PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN
IN THE AMOUNT OF US$25.21 MILLION
AND A PROPOSED CREDIT
IN THE AMOUNT OF 25.7 MILLION SDR
(US$38.94 MILLION EQUIVALENT)
TO THE
GOVERNMENT OF INDIA
FOR A
CAPACITY BUILDING FOR INDUSTRIAL POLLUTION MANAGEMENT PROJECT

Sustainable Development Department
Social, Environment and Water Resources Management Unit
India Country Management Unit
South Asia Region

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CURRENCY EQUIVALENTS
(Exchange Rate Effective March 31, 2010)

Currency Unit = INR
INR 44.94 = US$1
US$ 1.51824 = SDR 1

FISCAL YEAR
April 1 – March 31

ABBREVIATIONS AND ACRONYMS

ADB  Asian Development Bank
AECEN  Asia Environmental Compliance and Enforcement Center
APPCB  Andhra Pradesh Pollution Control Board
BOD  Biochemical Oxygen demand
CAS  Country Assistance Strategy
CBIPM  Capacity Building for Industrial Pollution Management
CETP  Common Effluent Treatment Plant
CHWTDF  Common Hazardous Waste Treatment and Disposal Facility
cm  Centimeter
CPCB  Central Pollution Control Board
COD  Chemical Oxygen Demand
crore  one hundred lakhs, or the sum of ten million
DOE  Department of Environment
EIA  Environment Impact Assessment
ENVIS  Environmental Information Center
ETP  Effluent Treatment Plant
US EPA  United States Environmental Protection Agency
EPA  Environmental Protection Act
ECAC  Environmental Compliance Assistance Center
EMP  Environment Management Plan
ESMF  Environment and Social Management Framework
ESMP  Environment and Social Management Plan
FDI  Foreign Direct Investments
g kg-1  Gram per Kilogram
GAAP  Governance and Accountability Action Plan
GIS  Geographic Information System
GOI  Government of India
GOWB  Government of West Bengal
GOAP  Government of Andhra Pradesh
GTZ  Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
Ha  Hectare
HDA  Haldia Development Authority
HDPE  High Density Polyethylene
HPC  High Powered Committee
HW Hazardous Waste
HWM Hazardous Waste Management
KIE Katedan Industrial Estate
KMC Kadapa Municipal Corporation
LAA Land Acquisition Act
lakh The sum of 100,000: said specifically of rupees
MDG Millennium Development Goal
mm Millimeter
MC Management Consultants
MT Metric Ton
MOEF Ministry of Environment and Forest
MUD Ministry of Urban Development
MSW Municipal Solid Waste
IBRD International Bank for Reconstruction and Development
ICB International Competitive Bidding
ICR Implementation Completion Report
IDA International Development Association
IUFR Interim Unaudited Financial Report
MOEF Ministry of Environment and Forests
NGO Non-governmental Organization
NGRI National Geophysical Research Institute
NPRPS National Program for Remediation of Polluted Sites
NPC National Productivity Council
NOx Nitrogen Oxides
NPRPS National Program for Rehabilitation of Polluted Sites
OP/BP World Bank: Operational Policy / Bank Procedures
PAP Project Affected Persons
PD Project Director
PIL Public Interest Litigations
PIU Project Implementation Unit
PPE Personal Protective Equipment
PAD Project Appraisal Document
PDO Project Development Objective
POC Project Oversight Committee
POM Project Operation Manual
PSC Project Steering Committee
SCs Scheduled Castes
SC Supreme Court of India
SCMC Supreme Court Monitoring Committee
SLF Secured Landfill
SME Small and Medium Size Enterprise
SMP Social Management Plan
SPCB State Pollution Control Board
SPM Suspended Particulate Matter
SO2 Sulphur Dioxide
SOx Sulphur Oxide
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ST</td>
<td>Scheduled Tribes</td>
</tr>
<tr>
<td>Sq. m/km</td>
<td>Square Meter/ Kilometer</td>
</tr>
<tr>
<td>TEP</td>
<td>Technical Evaluation Panel</td>
</tr>
<tr>
<td>TDS</td>
<td>Total Dissolved Solid</td>
</tr>
<tr>
<td>WBPCB</td>
<td>West Bengal Pollution Control Board</td>
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<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vice President</td>
<td>Isabel M. Guerrero</td>
</tr>
<tr>
<td>Country Director</td>
<td>N. Roberto Zagha</td>
</tr>
<tr>
<td>Sector Director</td>
<td>John Henry Stein</td>
</tr>
<tr>
<td>Sector Manager</td>
<td>Gajanand Pathmanathan</td>
</tr>
<tr>
<td>Task Team Leader</td>
<td>Charles J. Cormier</td>
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INDIA
Capacity Building for Industrial Pollution Management

