articles 47, 48A of Indian constitution have delineated fundamental rights for environmental safeguards and protection of human health</p> <p>The Civil Liability for Nuclear Damage Act, 2010, holds the operator of a nuclear installation liable to restore damages.</p> <p>The Mineral Conservation and Development Rules, 1988 requires mining companies to remediate their lands before leaving.</p> <p>E-Waste (Management) Rules, 2016 introduces the concept of "Extended Producer Responsibility places the onus on the producer to prevent his/her product from being a cause for pollution.</p> <p>No specific regulation for notification and delineation of a contaminated site is available or registration of a land as contaminated.</p> <p>No institutional authority is provided by the current legal framework to notify a site as a probably contaminated site and delineate the details of the land in the notification.</p> <p>No specific procedure and legal powers conferred to existing institutions to get into administrative/legal agreements with responsible parties to take the responsibility of remediation or to pay for remediation.</p> <p>No procedure to determine liability when a single responsible party cannot be identified or to determine liability when the act of contamination has taken place before enactment of the concerned legal framework.</p>	<p>notices to notify the public of sites EPA believes warrant further investigation.</p> <p>CERCLA 107 (a - c) identifies owner, operator of a site, transporter of waste to a site as the responsible party.</p> <p>As per Section 106 of CERCLA-EPA can order, or ask a court to order, PRPs to clean up the site when an imminent or substantial endangerment may exist.</p> <p>CERCLA recognizes retroactive liability (i.e. parties liable for acts taken place before enactment of CERCLA), joint liability (Any one party may be held liable for the entire cleanup of the site when the harm caused by multiple parties cannot be separated) and strict liability (a party cannot simply say that it was not negligent or that it was operating according to industry standards).</p>
4. Priority list addition	<p>CEPI provides pollution index used to rank sites according to the level of risk present due to pollution. CEPI is calculated based on the presence of a pollutant, its impact on people and ecology and additional risk element if any. However, there is no legal mandate to use this index for prioritization.</p> <p>No legally mandated ranking procedure is there that considers all types of pollution</p>	<p>As per CERCLA section 105, EPA needs to apply HRS to score a site. The cut off for prioritization is HRS score 28.5 which is a RMS value of ground water, surface water, soil exposure and air pathway values from 0-100. The site with score less than 28.5 should receive a "no further remedial action planned"(NFRAP) recommendation.</p>

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Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
	<p>pathways, risk exposure of local community to determine the severity of contamination. No managing institution is identified by law to conduct the prioritization exercise. There is no legal procedure to take inputs from other ministries, state level institutions, and state government departments while prioritizing.</p>	<p>CERCLA also refers to Section 300.425(c) of the NCP by which NPL listing depends on inputs from U.S. Public Health Service that recommends removing people from the site, if states feel it is a top priority.</p>
<p>5. Remediation investigation</p>	<p>As described above, references of sample collection are available under hazardous waste management rules and CEPI.</p> <p>The current legal framework does not refer to any guideline on carrying out detail remedial investigation for preparation of DPR.</p> <p>No delegation of power is observed to the existing institutions in the hazardous waste management hierarchy to prepare DPR for the remediation work. Currently, due to local presence, for all funded activities of DPR preparation are being supervised by SPCBs who are tendering out the work to competent technical firms, mostly international.</p>	<p>EPA document-EPA/540/G-89/004 provides guidelines to conduct Feasibility Analysis and Remedial Investigation under CERCLA.</p> <p>CERCLA recognizes EPA to conduct remedial investigations through its regional offices or through contractors.</p>
<p>6. Remedial Design, DPR.</p>	<p>There are no existing provisions in the legal, institutional and financial framework to address the requirements of this step.</p>	<p>Under superfund programme in USA the outcome of step 5 is The outcome of this step is Records of Decision (ROD) containing site details, characteristics, alternatives of remediation with methodology, technology and time details and the justification of the best alternative to go for approval by EPA review board. The approved ROD becomes the basis of the next steps.</p>
<p>7. DPR approval and financing</p>	<p>The National Environment Policy, 2006 suggests creation of a National Environment restoration Fund from the net proceeds of economic instruments, user fees for access to specified natural resources, and voluntary contributions which may be used for restoration of environmental resources, including clean-up of toxic and hazardous waste legacies.</p> <p>Gujarat Pollution Control Board maintains an "environment fund" as a result of a Gujarat High Court order on a plea by a resident of Boriya Khurad village of Sabarkantha for restoration of environmental damages. Maintenance of this fund is the responsibility of the state government and the fund comprises direct payment of penalties, ascertained by the district judge, for damage caused to the environment.</p>	<p>In USA fund is sourced from i) cost recovery/cash agreements with the responsible persons/liable parties that go to the "special accounts" of EPA within the Superfund Trust Fund to pay for cleanup activities at the site for which it received the money (70%) and ii) trust fund (Refer: CERCLA section 122)- dedicated for remediation mostly used for orphaned sites (30%).</p> <p>In Romania, the Environmental Fund was set up by Law no. 73 in 2000, as a special fund, outside the budget to meet the objectives as set out by the National Waste Management Strategy. The law prescribes a structure and sources of the fund from taxes paid by users of natural resources and harmful chemicals. The fund is managed by a management</p>

Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
	<p>There are relevant fund structures available under different national programmes. Projects under National River Conservation Plan are funded on 70:30 cost sharing basis between MoEFCC and state government or a local body concerned. It is mandated that of the 30% share of state share at least 10% should come from public participation to promote the sense of ownership among beneficiaries.</p>	<p>board whose structure is also mandated by the law.</p> <p>In Canada, funding is through budget allocation. Budget 2009: Under Canada's Economic Action Plan (CEAP), the Federal Contaminated Sites Action Plan receives \$245.5 million till 2011. The funding includes \$80.5 million in new funding and \$165 million from existing funding (Budget 2004). Budget 2011 includes an additional \$68 million over two years for funding site assessments and program management.</p>
<p>8. Implementation of remediation</p>	<p>The acquisition of land for public purposes has been legally valid from the inception of the Constitution. The Constitutional provision for eminent domain may be found in Article 31A (1) of the Constitution. The Land Acquisition Act, 1894 amended 1984, sets out the provision for the government to acquire land where it appears to the government that the land is needed or likely to be needed for any public purpose. An important point is that the government may also acquire the land for the use of a Company.</p>	<p>Under USA's superfund programme, as per SARA section 104 e (1-5) EPA can access a private land for preliminary site investigations, removal and remedial actions. The Act mandates that EPA should, in the first instance, seek to obtain access through consent. If consent is denied, EPA should use judicial process or an administrative order to gain access. The appropriate type of judicial process varies depending on the nature of the onsite activity. As per SARA where there is a "reasonable basis to believe there may be a release or threat of a release of a hazardous substance or pollutant or contaminant," courts are instructed to enforce an EPA request or order.</p> <p>In addition, a penalty not to exceed \$25,000/day may be assessed by the court for failure to comply with an EPA order or the provisions of subsection 104 (e) of SARA.</p>
<p>9. Approval of remediation completion.</p>	<p>There are no existing provisions in the legal, institutional and financial framework to address the requirements of this step.</p>	<p>Under CERCLA, guidance on achieving the construction completion milestone is available in the "Close Out Procedures for National Priorities List Sites" guidance of USEPA.</p> <p>EPA evaluates and approves a Remedial Action Report marking completion of remediation. Remediation action completion depends of Remediation Action Guidelines for different measures e.g. for source remediation through in-situ treatment of soil clean up level as per ROD has to be achieved. For measure regarding containment of pollution, construction needs to be complete.</p>

Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
10. Post remediation plan.	Current legal framework has conferred institutional powers to CPCB and SPCBs to monitor industrial pollution on a regular interval but has no specific mention of remediated sites.	Under superfund, a national strategy is developed called National Strategy to Manage Post Construction Completion Activities at Superfund Sites. This is as per sub-part A, section 300.5 of NCP. This includes Long-Term Response Action (LTRA) by EPA that generally applies to the first 10 years for monitoring of ground and surface water restoration, maintenance of remedial action, five yearly review and working with third parties for reuse of land. In US, CERCLA and NCP have defined the roles and responsibilities of EPA, PRPs, states, federal agencies to protect a rehabilitated land for long term.
11. Post remediation action	HW Rules Schedule VII, SPCBs and the CPCB are required by law to monitor industrial pollution. As per the Disaster Management Act, 2005, the pollution control boards are identified as the agency for monitoring the developing severity of the disaster and ascertaining if an area is fit for re-entry. The guidelines mention that the decontamination activities would be done with the help of other agencies and industries.	International practices cover monitoring and evaluation as a part of post construction activities.
12. Cost recovery	Existing legal provisions to assign liability are discussed in step #3. Guiding principles on for calculation of compensation of damage are provided by the Supreme Court with the landmark order of 12.12.1996 that directed that compensation be calculated on the basis of NPV (Net Present Value) of the forest as a resource. In supreme court case Vellore Citizens' Welfare Forum Vs Union of India AIR 1996 SC 2715, The Court issued directions to the Government to set up an authority called as "Green bench" as per section 3/3 of the Environment Protection Act to deal with the situation as well as to enforce the polluter pays and precautionary principles. The Court imposed pollution fine on the tanneries and directed the authority to compute the compensation payable for reversing damage to the ecology as well as for payment to individuals affected. The fine to be deposited under an Environment Relief Fund.	As per CERCLA section 107, EPA orders PRPs to have an agreement with EPA on work, cost recovery/cash out. CERCLA section 122: a) Administrative Order on Consent-between EPA and PRP where PRP carries out short term clean up, remedy design b) Administrative agreements between EPA and PRP for cost recovery/cash out where PRP pays the cash before or after actual remediation takes place by EPA For cost recovery EPA tracks the amount owed by potentially responsible parties (PRPs) in its accounting system. Generally, a PRP has a certain period of time in which to pay the amount owned. A penalty of thrice the remediation cost (to be incurred by EPA) is collected from the PRP on failure of payment for remediation. When a payment is overdue EPA works with the Department of Justice to collect the debt.

Steps of a remediation process	Observations- In existing Indian Framework	Observations- In the existing International References
13. Priority list deletion	In India, the remediation framework is at a nascent stage and hence this step is not introduced as yet.	<p>Under superfund, EPA may delete a final NPL site if it determines that no further response is required to protect human health or the environment. Under Section 300.425(e) of the National Contingency Plan (55 FR 8845, March 8, 1990), a site may be deleted where no further response is appropriate if EPA determines that one of the following criteria has been met:</p> <p>EPA, in conjunction with the State, has determined that responsible or other parties have implemented all appropriate response action required.</p> <p>Remedial investigation has shown that the release poses no significant threat to public health or the environment and, therefore, remedial measures are not appropriate.</p>
14. Site Reuse	As per the current legal framework, Land acquisition or allocation remains within the control of the state government and the state governments need to be involved even for site reuse after remediation.	EPA in USA developed the Return to Use (RTU) Initiative. The RTU Initiative is designed to remove barriers to appropriate reuse at those Superfund sites Barriers include lack of understandable information about the site; liability concerns; site ownership issues; and lack of clear information regarding what uses might be appropriate for the site. As part of the RTU Initiative, EPA provides the public with site reuse information sheets and works with surrounding communities to establish processes for determining appropriate reuses; supplies information to potential purchasers etc.

For further details of review findings, please refer to Combined Task 1 and Task 2 report of Assignment 3.

4 Options for National Program

Based on the findings from the review carried out in Task 1 and Task 2 of Assignment 3, options are developed in Task 3 of Assignment 3 for strengthening existing legal, institutional and financial provisions to deal with remediation of polluted sites in India.

4.1 Options for legal framework

There are two broad options possible to address the gaps in the legal framework – one that reflects an incremental approach to the existing legal and regulatory framework and two that reflects a substantial and comprehensive overhaul of the legal and regulatory framework. An incremental approach is reflective of the nature of environment legislation (delegated legislation) and thus would mean establishing a new set of rules and/or amending Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. This approach has been followed for the Batteries (Management & Handling) Rules, 2010 and E-Waste (Management) Rules, 2016.

Table below describes the aspects for the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 those are (i) already covered; (ii) are missing and (iii) for which the rules need strengthening:

Table 5: Coverage and gaps in Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

Aspects covered under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016:
<ul style="list-style-type: none">• As per Chapter II, rule 6, sub-rule (2) and (3), SPCBs are authorized to review appropriate facilities, technical capabilities and equipment details for safe handling of hazardous waste before granting “authorization for handling hazardous wastes” to industries. The same is reviewed during renewal of authorization.• Chapter II, rule 6, sub-rule (5), SPCBs are authorized to periodically review industrial records of hazardous waste generation, transportation and disposal.• Since HW Rules are notified under the Act, drawing upon section 10 and 11 of the Act, any authorized entity has the right to enter any place (industrial premises or other), to take air, water and soil samples.• Schedule I provides exhaustive list of all hazardous processes and schedule II provides comprehensive list of contaminants with its concentration limit.• Rule 23 identifies the occupier, importer, transporter and operator of the facility as liable for all damages caused to the environment or third party due to improper handling of the hazardous wastes or disposal of the hazardous wastes. The occupier and the operator of the facility remain liable to pay financial penalties as levied for any violation of the provisions under these rules.

Aspects that are currently not covered under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016:

- Review of plant records of hazardous waste generation, incineration and transportation to the disposal facility by SPCBs during renewal of “Consent to Operate” for hazardous waste generating facilities.
- Periodic monitoring of land contamination, illegal dumping of hazardous wastes due to non-compliance to the rules, or from before the rules.
- Specific reference to power of entry, inspection of a “probably contaminated site” irrespective of ownership i.e., public, private, industrial, domestic.
- Provision to notify a land as “contaminated” and restrict activities on a notified site.
- Licenses to remain, use, take possession and continue to remain in possession of a “notified contaminated site” for the purpose of remediation.
- Procedure for risk ranking of contaminated sites.
- Definition of responsible persons/liable parties – e.g., polluter, owner, occupier, transporter.
- Definition of types of liabilities such as absolute, strict, joint, vicarious that may be applicable under different scenarios.
- Definition of extent of liability – e.g., till cost of remediation, a fixed amount as payment for damages etc.
- Provision for calculation of liability –e.g., to put an economic value for damage to the environment or natural resources.
- Provision for attachment of land/asset to recover cost of remediation from responsible persons/liable parties

Strengthening of rules or developing new set of rules for remediation might not be sufficient if the mother act under which those are notified does not have the enabling provisions for conducting remediation of a contaminated site. Some of the enabling provisions required under the Act (i.e., Environment (Protection) Act, 1986) are set out below.

Table 6: Suggested amendments to the Act

Suggested Amendments	Justification
I. Amendment in “Definitions” under Section 2	Definitions of probably contaminated site and contaminated site are required in Section 2(h). Currently, there is no definition of contaminated site or probably contaminated site in any Act or Rule.
II. Amendments in Section 3(2)	
Add new sub-section <i>for laying down standards, procedures, safeguards, restrictions and all necessary measure to be adopted for remediation of contamination where contamination may occur due to hazardous substances from before the Act and rules under the Act</i>	Currently section 3(2) does not talk of laying down procedures for remediation of contamination that may occur due to any kind of use of “hazardous substances” as defined under the Act. The scope should cover all eventualities and not just due to mishandling, accidents or any other unforeseen events.
Amendment of sub-section <i>for inspection of any premises such as public land, private land like factory premises, residential, non-residential</i>	The Act specifically mentions plant premises for entry and inspection but is silent on other types of sites (e.g., non-industrial land). For the purpose of remediation, the competent authority will require jurisdiction over any

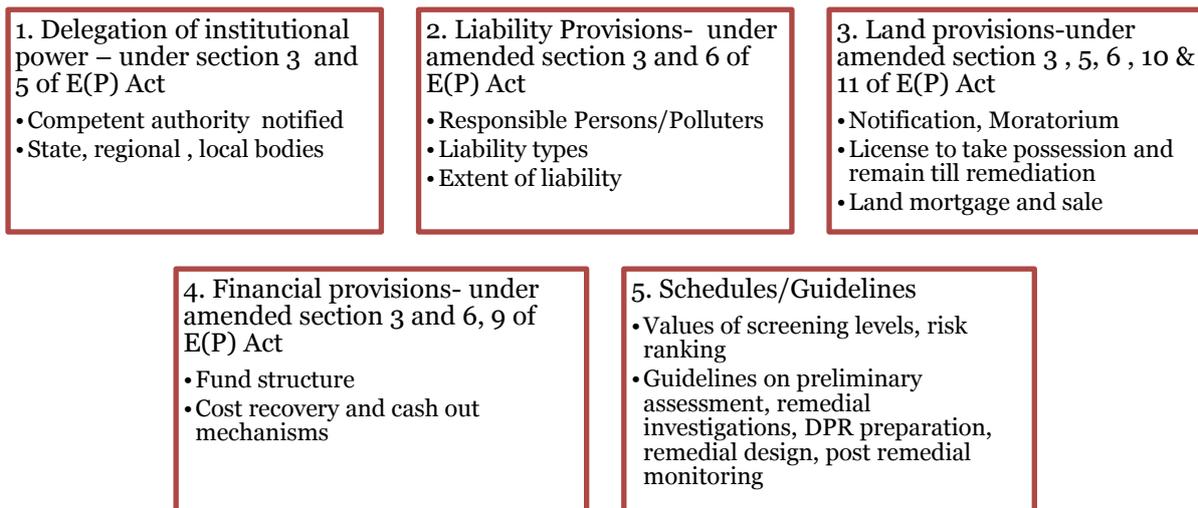
Suggested Amendments	Justification
<i>complexes or any other place for prevention, control, abatement of environmental pollution and remediation of contamination</i>	type of site including non-industrial land. Hence examples of “any premises” may be included in this section.
<p>Add new sub-section for appointing adjudicating officers to:</p> <p>a) <i>Impose penalty in case of non-compliance to any directions, orders, agreements under the Act.</i></p> <p>b) <i>Provide for a system of graded fine / penalty depending upon the type of contravention or non-compliance</i></p> <p>c) <i>Provide for civil liability that is a multiple of the potential economic gain by a defaulting party</i></p>	<p>In the Real Estate (Regulation and Development) Bill 2013, ‘Real Estate Regulatory Authority’ to be situated in each state/union territory has specific powers, and responsibilities to exercise oversight of real estate transactions, to appoint adjudicating officers to settle disputes between parties, and to impose penalty and interest. The bill mentions that the power to appoint adjudicating officers is meant for expediting the judiciary process.</p> <p>The Electricity (Act) 2003 and the Petroleum and Natural Gas Regulatory Board Act, 2006 provide for civil administrative adjudication. Civil administrative adjudication is also found in Information Technology Act, 2000, SEBI Act, 1992 and the Food Safety and Standards Act, 2006.</p> <p>Civil administrative adjudication may be adopted in the National Program and the competent authority may be given specific power to appoint adjudicating officers to expedite the process.</p>
<p>Add new sub-section to assign liability based on “polluter pays” and “precautionary” principle</p>	<p>“Polluter Pays” principle: The liability provisions in the regulatory framework of countries like USA, Canada, Australia, Germany, and Netherlands are based on the polluter pays principle. In India, section 20 of National Green Tribunal Act upholds polluter pays principle as the basis for claiming environmental restitution from a party. In India this principle has been repeatedly referred to by various court orders relating to restoration of environment damages.</p> <p>“Precautionary” principle: In the National Environment Policy 2006, Precautionary Principle is defined as “Where there are credible threats of serious or irreversible damage to key environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”. This principle has been repeatedly referred to by various court orders in India relating to restoration of environment damages as an integral part of “sustainable development” along with the “polluter pays” principle. Section 20 of NGT Act upholds precautionary principle along with polluter pays principle</p> <p>The principle if comes under amended Act helps the National Program in defining “absolute liability” where a party becomes liable under tort when it handles an “inherently dangerous material” (irrespective of act of god, accidents), developing risk ranking criteria to notify sites as “contaminated” where there are credible threats of serious or irreversible damage to environment even if no direct, scientific correlation is found between contamination and impacts on health/environment through preliminary investigations (i.e. when there are chronic, long term impact)</p>
<p>Add new sub-section to employ absolute (or strict), retroactive, joint and extended liability while assessing and assigning liability relating to hazardous substances</p>	<p>The principles of assessing and assigning liability should be part of the primary legislation based on which the delegated legislations can be made.</p> <ul style="list-style-type: none"> • Absolute Liability- If an entity handles an “inherently dangerous” substance then liability arises out of tort. • Strict Liability- An entity is responsible in all cases as mentioned under absolute liability other than cases of Act of God where otherwise the entity was diligent.