PROJECT APPRAISAL DOCUMENT

SOUTH ASIA
SASDI

Date: May 06, 2010
Country Director: N. Roberto Zagha
Sector Manager/Director: Gajanand Pathmanathan / John Henry Stein
Project ID: P091031

Team Leader: Charles J. Cormier
Sectors: General public administration sector (40%); Other industry (30%); Solid waste management (30%)
Themes: Environmental policies and institutions (P); Pollution management and environmental health (S)

Environmental screening category: Full Assessment
Safeguard screening category: Limited impact

Project Financing Data

For Loans/Credits/Others: n/a
Total Bank financing: US$64.15 M
Proposed terms: Standard IDA Credit and IBRD Loan

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<th>Foreign</th>
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<td>BORROWER/RECIPIENT</td>
<td>10.60</td>
<td>0.64</td>
<td>11.24</td>
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<td>INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT</td>
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<td>INTERNATIONAL DEVELOPMENT ASSOCIATION</td>
<td>36.73</td>
<td>2.21</td>
<td>38.94</td>
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<tr>
<td>Total</td>
<td>71.11</td>
<td>4.28</td>
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Borrower: Government of India, Ministry of Finance
Responsible Agency: Ministry Of Environment and Forest, State Governments of Andhra Pradesh and West Bengal

<table>
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<tr>
<th>Estimated disbursements (Bank FY/US$m)</th>
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<tr>
<td>Annual 2.07 7.71 16.04 16.63 17.70 3.0</td>
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<tr>
<td>Cumulative 2.07 9.78 25.82 42.45 61.15 64.15</td>
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Project implementation period: Start: September 2010  End: September 30, 2015
Expected effectiveness date: September 30, 2010
**Expected closing date:**  September 30, 2015

<table>
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<tr>
<th>Question</th>
<th>Response</th>
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<tr>
<td>Does the project depart from the CAS in content or other significant respects?</td>
<td>[ ]Yes [x] No</td>
</tr>
<tr>
<td>Ref. PAD A.3</td>
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<tr>
<td>Does the project require any exceptions from Bank policies?</td>
<td>[x]Yes [ ] No</td>
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<tr>
<td>Ref. PAD D.7</td>
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<tr>
<td>Have these been approved by Bank management?</td>
<td>[x]Yes [ ] No</td>
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<td>Ref. PAD D.7</td>
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<td>Is approval for any policy exception sought from the Board?</td>
<td>[ ]Yes [ ] No</td>
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<tr>
<td>Ref. PAD C.5</td>
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<tr>
<td>Does the project include any critical risks rated “substantial” or “high”?</td>
<td>[x]Yes [ ] No</td>
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<tr>
<td>Does the project meet the Regional criteria for readiness for implementation?</td>
<td>[x]Yes [ ] No</td>
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<td>Ref. PAD D.7</td>
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**Project development objective**  
*Ref. PAD B.2.19, Technical Annex 3*

The development objective of the project is (i) to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites (ii) to support the development of a policy, institutional and methodological framework for the establishment of a National Program for Rehabilitation of Polluted Sites (NPRPS).

**Project description**  

The project will provide a comprehensive framework for investments in remediation of contaminated orphan sites and solid waste dumpsites which pose significant hazards to communities and meet the criteria of a “public good”. The Project has the following 3 components:

**Component 1:** Strengthening of Environmental Institutions: Building capacity for addressing pollution remediation  (Estimated cost US$ 16.74 million).

**Component 2:** Investments in Priority Remediation and Environmental Improvements: Rehabilitation of orphan hazardous waste sites and municipal dumpsites (Estimated cost US$ 52.80 million).

**Component 3:** Project Management (US$ 5.85 million).

**Which safeguard policies are triggered, if any?**  
*Ref. PAD D.6, Technical Annex 10.*

The following safeguard policies are triggered:

- Environmental Assessment (OP 4.01)
- Involuntary Resettlement (OP 4.12)
- Cultural Property (OP 4.11)

The Borrower has prepared an Environmental and Social Management Framework which has been reviewed, approved and disclosed in-country and at the World Bank InfoShop on November 28, 2008.