Suggested Amendments	Justification
	<ul style="list-style-type: none"> • Retroactive Liability- Parties may be held liable for acts that happened before enactment of any legal provision under absolute or strict liability. • Joint Liability- Any one responsible party may be held liable for the entire cleanup of a site when the harm caused by multiple parties cannot be separated. • Extended/Vicarious Liability - a person is held liable to the action or inaction of another person in view of the fact that such persons share a special relationship and one person has carried out such unlawful actions on behalf of the other.
<p>Add new sub-section for</p> <p><i>a) Supervision over activities to complete a remediation cycle</i></p> <p><i>b) Estimation of costs of investigations for remediation, actual remediation, rehabilitation and restitution for the purpose of remediation.</i></p>	<p>The activities of completing a remediation cycle are different from that of regular environmental compliance monitoring hence insertion of additional points specific to the case of remediation will help reduce ambiguity and empower appropriate authority formed for the National Program to enforce these provisions.</p>
<p>Add new sub-section for</p> <p><i>Establishing fund(s) for the rehabilitation of contaminated sites and persons impacted;</i></p>	<p>This would enable creation of a fund for remediation of sites under the Act and remove ambiguity on the provision of levy of fees, penalties, bank guarantees, etc.</p>
<p>III. Amendments in Section 5</p>	<p>Add new sub-section to enable the competent authority to do the following:</p> <ul style="list-style-type: none"> • Give directions to the owner / occupier to hand over temporary custody and control of contaminated site till remediation is complete • Assign roles and responsibilities of the polluters for remediation of contamination • Impose remediation cost, environmental damages on polluters, secure assets, revoke bank guarantees for recovery of cost of remediation from polluters
<p>IV. Amendments in Section 6</p>	<p>This section of the Act will require provisions for laying down procedures and safeguards for remediation of contaminated sites. It is also important to have provisions to make rules under this section for recovery of costs of remediation. The following provisions are suggested:</p> <ul style="list-style-type: none"> • Add new sub-section for laying down standards, procedures, safeguards for restrictions and all necessary measure to be adopted for remediation of contamination where contamination may occur due to “hazardous substances” from before the Act and rules under the Act • Add sub-section for laying down standards, procedures, safeguards for imposing restrictions, prohibitions, and other issuing necessary directions to control, manage, take as security, use on (a temporary or permanent basis), dispose and appropriate the proceeds of any property for the purposes of remediation/ restoration of property
<p>V. Amendments in Section 15</p>	<p>Section 15 covers the penal provisions, which will need to be strengthened and aligned to the nature and magnitude of contravention. The penal provisions will need to be in addition and not in derogation of</p>

Suggested Amendments	Justification
	<p>any liability, compensation, restitution, administrative action, etc. Penal provisions and thresholds will need to be set at different levels for different types of contravention of law.</p> <p>In India, there has been precedence where different levels of penalties are assigned for different categories of violations. The Electricity (Act) 2003, Petroleum and Natural Gas Regulatory Board Act, 2006, the Income Tax Act, 1961, the Factories Act, 1948 etc., provide for a differentiated penal provision. These also cover attaching civil liabilities linked to the amount of gain made by contravening the law.</p> <p>Similarly, the Indian Penal Code (IPC) has also identified different categories of offences and defined level of punishment for each category of offence.</p>

Once the amendments to the Act are in place, a new set of rules may be notified under the Act. The key aspects that would be covered under the rules are presented in Figure 2 below:

Figure 2: Proposed structure of the Rules



4.2 Options for institutional framework

The approach for an institutional framework begins by identifying activities under the 14-step framework and identifying the competent authority for undertaking the activity. In the first instance, all activities are allocated to existing institutions that are best placed to undertake such activities. If it is a new and unrelated activity, then an assessment is made whether an existing institution can be provided the role and responsibility or whether a new entity may be required. The approach is to minimize creation of new institutions and authorities for two reasons – (a) co-ordination between new and existing institutions may be inefficient, (b) creating new institution and authorities will need to incur extra administrative and establishment costs.

Remediation program will be significantly different from enforcement, particular in the context of orphan sites (site owner is not a responsible person/polluter) or sites involving multiple

parties as that will require significant co-ordination and co-operation between different entities. SPCBs have been the enforcing agencies under other Acts and some SPCBs have caused polluters to clean-up contamination thereby gaining supervision experience. Currently SPCBs are actively involved in remediation in the two pilot states. SPCBs can be supported through program management units if a particular skill or number of people required is on a temporary basis. The choice of developing or hiring capabilities for execution will depend upon the number of contaminated sites (current or in future). Further, SPCBs will certainly require support from the state governments, particularly in matters related to site access, site use, cost recovery, etc.

The central government can delegate specific powers to existing entities supported by appropriate institutional capacity to carry out the tasks. This has been used by the central government under Section 23 of the Act to delegate specific powers (for example, delegation of power under Section 5 to state governments). On the other hand, there are instances in India where section 3(3) authority has been set up to run specific programs (some of them national), e.g. Central Ground Water Authority, the Loss of Ecology (Prevention and Payments of Compensation) Authority, the Dahanu Taluka Environment Protection Authority, etc. For having multiple section 3(3) authorities in the states, there is a precedence in Ganga Action Plan where at the centre National Ganga River Basin Authority has been notified under section 3 (3) of the Act as the planning, financing and coordinating body of the centre and states. In the five NGRBA programme states, under section 3(3) of the Act, State Ganga River Conservation Agencies are notified as the apex decision making body in the states.

An examination of the activities and the likely entities that may be made responsible shows that there are certain activities that may require consideration of whether powers should be delegated to existing institution or setting up a new section 3(3) authorities. The activities are:

- i. Notify certain categories of land owners under certain circumstances to submit preliminary assessment reports;
- ii. Issue notification restricting site access and activities, as required; de-notify the site when remediation is completed;
- iii. Levy fine on responsible persons/polluters for having caused contamination at site, for not complying with orders or directions; and
- iv. Approval of remediation option and remediation costs to be funded through central / state funds (for orphan sites and where the responsible person/polluter is unable to pay).

Section 20 of the Act allows central government to require any person to submit report, return, statistics, accounts and other information. This power may be used (and delegated as appropriate) to require certain category of land owners under certain circumstances to submit preliminary assessment reports. Receiving and reviewing additional information as envisaged in point (a) above may not require a new institution / authority. Considering that remediation of contamination of site will have strong local context, the issue of site access and regulating land owners should fall in state's jurisdiction (any other authority will also have to work through state departments) and SPCBs are already engaged in activities restricting access, point (b) above is unlikely to require a separate authority and can be dealt with strengthening the legal provisions, institutional framework and closer monitoring of activities. However, since land is a state subject hence the state land and land revenue department may have to be involved while notifying a site. Consequently, SPCBs may be delegated as a competent authority for carrying out (a) and (b) in consultation with the state government.

The issue of having a civil administrative adjudication system for levying fines, assessing liability parties, assessing cost of remediation, etc. that addresses point (c) above goes beyond fines relating to remediation as it relates to all types of fines and penalties for contravening the law and not following orders, directions, etc. This is certainly needed to shorten the time for levy of penalty which otherwise has to be routed through courts. The only exception is a provision under HW Rules in rule 23 where SPCB in consultation with CPCB can levy fine. CPCB at the centre and SPCB in the states are logical choice for being entrusted with civil administrative adjudication powers for levy of fine and penalty with appropriate institutional strengthening, rules and procedures and under the supervision of central / state government as required. The other option would be to appoint an appropriate person in each state environment department and in MoEFCC as adjudicating officers for all matters relating to fines and penalties under the Act. Creating a separate national level and state level regulatory authority only for the purpose of levy of fine may not be appropriate.

Approval of the remediation option will require a balancing of the cost of remediation with the choice of restoring the site to its pre-contamination level (and relatively less site use restriction and monitoring post remediation) or restoring the site to appropriate land use level (and potentially more site use restriction and monitoring post remediation). It is a matter of policy (and regulation) that balances use of public funds, achieving public health and environment objectives and increasing utilization of a scarce resource like land. Further the policy choices will need to be exercised in each case of remediation of contaminated site as the situation and circumstances can vary significantly. The matter of policy will need to be carried out by the central government / CPCB and state governments / SPCBs.

SPCBs are currently carrying out several responsibilities under the Environment (Protection) Act, Air Act and Water Act and rules under these acts and hence there is a possibility of over burdening the SPCBs. Further, most of the work carried out by SPCBs involve compliance monitoring, sampling, testing etc and does not involve identification of contaminated sites, maintaining computerized database of sites, notification of land, identification of responsible persons, recovery of cost from responsible persons, actual site remediation, etc. These activities will need new skills and capabilities. Task 1 review of Assignment 3 reveals with respect to infrastructural capacity, almost all the SPCBs reviewed have i) inadequate laboratory infrastructure – all the regional offices do not have regional laboratories ii) current staff numbers below (sometimes significantly below) the sanctioned staff strength.

Adequate institutional capacity including project management support will need to be provided to the SPCBs. Technically competent staff in engineering, hydrogeology; computer database management, project management finance and accounts, etc. will be required. The requirement will vary from state to state depending on the nature and number of contaminated sites.

The competent authority should have the required skill set mix and manpower strength to supervise/execute a remediation project. The required skill sets and manpower strength can also be supplemented through the accreditation guidelines of third parties for preliminary assessment, remedial investigation, DPR preparation, remediation works, monitoring and evaluation, etc.

So far as the manpower strength is concerned, review of international practices reveal that on an average, about 20 qualified remediation experts of different level of experience (junior, senior and support staff) are required per site per day for a small site of area less than 1000 m², about 140 experts per day per site for a medium site of area in between 1000 to 100,000 m² and about 400 experts for sites with area greater than 100,000 m². Amongst the experts 60% are engineers- civil, chemical etc, around 20% are geologists and the rest 20% are mix of biologists, chemists, geographers, hydro-geologists, microbiologists, and industrial technicians or technologists . The requirements of capacity enhancement would depend on

factors like the size of the inventory, size of the sites in the inventory, number of sites requiring urgent remediation etc. Based on these factors, it may be decided if the competent authority should have all these skill sets in-house, be supported by a long term project management unit or outsource specific work to accredited third parties.

4.3 Options for financial framework

Remediation involves significant fund requirement. At this stage, it is difficult to determine the extent to which the responsible persons can be identified or have the ability to pay. International experience shows primarily public funded remediation programs at one end to primarily private financed remediation programs at another end.

Insurance market may develop to offer products that cover liability of remediation. Insurance market may also develop for orphan site owners and occupiers, i.e., where the site owner or occupier has not contaminated the site.

The other potential source of funding could be potential increase in the value of contaminated land post remediation. In case of orphan sites or sites where responsible person cannot pay necessitating use of public funds, the potential increase in the value of land may be captured by a voluntary party (potential a developer) who can potentially enter into agreement with non-liable owner of site, pay for remediation and put the remediated site to appropriate use. In the absence of a voluntary party, the competent authority can offer to buy the land from the non-liable owner at the estimated value of land less the cost of remediation. In case that is not feasible, the competent authority can raise a demand on the land owner post-remediation based on a valuation of the increase in land value, subject to a maximum of the amount of public fund used.

Identification of responsible persons and making them pay for remediation might be time consuming hence to address these situations it is necessary to allocated a separate fund for specific use in case of urgent remediation. The key sources of public funds are – (i) appropriation from existing fund like the National Clean Energy Fund (ii) levy of new cess (iii) central and state budgetary support (v) fines and penalties collected by SPCBs (vi) grants.

Funding from National Clean Energy Fund has been obtained to the extent of Rs 60 crores for preparing DPR for 12 sites. Further financing may be approved where public funding required does not exceed 40% of the project cost and provided no other public funding sources are used, based on the requirement of funding projects under the National Clean Energy Fund.

At this stage, there are no estimates available on the cost of remediation program or the amount of money that can be recovered from responsible persons. On the assumption that public funding will be required for half of the cost of remediation program but in the initial years (first 5 – 6 years), public funding will be required for full cost of remediation before recovery of cost becomes significant.

For reference, the collection of education cess, cess administered by revenue authorities, central excise collections made by industry category and state electricity duty in the last 2 years is set out in Table 7 below³.

³ Tax Revenue: Actual collection figures available for 2011-12, 2012-13

Table 7: Types of cess and amounts collected in last 2 years

Cess	Applied through	Collection in 2010-11 (INR Crores)	Collection in 2011-12 (INR Crores)
Education Cess	Corporation tax	8627.57	9661.30
	Income Tax	5125.05	4803.40
	Customs	3130.76	3459.31
	Union Excise Duties	3072.70	3273.22
	Service Tax	1378.95	1873.17
Clean Energy Cess	Union Excise Duties	1066.46	2579.55
State Electricity Duty	Consumption on electricity consumption	8,136	9,128

Levy of new cess can take three forms (or a combination of these):

- Cess on income tax and corporate tax (similar to education cess): At the current levels, the amount of cess for remediation can be set at 10% of the education cess. The underlying premise is that contaminated sites cause public health issues and damage to environment. The activities that can potentially cause contaminated sites produced goods and services that are utilized throughout the economy. Both point to levy of cess across the spectrum of economic activities.
- Central Excise cess on hazardous waste generating industries (similar to Clean Energy cess): At the current levels, the cess for remediation will need to be set at 75% of the clean energy cess to gather sufficient resources. Cess can also be levied on identified activities that generate hazardous waste or handle hazardous substance. International experience (e.g., CERCLA) point to cess levied on chemical and petroleum industries. An examination of the excise collection by categories of hazardous waste generating industries will need to be made to assess the level of cess.
- State cess on turnover, electricity consumption, etc. (similar to the Green Cess levied in Gujarat): State level cess is based on the premise that land (state subject) is a scarce resource and needs to be put into productive use, in addition to addressing public health issues and environment damage concerns. Cess or tax on sale or consumption may be levied based on legislation enacted by the state legislature. At the current levels, the amount of cess for remediation can be set at 20% of the state electricity duty. This is an overall average figure and may vary from state to state as it is possible that states which collect significant electricity duty may not have contaminated sites (in proportion) or vice versa.

The above options are discussed with MoEFCC, technical experts, CPCB and SPCBs for finalization of the legal, institutional and financial framework of the National Program in Task 4 of Assignment 3 which are presented in the next chapter.

For further details on the suggested options, please refer to Task 3 report of Assignment 3.

5 National program framework

5.1 Need for National Program

Areas polluted by toxic and hazardous substances that pose a risk to human health, environment, flora and fauna are commonly referred to as contaminated site or polluted site. Polluted sites may include production areas, landfills, dumps, waste storage and treatment sites, mine tailings sites, spill sites, chemical waste handler and storage sites. These sites may be located in residential, commercial, agricultural, recreational, industrial, rural, urban or wilderness areas.

The ongoing study under CBIPMP has identified an initial inventory of 320 sites across the states, out of which 204 sites are probably contaminated. Site investigation of 100 probably contaminated sites has recently been concluded and the results are being analysed to confirm whether they are contaminated and require remediation. International experience shows that the inventory of sites grows significantly compared to the initial inventory once standards are defined, institutional capacities are built and identification processes are strengthened.

Remediation of polluted sites currently lacks a comprehensive legal, regulatory and financial framework and suffers from weak institutional capacity. Legacy contamination from before the enactment of Act and before the notification of hazardous waste management rules pose challenge in identification of the responsible persons (polluters) for undertaking remediation and paying for remediation costs.

Sporadic efforts at tracking hazardous waste and inventorying hazardous waste dump-sites, lack of expertise in remediation related activities, absence of a comprehensive remediation framework and overburdened and underfinanced SPCBs make the task of remediation particularly challenging. Further, extremely low level of fines and penalty under the Act, lack of adequate TSDFs, perceived high cost of treatment and disposal of hazardous waste, presence of large number of small and medium enterprises and informal sector engaged in hazardous activity pose significant challenge in preventing ongoing contamination.

International experience shows that remediation is complex and expensive process. High remediation costs have prompted national governments to shift their original approach of complete removal of hazardous substance and focus on remediating appropriate to the site use. Implementing polluter pays principle has understandably been litigious. The use of public funds for remediation when polluters cannot be identified or do not have sufficient resources to pay has raised the debate of tax-payers versus polluters financing remediation.

Remediation activities in India so far have been largely enforced through the judicial process. There have been just few instances where SPCBs have ordered clean-up of polluted sites that were located in industrial estates. T.S.R. Subramanian Committee that reviewed various environmental legislations of the country, in their report of November 2014, strongly recommended insertions of enabling provisions in the Act that would empower the central government to generate public funds for remediation through levy of cess and take over polluted sites to carry out remediation through state governments and/or through public private partnerships. The report also highlighted the need for a robust institutional mechanism and emphasized on inclusion of institutional and financial mechanisms for remediation of polluted sites in the regional development policies.

A comprehensive national program covering policy, legal, regulatory, institutional and financial aspects is urgently needed to address the growing problem of polluted sites.

5.2 National Program objectives

The National Program aims to:

- (i) eliminate or minimize threat to environment, flora and fauna and human health and safety caused by existing or threatened discharge of hazardous substance
- (ii) achieve sustainable reuse of polluted sites by focusing on efficient and if required alternate use of land resource and wellbeing of local communities, taking into consideration any temporary or permanent relocation
- (iii) ensure that polluter bear the responsibility of remediation and all costs, claims and compensation related to remediation
- (iv) proactively identify polluted sites, investigate each and every identified site and where contamination exists, remediate the site and where contamination cannot be fully removed, employ post remediation measures and site restrictions

5.3 National Program strategy

The strategy for National Program is premised on the following:

- (i) ***In the short term***, use appropriate provisions of the existing legal framework to take immediate measures on the polluted sites already identified Assignment 1 , recover remediation cost from the polluters and bring in additional conditions in the environmental clearance and consent procedures to any industry to prevent future contamination
- (ii) ***In the long term***,
 - a. strengthen the legal and regulatory framework to enforce *polluter pays* principle, *precautionary* principle and *sustainable development* principle
 - b. usher civil liability regime and administrative adjudication, revise fines and penalties to act as effective deterrents, allow imposition of financial securities for securing performance and minimize the use of public funds
 - c. establish standards and enforcement procedures and follow flexible and enforcement led approach to remediation and significantly upgrade the information and knowledge base on polluted sites
 - d. build significant institutional and infrastructure capacity to deal with the complex issues in remediation and leverage internal and external expertise
 - e. emphasise the participatory role of State Government in remediation where it relates to land and land use related matters and local community issues including temporary or permanent relocation of site occupiers
 - f. secure sufficient and dedicated public funds to finance upfront investigation and design costs and meet financing gaps in remediation

5.4 Outcomes of National Program

The expected outcomes of the National Program, once the legal, regulatory and financial mechanisms have been established and the national program has been rolled out, are as follows:

- (i) A national inventory of sites is prepared and updated on a regular basis
- (ii) Any site in the inventory is assessed and investigated within 3 months from the date of identification or a petition received
- (iii) A polluted site is notified and accorded appropriate priority for remediation within 6 months from the date of determination that such site is a polluted site
- (iv) A polluted site is scheduled for commencement of remediation within 12 months of such polluted site being included in the priority list of sites for remediation
- (v) Polluters remediate polluted sites and pay for all costs in more than 75% of remediation cases
- (vi) More than 90% of remediated sites are put to productive reuse within 2 years of completion of remediation and post remediation measures.

5.5 National Program framework and measures

There are a number of measures that would need to be incorporated under the National Program. These are described below.

Policy measures: The Central Government would establish policy on remediation that balances use of public funds, achieves environmental and human health objectives and encourages efficient utilisation of scarce land resource. The State Government would provide support in encouraging productive reuse of remediated sites.

Legal and regulatory measures: This would be divided into short term and long term measures. Short term measures will be based on existing environmental legislations to take immediate action on the polluted sites identified in Assignment 1 through issuance of appropriate notifications to delegate authorities to Central and State Pollution Control Boards for planning and execution of remediation, recover the cost from the polluters and issue technical guidelines.

In the short term appropriate measures would be taken towards prevention of future contamination through inclusion of provisions under consent conditions, Terms of Reference for Environmental Impact Assessment, Hazardous Waste Authorisation for technology consideration, periodic monitoring to prevent future contamination.

In the long term, appropriate amendments to existing environmental legislations along with new remediation related legislation (new Remediation of Polluted Site rules) would be necessary to define the standards of contamination, establish and enforce a duty-to-report regime to expand the knowledge base of polluted sites and determination of persons responsible for remediation. The determination of responsible person would also lead to determination of violation of the Act and rules that led or contributed to contamination. A civil liability regime would be introduced and administrative adjudication would be provided. The provisions of administrative adjudication and civil liability are present in a number of instances

in India. Administrative adjudication is increasingly being used in India ranging from nuclear damage, electricity regulations, oil & gas regulations, information technology regulations, securities regulations, etc. An order or direction consequent to administrative adjudication would be subject to the appeal under the NGT Act. Fines and penal provisions would be strengthened. The regulatory framework would follow flexible and enforcement led approach to remediation, i.e., all efforts would be made to find the person responsible for contamination and direct the person to carry out remediation related activities. Voluntary remediation would be provided where a discharge has occurred but contamination thresholds are not reached to encourage early action and prevent threats to human health, environment, flora and fauna.

Institutional measures: Detailed step-by-step remediation process and technical guidance on methodologies, tools and techniques would be developed for agencies engaged in remediation related activities.

In the short term it would be a state-led remediation mechanism where a committee comprising State Board, District Collector, and Central Ground Water Board in line with NGT rule 37 may be established at the states for supervision of activities. Role of private and public sector organisations in remediation process would be emphasised and encouraged through establishing criteria for engaging third parties and international expertise would be leveraged to develop local expertise. Suitably qualified staff should be retained for program management and remediation implementation. General public would be informed about polluted sites, hazards of contamination and safety precautions. Local communities would be engaged in the remediation process. A program for research and development on remediation techniques would be undertaken to develop India specific remediation techniques. Public health authorities and research institutions would be engaged to develop response to health hazards relating to contamination.

In the long term, the roles and responsibilities of authorities, including establishing a new central authority for remediation of polluted sites under section 3(3) of the Act, with regional offices in the state would be defined and appropriate capacity development programs would be planned and implemented to enable the authorities to discharge their responsibilities.

Financial measures: *In the short term* a trust fund like Clean Ganga fund that utilizes money for Corporate Social Responsibility (CSR) for remediation purposes would be set up. Revoking Bank Guarantee from the polluters in the event of detection of pollution would be an important instrument for cost recovery for remedial measures in the short term.

In the long term, the financial mechanism would involve creation of a public fund called the National Environmental Restoration Fund and setting up a mechanism through cess for financing. The fund would be used for remediation related activities. Enforcing cost recovery from responsible persons would ensure replenishment of the fund. Over the medium term, the insurance market would be encouraged to develop products suitable for polluted sites.

Site inventory: The information base on sites would be developed by preparing initial site inventory, keeping information updated throughout the remediation process, prioritizing polluted sites and developing information base for identification of polluted sites on an ongoing basis.

The options for short term and long term are summarised in the tables 8, 9 and 10 below:

Table 8: Options for legal mechanism

Timeline	Options	Reason
Short term	<p>Issuance of appropriate notifications to delegate authorities to Central and State Pollution Control Boards under relevant sections of the E(P) Act for carrying out remediation activities at national and state levels as per the following:</p> <ul style="list-style-type: none"> • <i>Under section 3(2)(ii)</i> of the Act for planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution in the state (to the SPCB) and at the national level (to the CPCB); • <i>Under section 5</i> of the Act for issuing directions relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental pollution in the state (to the SPCB) and at the national level (to the CPCB); <p>The technical guidelines for remediation prepared under Assignment 2 would be notified by the Central Government in exercise of its power under <i>section 3(2) (xiii), 6 and 25</i> of the Act.</p>	<ul style="list-style-type: none"> • Short term measures will be based on existing provisions of the E (P) Act to take immediate action on the polluted sites identified in Assignment 1. • Landmark Supreme Court judgements (e.g. Indian Council For Enviro-Legal & Ors vs Union Of India And Ors on 13 February, 1996) have clearly stated that Sections 3 and 5 of the E(P) Act, sufficiently empower the Central Government (or its delegates) to make all such directions and take all such measures as are necessary or expedient for protecting and promoting the `environment', which include directions for: <ul style="list-style-type: none"> ○ undertaking remedial measures ○ the power to impose the cost of remedial measures on the offending industry and ○ utilize the amount so recovered for carrying out remedial measures <p>Hence, notifications under section 3 and 5 of the E (P) Act may be issued for expediting remediation activities in the short term.</p>
Long Term	<p>Amendment of E(P)Act to:</p> <ol style="list-style-type: none"> (i) Include specific aspects of "remediation" under the Act <ul style="list-style-type: none"> • Define remediation under section 2 • Bring the aspect of planning & execution of remediation under section 3(2) • Add the provision for issuance of standards and procedures specific to remediation section 6 (ii) Include the concept of "liability" under the Act <ul style="list-style-type: none"> • Define polluter pays, precautionary principles and sustainable development principles as section 2 (xiii-c) • Introduce the concepts of absolute, retroactive liability as section 15 A (iii) Increase the penalty limit under section 15 (iv) Include the concept of "civil adjudication" under the Act <ul style="list-style-type: none"> • Provide Civil court power to an authority formed under section 	<ol style="list-style-type: none"> (i) E (P) Act in its current form does not recognise remediation as a distinct activity hence it may be defined in the amended Act. (ii) The concept of liability is not explicitly defined in the existing E (P) Act which may be included as a part of the amendments. (iii) The existing penalty limit under the E (P) Act is not adequate to act as a deterrent for wrong doers hence may be increased. (iv) Civil adjudication is increasingly being used in Indian legislations to expedite the process of decision making compared to that taken by a criminal prosecution. The Supreme Court and the NGT in several of their judgements have referred to "remediation of environmental damages" as a compensatory (and not penal) activity hence it is logical to embed civil adjudication process as a part of decision making in matters related to remediation. (v) Historically, there have been disputes over the extent of power the Central Government (or its delegate) has to impose remediation cost on the responsible parties and to recover the cost in terms of securitisation of assets in

Timeline	Options	Reason
	<p>3(3) of the Act under Code of Civil Procedure, 1908</p> <p>(v) Include specific powers to direct under section (5) of the Act to:</p> <ul style="list-style-type: none"> • Impose remediation cost and compensation for environmental damages • Create mortgage and hypothecation over assets, property, land and building for securing compliance • Impose site restrictions and take over site control for remediation 	<p>case of failure of payment by the responsible parties. Most of these disputes were ultimately settled by the Supreme Court. To avoid this ambiguity and expedite the process of cost recovery, section 5 of the E (P) Act needs strengthening.</p>
	<p>New rules for remediation of polluted sites- Remediation of Polluted Sites Rules, 20XX notified under the amended E(P)Act</p>	<p>The Rules are meant for delineating the regulatory procedures specific to remediation as per the amended provisions of the E (P) Act.</p> <p>The rules will contain all the regulatory procedures to be followed for identification and notification of a polluted site, identification of responsible parties and cost recovery, execution of remediation investigation and remediation of a polluted site and post remediation activities. It will also contain all the forms/templates to be used for different purposes.</p>

Table 9: Options for institutional mechanism

Timeline	Options	Reason
Short term	<ul style="list-style-type: none"> • A state-led remediation mechanism with State Government as the nodal agency • Formation of a state level committee comprising Member Secretary of the State Pollution Control Board, Director Public Health of the State Government, District Collector, advisors from Central Ground Water Board and Academia (such as agencies like NEERI, civil engineering departments of universities, agricultural universities etc.), and a representative from MoEFCC for assessment of environmental damages and supervision of remediation activities in a state. 	<p>In a number of instances the NGT directed the formation of similar committees in line with NGT rule 37 for assessing damage and carrying out remediation activities.</p> <p>It is both expedient and appropriate to align the institutional arrangement of the National Program with that envisaged in the NGT rule 37 and contained in various judgments of the NGT and to follow a state-led remediation program in the short term.</p>
Long Term	<p>Setting up a central, quasi-judicial authority notified under section 3(3) of the amended E (P) Act (proposed to be called Remediation of Polluted Sites Authority) for overall supervision of the National Program. Regional offices of the authority may be there to monitor remediation activities in a state and report to the central authority.</p>	<p>A central authority notified under section 3(3) of the E(P)Act will be empowered with section 3 and section 5 powers of the amended E (P) Act which means:</p> <ul style="list-style-type: none"> • It will have the same powers as are vested in a civil court under the Code of Civil Procedure, 1908 for determining and imposing

Timeline	Options	Reason
		<p>remediation cost, environmental damages and liability for non-compliance.</p> <ul style="list-style-type: none"> • It will have the power to encash bank guarantees and take over securitised assets in case of failure of payment of remediation cost/liability. • Possess, control and manage a polluted site for remediation. <p>While all their judgements are appealable at NGT, presence of a powerful central authority will expedite the process of cost recovery for remediation.</p>

Table 10: Options for financial mechanism

Timeline	Options	Reason
Short term	<p>(i) Setting up a trust fund to remediate a site and improve the quality of environment within a state or at a national level. Contributions could be sought from industrial units and service sector organizations. The fund may be utilized for remediation related activities for orphan sites having non-industrial use, i.e., in villages, agricultural land, water bodies and urban residential areas.</p> <p>(ii) Encashing bank guarantee for recovering cost of remediation of environmental damages</p> <p>(iii) Utilization of provision of section 9 of the E(P)Act by which costs incurred by public authorities for remedial measures may be recovered as Arrears of Land Revenue from the person concerned</p> <p>(iv) Waste exchange between industries where the waste from one industrial process can be reused as a fuel or as a raw material in another industrial process</p> <p>(v) Public Private Partnership (PPP) models</p>	<p>(i) As the Clean Ganga fund that successfully utilises CSR money for remediation purposes, similar trust fund may be set up for remediation of orphan sites.</p> <p>(ii) In several judgements (e.g. State Pollution Control Board, Odisha Vrs. M/s Patnaik Steel & Alloys Ltd. & Ors. APPEAL NO. 69 OF 2012 State Pollution Control Board, Odisha Vrs. M/s Swastik Ispat Pvt. Ltd. APPEAL NO. 68 OF 2012), NGT has upheld the use of bank guarantee for environmental compensation and restoration purposes. Hence this mechanism may be followed as a short term measure.</p> <p>(iii) Though Section 9 of the E (P) Act may be interpreted as applicable only for accidental releases, as per the Supreme Court judgement in the Oleum Gas Leak case it may be concluded that remedial measures as envisaged in section 9 of the Act should apply, in all situations that led to discharge of environmental pollutants, irrespective of how it was caused. Hence Arrears of Land Revenue will also be applicable for remediation of sites polluted by negligence or wilful act of the responsible party.</p> <p>(iv) Wherever possible, co-processing of hazardous wastes for use as a supplementary resource, or for energy recovery is considered as a preferential mechanism over disposal in the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the approval mechanism has also been streamlined. This becomes a win-win situation for hazardous waste generators</p>

Timeline	Options	Reason
		<p>when the waste can be reused for a commercial purpose and future pollution can be prevented.</p> <p>(v) Similar to the development of PPP models between state development authorities and private parties such as Ramky Enviroe Engineers Limited, for setting up Common Hazardous Waste Treatment, Storage and Disposal Facilities in West Bengal and other states, models may be developed for remediation of sites especially where post remediation the land can be used for commercial purposes.</p>
<p>Long Term</p>	<ul style="list-style-type: none"> • Public fund for orphan sites: <ul style="list-style-type: none"> (i) Creation of National Environmental Restoration Fund under section 8A of the amended E(P)Act (ii) Levy 2% cess on duty of excise on activities involving hazardous substances –e.g., crude and petroleum, cement, Chemical, plastics, pharmaceuticals, Raw hide, leather, pulp, paper, textiles, Metals (ferrous, non-ferrous), electrical and non-electrical machinery, motor vehicles & others • Cost recovery mechanisms from polluters <ul style="list-style-type: none"> (i) Identification of responsible parties and assessment of capacity to pay (ii) Recover cost from site owner/buyer based on increased land valuation post remediation (iii) Develop insurance market for: <ul style="list-style-type: none"> ○ Innocent land owners against illegal dumping ○ Innocent land owners who may have become responsible solely on account of migration of contamination ○ parent companies who sub-contract hazardous activity 	<p>(i) National Environment Policy, 2006 recommends creation of a National Environmental Restoration Fund. Hence this may be included as a part of the amendments of the E(P)Act</p> <p>(ii) Collection of proposed cess will contribute to the Fund created under the amended E(P) Act</p> <p>(iii) The primary mechanism of cost recovery will be from polluters where the polluter is identifiable and has the capacity to pay</p> <p>(iv) If there is a gain in the land value post remediation where the land may be reused for commercial purposes or by real estate builders, cost may be recovered from the current owner (who will benefit from selling the land to the buyer at an incremental value) Or the future owner (e.g. buyer who will use the land commercially).</p> <p>(v) Insurance market may be developed once remediation becomes an established activity in India and the nature of risks and liabilities in context of remediation is better understood.</p>

For further details on legal, institutional and financial frameworks of the National Program in short and long term please refer to Task 4 report of Assignment 3.

5.6 Additional measures

Outside the National Program, there are two key measures that would need to be implemented to reduce the occurrences of polluted sites. In order to reduce the occurrences of polluted sites, the National Hazardous Waste Management Strategy would need to be effectively implemented including measures relating to tracking hazardous waste, establishing additional TSDF capacities and strengthening the infrastructure of regulatory bodies. It is essential to create a time bound plan and annual reporting on its implementation to establish suitably located and sufficient number of TSDFs appropriate to the level of hazardous waste generation (over the next 10 years) in each of the states where hazardous waste is generated. The processes and systems to track in real time, hazardous waste handling and management in the states would need to be strengthened and the results of such tracking would need to be effectively used in granting (or refusing) consents and authorisations to existing operations. Monitoring and supervision of hazardous waste generation transport and disposal by small and medium enterprises and informal sector would need to be strengthened.

Further, there is an urgent need to strengthen the overall institutional and financial capacity of CPCB and SPCBs so that there is sufficient capacity available for discharge of their roles and responsibilities under various acts, rules and notifications. Weak institutional capacity may otherwise impact the SPCBs' capacity to prevent occurrences of polluted sites in future or reduce ongoing contamination.

5.7 Contamination covered under National Program

There are a number of areas that may overlap with the National Program including contamination caused by different types of waste and co-mingling of different substances, situations involving other agencies (e.g., disaster and accidents) and interplay with ongoing schemes involving rehabilitation and remediation (e.g., river and lake cleaning schemes). It is necessary to clarify the scope of National Program with respect to the actual or anticipated overlap and some of these aspects are set out below.

5.7.1 Substances covered

The National Program applies only to sites contaminated by hazardous substances that will be notified by the Central Government in relation to soil standards under sub-section 2(a) of section 6 of the Act. If there is a co-mingling of hazardous substances covered under the National Program with nuclear waste, the provisions of the Atomic Energy Act, 1962 (33 of 1962) would apply irrespective of the level of contamination by hazardous substance.

If there is co-mingling of hazardous substances covered under the National Program with mining waste, bio-medical waste, municipal solid waste, plastics, e-waste and battery waste, then unless the level of contamination by hazardous substance exceeds the threshold specified and then only to the extent of removal of hazardous substance would be covered under the National Program. The cost of removal of other types of waste or removal of hazardous substance below the threshold specified in the National Program would not be covered.

5.7.2 Disaster and accidents

If there is a disaster or accident that involves hazardous chemicals, the provisions of ensuring chemical safety would apply and the remediation process would be initiated after the safety measures have been completed.

5.7.3 Interaction with initiatives on cleaning water bodies

The ongoing programs on river conservation should not influence or be influenced by the National Program. However, lakes that are contaminated by hazardous substances (covered under the National Program) may be covered provided they meet the criteria set out under the National Program. Oil spills would be governed by the Merchant Shipping Act of 1958, the Marine Insurance Act of 1963 and the Merchant Shipping (Prevention of Pollution of the Sea by Oil) Rules, 1974.

6 Implementation Plan

6.1 Short Term Implementation ⁴

Table 11: Timeline for implementation of various measures for short term legal framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
<p>A notification by the Central Government to delegate its authority under the following sections of the Environment (Protection) Act , 1986 (“Act”):</p> <ul style="list-style-type: none"> Section 3(2)(ii) of the Act for planning and execution of a nation-wide programme for the prevention, control and abatement of environmental pollution in the state (to the State Pollution Control Board or “SPCB”) and at the national level (to the Central Pollution Control Board or “CPCB”); Section 5 of the Act for issuing directions relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental pollution in the state (to SPCBs) and at the national level (to CPCB); Section 20 of the Act to require any person, State Government or authority to furnish 	6 months from the date of approval of National Program by MoEFCC ⁵	MoEFCC	<ul style="list-style-type: none"> Drafting the notifications Obtaining necessary approvals Publication of notification in the Gazette of India 	<p>Law Consultant - 1</p> <p>Scientist of Hazardous Substance Management (HSM) Department – 0.25</p> <p>Project Director of NPRPS- 0.1</p> <p>Administrative Officers- 2</p>	0.20 ⁶

⁴ Please note all estimates on timeline, staff month and costs are tentative and indicate a broad range

⁵ All timelines from hereon are considered from the date of approval of the National Program by MoEFCC

⁶ The estimate includes consultant’s fee, administrative overheads, salary proportions of Ministry staff, cost of workshops/consultations etc.

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
information relating to any and all aspects of the nation-wide programme for prevention, control and abatement of environmental pollution (to the SPCBs).					
Notification of a separate set of rules called "Contaminated Sites (Identification and Management) Rules, 20xx" issued under section 3(2)(iii), 6(2)(a) and 25 of the Act that provides for standards for soil and water pollution, carrying out mandatory site assessment and reporting, determination of a contaminated site and related matters.	12-15	MoEFCC	<ul style="list-style-type: none"> • Drafting the notifications • Incorporating comments (from Ministry of Finance, Prime Minister's Office, Public Stakeholder Consultations) • Obtaining necessary approvals • Drafting cabinet note • Publication of notification in the Gazette of India 	Law Consultant - 6 Scientist of HSM Department – 1 Project Director of NPRPS- 0.5 Procedural activities by Administrative Officers- 6	1.50 ⁶
Adoption of a procedure manual called "Enforcement Policy (Contaminated Sites)" by the State Governments that would cover various aspects relating to polluters, remediation costs, apportionment of costs, actions to be taken by various government authorities, directions to be given, co-ordination amongst government authorities, linkages with existing consents, clearances and authorizations.	8-10	CPCB MoEFCC	<ul style="list-style-type: none"> • Drafting the procedure manual • Stakeholder consultations • Obtaining and incorporating review comments Notification of the procedure manual	Technical Consultant – 3 Senior Environmental Scientist at CPCB- 0.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	0.80 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Notification of the technical guidelines for remediation prepared under Assignment 2 by the Central Government in exercise of its power under section 3(2) (xiii), 6 and 25 of the Act.	8 -10	CPCB MoEFCC	<ul style="list-style-type: none"> • Finalising the technical guidelines • Obtaining necessary approvals • Stakeholder consultations • Notifying the technical guidelines 	Senior Environmental Scientist at CPCB- 0.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	0.20 ⁶
<p>Inclusion of conditions on periodic site assessment and budgeting for prevention technology in the following:</p> <p>a) Consents under section 25 and 26 of the Water Act, 1974</p> <p>b) Environmental Clearance under the Environment Impact Assessment Notification 2006,</p> <p>c) Authorisation under rule 6, permission for import of hazardous waste under rule 13 of HW Rules</p>	12-15	MoEFCC	<ul style="list-style-type: none"> • Drafting amendments • Obtaining necessary approvals • Stakeholder consultations • Notifying amendments the 	Law Consultant - 3 Scientist HSM Department – 0.5 Project Director of NPRPS- 0.1 Administrative Officers- 6	1.50 ⁶

Table 12: Timeline for implementation of various measures for short term institutional framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Notifying the State Government Department of Environment as the Nodal Agency for a short term state led remediation program in states where most of the polluted sites identified under Assignment 1 are located - Uttar Pradesh, West Bengal, Orissa, National Capital (Delhi), Karnataka, Gujarat, Jharkhand, Tamil Nadu, Kerala, Andhra Pradesh and Punjab.	5-6	MoEFCC	<ul style="list-style-type: none"> Drafting and publication of the notification 	Law Consultant - 1 Scientist of HSM Department – 0.2 Project Director of NPRPS- 0.05 Administrative Officers- 3	0.20 ⁶
Formation of a committee comprising of the SPCB, District Collector, Central Ground Water Board and other relevant academia for assessment of contamination, review of reports of remediation investigation, Detailed Project Report (DPR), monitoring progress of remediation implementation, review of post remediation plan under the supervision of the Nodal Agency in the states mentioned above.	5-6	State Departments of Environment (DoE)	<ul style="list-style-type: none"> Procedures to set up the state level committee 	Environment Officer- 1 Law Officer- 1 Senior Environment Officer – 0.5 Secretary – 0.2	0.20 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Empanelment, appointment of competent third parties for carrying out preliminary site investigation, remedial investigation, DPR, remediation of sites identified in the initial inventory (320) in Assignment 1	6-8	State Committee SPCB State DoE	<p>State Committee:</p> <ul style="list-style-type: none"> Review of Terms of Reference for the work Evaluation of technical and financial bids from interested third parties in a time bound manner Selection of competent third parties <p>SPCB:</p> <ul style="list-style-type: none"> Preparation of Terms of Reference for the work Contracting with competent third parties once selected <p>State DoE:</p> <ul style="list-style-type: none"> Supervision of progress of work 	<p>State committee- 2</p> <p>SPCB:</p> <p>Junior Environmental Engineer- 2</p> <p>Senior Environmental Engineer- 1</p> <p>State DoE:</p> <p>Chief Environment Officer- 0.25</p> <p>Senior Environment Officer- 0.5</p>	0.20
Commencement of DPR preparation for 39 sites found as polluted as per the site investigation conducted in Assignment 1 (out of 100 sites selected for preliminary site assessment and investigation in Assignment 1)	8-10	State Committee SPCB State DoE Third Party Consultant	<p>State Committee:</p> <ul style="list-style-type: none"> Supervision of progress of work Review and approval of DPR <p>SPCB:</p> <ul style="list-style-type: none"> Periodic on-site monitoring of third party work 	<p>Third Party Consultant- 18⁷</p> <p>SPCB:</p> <p>Junior Environmental Engineer- 2</p> <p>Senior Environmental Engineer- 0.5</p>	195 ⁸

⁷ The consultant's estimate is per site basis, other estimates for SPCB, State Committee, DoE are per state basis

⁸ Considering Rs 5 Crore/site for DPR preparation which includes consultant's fee plus other overheads in terms of work supervision, DPR evaluation etc.

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> • Regular follow up with third parties, state committee and DoE State DoE: <ul style="list-style-type: none"> • Intervene if there is any land related issue Third Party Consultant: <ul style="list-style-type: none"> • Carry out on-site work and report to SPCB on a timely manner 	State Committee: 3 State DoE: Chief Environment Officer- 0.1 Senior Environment Officer- 0.25	
Commencement of preliminary site investigation for rest 61 sites which could not be confirmed as polluted in Assignment 1 (out of 100 sites selected for preliminary site assessment and investigation in Assignment 1)	6-8	State Committee SPCB State DoE Third Party Consultant	State Committee: <ul style="list-style-type: none"> • Supervision of progress of work • Review and approval of preliminary investigation report SPCB: <ul style="list-style-type: none"> • Periodic on-site monitoring of third party work • Regular follow up with third parties, state committee and DoE State DoE: <ul style="list-style-type: none"> • Intervene if there is any land related issue Third Party Consultant: <ul style="list-style-type: none"> • Carry out on-site work and report to SPCB on a timely manner 	Third Party Consultant- 3 SPCB: Junior Environmental Engineer- 1 Senior Environmental Engineer- 0.25 State Committee: 1 State DoE: Chief Environment Officer- 0.05 Senior Environment Officer- 0.25	15 ⁹

⁹ An average of Rs 20 lacs per site is considered for onsite work plus administrative overheads

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Commencement of preliminary site assessment and investigation in the 220 sites identified as probably contaminated in Assignment 1 (which were not selected as a part of 100 sites for preliminary site assessment and investigation in Assignment 1)	8-10	State Committee SPCB State DoE Third Party Consultant	State Committee: <ul style="list-style-type: none"> Supervision of progress of work Review and approval of preliminary investigation report SPCB: <ul style="list-style-type: none"> Periodic on-site monitoring of third party work Regular follow up with third parties, state committee and DoE State DoE: <ul style="list-style-type: none"> Intervene if there is any land related issue Third Party Consultant: <ul style="list-style-type: none"> Carry out on-site work and report to SPCB on a timely manner 	¹⁰ Third Party Consultant- 3 SPCB: Junior Environmental Engineer- 3 Senior Environmental Engineer- 1 State Committee: 3 State DoE: Chief Environment Officer- 0.25 Senior Environment Officer- 1	50 ⁹
Commencement of remediation for 39 sites found as polluted as per the site investigation conducted in Assignment 1	12-15	State Committee SPCB State DoE	State Committee: <ul style="list-style-type: none"> Supervision of progress of work Review and approval of completion of remediation SPCB:	¹¹ Third Party Consultant- 100-120 SPCB: Junior Environmental Engineer- 6	2000 ¹²

¹⁰ The consultant's estimate is per site basis, other estimates for SPCB, State Committee, DoE are per state basis. State wise estimates may vary depending on the number of sites/state

¹¹ The consultant's estimate is per site basis, other estimates for SPCB, State Committee, DoE are per state basis. State wise estimates may vary depending on the number of sites/state

¹² On an average Rs. 50 Cr per site plus cost of supervision, administrative overheads

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
		Third Party Consultant	<ul style="list-style-type: none"> • Periodic on-site monitoring of third party work • Regular follow up with third parties, state committee and DoE State DoE: <ul style="list-style-type: none"> • Intervene if there is any land related issue Third Party Consultant: <ul style="list-style-type: none"> • Carry out on-site work and report to SPCB on a timely manner 	Senior Environmental Engineer- 2 State Committee: 6 State DoE: Chief Environment Officer- 0.5 Senior Environment Officer- 1 Junior Environment Officer- 2	

Table 13: Timeline for implementation of various measures for short term financial framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up a trust fund by the Central Government in similar lines with Clean Ganga Fund for utilizing CSR money for remediation purposes.	6-8	MoEFCC	<ul style="list-style-type: none"> Determining the fund characteristics (objective, purpose, source, size, administration etc.) Obtaining necessary approvals from Ministry of Finance (MoF) 	Law and Finance Consultants – 1.5 Scientist of HSM Department – 1.5 Project Director of NPRPS- 0.25 Administrative Officers- 2	0.30 ⁶
Budgetary allocation (by Centre and State) for carrying out initial activities (preliminary site investigation, DPR etc.) for the site inventory (320) identified as per Assignment 1 , training program, laboratory upgrade, outreach and communication, research & development	Next budget session – 6 months	MoEFCC State DoE MoF State Governments	MoEFCC & State DoE: <ul style="list-style-type: none"> Preparation of estimation of budgetary allocation required at centre and state Obtaining necessary approvals MoF, State Governments: <ul style="list-style-type: none"> Determination of state contribution Carrying out necessary procedures for budget allocation at Centre and State. 	Finance Consultant – 1.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.2 State DoE- 1.5 Administrative Officers – 2 (each at Centre and State)	0.30 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Developing procedures for (i) setting the amount of bank guarantees required for (a) normal course of business, (b) suspected pollution (ii) submission of bank guarantee by industries (iii) determining the conditions and situations for revoking bank guarantee from polluters	12-15 (as a part of the "Contaminated Sites (Identification and Management) Rules, 20xx")	CPCB MoEFCC	<ul style="list-style-type: none"> Drafting the procedures Obtaining necessary approvals Stakeholder consultations Notifying the procedures 	Junior Environmental Scientist/Engineer at CPCB- 3 Law Officer at CPCB- 3 Senior Environmental Scientist at CPCB- 0.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	0.50 ⁶
Developing a waste exchange program around reusing the residual heat, chemicals in the hazardous wastes from one industry in useful manner in other industries	12-15	CPCB MoEFCC	<ul style="list-style-type: none"> Drafting the guidelines Obtaining necessary approvals Stakeholder consultations Notifying the guidelines 	Junior Environmental Scientist/Engineer at CPCB- 3 Senior Environmental Scientist at CPCB- 0.5 Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	0.50 ⁶
Identification of Public Private Partnership ("PPP") models for financing remediation of the initial site inventory prepared under Assignment 1	8-12	State DoE State Committee Third party consultant	State Committee: <ul style="list-style-type: none"> Drafting Terms of Reference for third party PPP consultant Selection of PPP consultants based on technical and financial bids 	State Committee- 2 Third party PPP consultant - 12 Staff month for negotiation and implementation of PPP models will be same as in	100 ¹³

¹³ 30 lacs/site for 320 sites initially till a private party is selected /contracted

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> • Supervision of work carried out by PPP consultant • Evaluation of Terms of Reference for private parties prepared by PPP consultant • Decision making on private partners, PPP structures • Selection of private parties <p>State DoE:</p> <ul style="list-style-type: none"> • Negotiation with private parties • Memorandum of Understanding with private parties • Implementation of PPP models <p>Third party consultant:</p> <ul style="list-style-type: none"> • Drafting the Terms of Reference for private parties • Assistance to State Committee in evaluating techno-financial bids received from interested private parties till a party is selected 	case of all other PPP models implemented by the State Government.	
Recovery of remediation cost from arrears of land revenue from the site owner (for the first 39 sites if polluter/responsible person cannot be identified)	12-15	Central Government State Government	State Government to follow legal procedures for recover arrears of land revenue as directed by the Central Government.	Standard effort as in case of all matters related to recovery of arrears of land revenue	Standard legal cost as in case of all matters related to

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
					recovery of arrears of land revenue

6.2 Long Term Implementation

Table 14: Timeline for implementation of various measures for long term legal framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Approval from Cabinet, Ministry of Finance	6	Ministry of Finance	Review of NPRPS program and provide approval	Standard effort as in case of all matters related to approval of a national program	Standard cost as in case of all matters related to approval of a national program
Notification of national policy on remediation of polluted sites	10-12	MoEFCC	<ul style="list-style-type: none"> Drafting the policy Stakeholder consultations Obtaining and incorporating review comments Notification of the policy 	Scientist of HSM Department – 4 Law Consultant – 2 Project Director of NPRPS- 0.25 Administrative Officers- 3	0.30 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Notification of state policy on reuse of remediated sites	12-15	State DoE	<ul style="list-style-type: none"> Drafting the policy in line with the objectives of the national policy Stakeholder consultations Obtaining and incorporating review comments Notification of the policy 	Junior Environment Officer- 3 Law Consultant - 1 Senior Environment officer – 1 Chief Environment Officer- 0.25 Administrative Officers- 3	0.30 ⁶
Notification of amendments to the Environment (Protection) Act, 1986 and National Green Tribunal Act , 2010	18-24	MoEFCC	<ul style="list-style-type: none"> Finalise drafting the amendments Following all procedures, approvals prior to notification Stakeholder consultations Incorporation of comments Notification in the Gazette of India 	Law Consultant - 6 Scientist of HSM Department – 3 Project Director of NPRPS- 1 Administrative Officers- 10	0.50 ⁶
Notification of Remediation of Polluted Sites Rules, 20XX under the amended Act	24-32	MoEFCC	<ul style="list-style-type: none"> Finalise drafting the rules Following all procedures, approvals prior to notification Stakeholder consultations Incorporation of comments 	Law Consultant - 6 Scientist of HSM Department – 3 Project Director of NPRPS- 1 Administrative Officers- 10	0.50 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<ul style="list-style-type: none"> Notification in the Gazette of India 		
Notification of Central Remediation of Polluted Sites Authority (RPS Authority) under section 3(3) of the amended Act	24-27	MoEFCC	<ul style="list-style-type: none"> Finalise drafting the notification Following all procedures, approvals prior to notification Stakeholder consultations Incorporation of comments Notification in the Gazette of India 	Law Consultant - 2 Scientist of HSM Department – 1 Project Director of NPRPS- 0.25 Administrative Officers- 6	0.30 ⁶

Table 15: Timeline for implementation of various measures for long term institutional framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Establishment of RPS Authority	32-36	MoEFCC	<ul style="list-style-type: none"> Setting up office for the RPS Authority Hiring resources as per the structure of the RPS Authority 	Scientist of HSM Department – 2 Project Director of NPRPS- 0.5 Administrative officers- 6	Standard cost as in case of all matters related to setting up an authority under section 3(3) of the E(P) Act
Establishing regional offices of the RPS Authority in States with most number of polluted sites or depending upon progress of various stages of remediation in different states	40-48	MoEFCC State DoE	MoEFCC: <ul style="list-style-type: none"> Selection of the states Directing the State DoE to set up regional authorities State DoE: <ul style="list-style-type: none"> Setting up office for the RPS Authority Hiring resources as per the structure of the RPS Authority 	MoEFCC: Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1 State DoE: Junior Environment Officer- 3 Senior Environment Officer- 1 Chief Environment Officer- 0.5 Administrative Officer- 6	Standard cost as in case of all matters related to setting up a regional authority

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up of national priority site registry	24-27	RPS Authority and its regional offices Third party consultant	<p>RPS Authority:</p> <ul style="list-style-type: none"> • Selection of an appropriate software platform for the registry • Setting up the procedures to input accurate information in the registry • Allocation of responsibilities to regional offices, SPCBs for reporting information to the registry on time • Review of information received from regional offices on polluted sites before inputting it in the registry <p>Regional Offices:</p> <ul style="list-style-type: none"> • Setting up the procedure in the states for collection of information on polluted sites, status of pollution, priority/ risk score, status of remediation etc. • Review of information collected before reporting to RPS Authority • Reporting to RPS authority on a polluted site with all relevant 	<p>For initial development and installation of software:</p> <p>Third party consultant- 6 IT team of RPS Authority – 3</p> <p>Once installed, continuous effort will be required by the resources of the RPS authority and the regional offices to collect data and input data into the registry and update the registry from time to time. In addition, periodic maintenance and upgradation of the software will be needed. Effort for these ongoing activities are not considered here.</p>	0.75 ¹⁴

¹⁴ This considers cost of development of the software, consultant's fee, time-cost of the resources of the RPS Authority for initial installation of the software. It does not consider the running cost of the registry in terms of resources time for operating and updating the registry, effort towards data collection and inputting in the registry, cost maintenance and upgradation of software, etc.

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			information as per the structure of the registry Third party consultant: <ul style="list-style-type: none"> • Development of the software platform in consultation with the IT department of the RPS authority • Installation and validation of the software platform developed 		
Preparation of training plan and budget on new rules, technical guidelines for SPCBs, site investigators, remediation contractors and other third parties by CPCB	6-8	CPCB	Preparation of training plan and budget as per the requirements of different group of stakeholders such as SPCBs, site investigators, remediation contractors etc.	Junior Environmental Engineer- 3 Senior Environmental Engineer- 1	0.10 ⁶
Commencement of accreditation program for third parties	12-15	MoEFCC and CPCB	CPCB: <ul style="list-style-type: none"> • Preparation of accreditation guidelines for the third parties (qualification criteria, procedure, budget, timeline etc.) • Carry out the necessary procedure for accreditation of competent third parties • Completion of empanelment • Updating the list of accredited third parties from time to time 	CPCB: Junior Environmental Engineer- 3 Senior Environmental Engineer- 1 Administrative officers- 6 MoEFCC: Scientist of HSM Department – 0.5 Project Director of NPRPS- 0.1	0.15 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			MoEFCC: <ul style="list-style-type: none"> • Supervision of the entire process • Review of accreditation guidelines for finalisation • Review of the list of empanelled third parties for finalisation 		
Commencement & continuation of training program	8-24	CPCB and SPCB	CPCB: Supervision of the trainings carried out in different states SPCB: <ul style="list-style-type: none"> • Hiring training consultants as and when required as per the plan • Conducting the training sessions in the respective states as per the plan • Reporting to CPCB on number of trainings completed, attendance, feedback received, results of pre and post training knowledge check 	This will be an ongoing activity	This will depend on the number of trainings that need to be carried out as per the plan

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Preparation of laboratory infrastructure upgrade plan and budget by CPCB	6-8	CPCB	<ul style="list-style-type: none"> Preparation of the plan and the budget taking into account the existing lab capacities and capabilities at CPCB, SPCB and private sector and the new requirements on the basis of initial inventory of sites prepared under Assignment 1 Review of the requirement from time to time. 	Junior Environmental Engineer- 3 Senior Environmental Engineer- 1	0.10 ⁶
Commencement and continuation of laboratory infrastructure upgrade program for CPCB and SPCBs	6-24	CPCB, SPCB, Private laboratories	Developing the infrastructure including: <ul style="list-style-type: none"> Technology and equipment sourcing Skill building of laboratory technicians 	This will be an ongoing activity	This will depend on the extent of the upgrade to be required in future
Preparation of research and development program and budget by CPCB	6-8	CPCB	<ul style="list-style-type: none"> Preparation of a plan and a budget keeping in mind the requirement of engaging with research institutes for technology innovation, developing toxicological profile and identifying health impacts of hazardous substances already found and to be found in the polluted sites 	Junior Environmental Engineer- 3 Senior Environmental Engineer- 1	0.10 ⁶

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Commencement & continuation of research and development program	8-48	CPCB	<ul style="list-style-type: none"> • Preparation of a list of top hazardous substances found in the polluted sites based on the results of the site investigation of the 100 sites in Assignment 1 and updating the list from time to time • Engaging with public health authorities and research institutions for preparation of toxicological profile, identification of signs of health impacts and appropriate treatment for the identified substances • Preparation of a list of remediation techniques that are most commonly required for polluted sites in India • Engaging with the research institutions to develop appropriate low cost remediation techniques • Conducting field trials and establish the use of such techniques. 	This will be an ongoing activity	This will depend on the extent of research required, type of technology innovation, requirement of procurement equipment from international technology providers
Expansion of the initial inventory prepared in Assignment due to mandatory reporting regime	24-48	RPS Authority & regional offices	<ul style="list-style-type: none"> • Supervision of compliance with mandatory reporting regime as 	This will be an ongoing activity	Depending on number of sites to

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			<p>a part of new regulatory mechanism</p> <ul style="list-style-type: none"> Regular update of the site registry 		be identified in future
Scheduling of new sites for preliminary investigation, site registry, remedial investigation, DPR etc.	36	RPS Authority & regional offices	<p>RPS Authority:</p> <ul style="list-style-type: none"> Review and decision making on status of a site (i.e. if it is a polluted site) <p>Regional Office:</p> <ul style="list-style-type: none"> Based on petitions/ complaints of suspected pollution carry out necessary site visits, investigations to determine the status of the site. Report to RPS Authority 	This will be an ongoing activity	Depends on number of sites to be suspected for pollution
Commencement of remediation of sites found as polluted out of 220 remaining sites in the initial inventory	24-36	RPS Authority & regional offices Third Party Consultant (accredited)	<p>RPS Authority:</p> <ul style="list-style-type: none"> Supervision of progress of work Intervene if there is any land related issue Review and approval of completion of remediation <p>Regional office:</p> <ul style="list-style-type: none"> Periodic on-site monitoring of third party work and report to RPS Authority 	<p>¹⁵Third Party Consultant- 100-120</p> <p>Regional office of RPS authority: 24</p> <p>RPS Authority: 12</p>	12000 ¹²

¹⁵ All estimates are per site basis

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			Third Party Consultant: <ul style="list-style-type: none"> Carry out on-site work and report to regional office on a timely manner 		
Commencement of remediation of new sites (not in the initial inventory)	36-48	RPS Authority & regional offices Third Party Consultant (accredited)	RPS Authority: <ul style="list-style-type: none"> Supervision of progress of work Intervene if there is any land related issue (in consultation with State Government) Review and approval of completion of remediation Regional office: <ul style="list-style-type: none"> Periodic on-site monitoring of third party work and report to RPS Authority Third Party Consultant: <ul style="list-style-type: none"> Carry out on-site work and report to regional office on a timely manner 	¹⁶ Third Party Consultant-100-120 Regional office of RPS authority: 24 RPS Authority: 12	Depends on number of sites to be identified in future
Marking completion of remediation in the 39 sites found as polluted in Assignment 1	32-36	RPS Authority & regional offices	RPS Authority: <ul style="list-style-type: none"> Review and decision making on completion of remediation as per DPR 	Technical team of RPS Authority: 3 ¹⁷ Technical team of regional office: 3 ¹⁸	No additional cost other

¹⁶ All estimates are per site basis

¹⁷ Total for all 39 sites

¹⁸ Per state

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
			Regional office: <ul style="list-style-type: none"> • Review of on-site remediation work • Review of post remediation laboratory results • Report to RPS Authority 		than staff salary
Commencement of reuse of 39 sites	36-48	RPS Authority & regional offices	<ul style="list-style-type: none"> • Promotion of site • Stakeholder engagement on prospective use of the remediated site • Liaise with land developers/interested parties RPS Authority will supervise the above actions carried out by their regional offices in different states.	¹⁹ RPS Authority – 1.5 Regional Office- 4	0.20 ²⁰

¹⁹ This is per site estimate for both staff month and cost

²⁰ Includes staff salary, costs towards stakeholder consultation costs, promotional activities

Table 16: Timeline for implementation of various measures for long term financial framework

Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up the National Environment Restoration Fund under the Amended Act	18-24	MoEFCC	<ul style="list-style-type: none"> Determining the fund characteristics (objective, purpose, structure source, size, administration etc.) Obtaining necessary approvals from MoF 	Law and Finance Consultants – 1.5 Scientist of HSM Department – 1.5 Project Director of NPRPS- 0.25 Administrative Officers- 2	0.30 ⁶
Estimation of cost of National Program for next 10 years	6-8	MoEFCC	<ul style="list-style-type: none"> Finalising the cost estimation and assessment of percentage of cess Obtaining necessary approvals from MoF 	Law and Finance Consultants – 1.5 Scientist of HSM Department – 1.5 Project Director of NPRPS- 0.25 Administrative Officers- 2	0.30 ⁶
Application of cess as duty of excise	18-24	MoF	<ul style="list-style-type: none"> Following necessary procedures for application of cess 	Standard as in case of all other cess	Standard as in case of all other cess

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Activity	Timeline (months)	Stakeholders	Roles and responsibilities	Estimate of Staff Month	Estimate of Cost (Rs Crore)
Setting up the administrative structure for National Environmental Restoration Fund – appraisal committee, approval forum etc.	24-32	MoEFC, MoF	<ul style="list-style-type: none"> Determining the composition for fund administration Hiring resources if required MoEFCC will carry out the responsibilities in consultation with MoF	Scientist of HSM Department – 2 Project Director of NPRPS- 0.5 Administrative Officers- 3	0.15 ²¹
Development of a procedure/methodology for identification of polluters , assessment of paying capacity of polluters	12-15	RPS Authority	Development of procedures for identification of polluters , assessment of paying capacity of polluters in line with the requirement of the new regulatory mechanism	Technical team of RPS Authority- 6 Non- Technical team of RPS Authority- 6	Only staff salary
Identification of buyers/real estate developers , private parties for financing remediation activities	12-48	RPS Authority	<ul style="list-style-type: none"> Promotion of site (post remediation benefits and use) Engaging with prospective buyers Negotiation with buyers 	²² Technical team of RPS Authority- 3 Non- Technical team of RPS Authority- 3	Will depend number of sites to be remediated in future
Development of insurance mechanism	36-48	Insurers & polluters	Once remediation becomes an established practice in India, insurers need to play a vital role in developing a market around it.	Not applicable	Not applicable

²¹ Internal costs – staff salary, administrative overheads

²² Estimate is per site