**Board presentation:**  June 3, 2010  
**Loan/credit effectiveness:**  September 30, 2010

**Covenants applicable to project implementation:**  N/A
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A. STRATEGIC CONTEXT AND RATIONALE

1. Country and Sector Issues

1. Environmental sustainability is likely to be the next greatest challenge on India’s development path. For over a decade, India has experienced one of the fastest economic growth rates averaging at more than 9% per annum over the past four years. While the country still continues to face the tremendous challenge of reducing poverty of the 354 million Indian citizens, who represent 27% of the world’s poorest, robust economic growth has already allowed millions to come out of the poverty trap and created a sizeable middle class of 300 million people. At the same time, this growth has been a dramatic driver in the nature and scale of impact on the environment and natural resources. Given high population density, vulnerable ecology, extreme climate and a significant share of the economy heavily dependent on the natural resource base, environmental sustainability might well be the next greatest challenge to India’s development, adding to the list of priority needs to reduce disparity, eliminate poverty and promote social cohesion. Mirroring the country’s size and diversity, environmental risks and problems are wide-ranging. India’s features of a low and middle income economy are reflected in the environmental damage estimates. While the damages are still dominated by poverty-related risks, such as lack of sanitation and indoor air pollution in rural areas, the share of growth-related risks manifested by deteriorating urban environment, contamination of land and water due to industrial waste and chemical pollution is increasing. As the country finds itself in the second decade of strong economic performance, making and further projecting massive investments in infrastructure, urban development, and industrialization, the issues of managing the environmental impacts associated with rapid industrial and urban growth are coming to the forefront of public attention.

2. Manufacturing sector will play an important role in future economic growth. Industrialization, fueled in part by economic liberalization in the past twenty years, has contributed significantly to economic growth and now accounts for about a quarter of the GDP. Most recently, industry has been growing at about 8.6% per year with manufacturing remaining an increasing factor in supporting India’s economic expansion.

3. Promoting cleaner production and minimizing waste generation is important to sustain industrial growth. As per a recent GOI report\(^1\), there are about 36,000 industries in the country which generate about 6.2 million tons of hazardous waste annually. Of this, seven states account for 80%, with Gujarat topping the list followed by Maharashtra and Andhra Pradesh. The production of petrochemicals, pesticides, pharmaceuticals, textiles, dyes, fertilizers, leather products, paint and chlor-alkali has grown significantly. These industries produce wastes containing heavy metals, cyanides, complex aromatic compounds and other toxics. Large quantities of industrial sludge and effluents laden with heavy metals are dumped by local industries in open areas, in rivers, around residential compounds, and on farm land. At some places toxic dumps have contaminated soil and groundwater, affecting the health of local communities. The cumulative impact from past industrial activities resulted in heavy pollution seriously affecting the quality of life of communities in certain locations. Indiscriminate and unscientific disposal of wastes in the past has resulted in environmental degradation of several

\(^1\) Report of Independent Panel of MoEF officials and NGO prepared in March 2010
sites in the country and several toxic waste hot spots – such as the industrial belt of Vapi and Vadodara in Gujarat, Thane-Belapur in Maharashtra, Howrah-Hooghly in West Bengal, Ranga Reddy District and Patancheru-Bollarm in Andhra Pradesh, Ellor/Udyogmandal in Kerala – have developed in the past twenty years. Recently, CPCB has identified 43 critically polluting industrial clusters, which includes Ankleshwar and Vapi in Gujarat, Ghaziabad and Singrauli in Uttar Pradesh, Korba (Chhattisgarh), Chandrapur (Maharashtra), Ludhiana (Punjab), Vellore (Tamil Nadu), Bhiwadi (Rajasthan) and Angul Talcher (Orissa)\(^2\). In January 2010, the MOEF imposed a temporary ban on further proposals envisaging expansion or setting up of new projects in these areas, till August 2010, thus providing time to prepare Action Plans for management and monitoring purposes.

4. Small and medium scale enterprises continue to account for significant industrial outputs and hazardous waste generation. There are more than 13 million micro, small and medium size industries spread around in the form of industrial clusters and estates, producing more than 6000 products ranging from traditional to high-tech items\(^3\). It is estimated that SMEs generate about 65-70% of the total industrial pollution load. According to MOEF, twelve states, including Maharashtra, Gujarat, Tamil Nadu, Andhra Pradesh, Karnataka, Uttar Pradesh, Orissa and West Bengal, generate about 97% of the industrial hazardous waste. Urban population in these states is particularly vulnerable to pollution with the highest share of the burden of negative health impacts falling onto the poor, thus placing the management of pollution and reducing public health risk from hazardous waste among the critical development issues.

5. Despite well developed policy and institutional framework, success in reversing environmental degradation has been limited. India has a comprehensive set of environmental laws and institutions, including a very active judiciary. Notwithstanding some successes, the issues of hazardous waste are far from being resolved. The country-wise average compliance ratio for monitored industries (falling far short of all polluting sources) is only 50%. In the absence of disposal mechanisms and adequate infrastructure, the industries either store wastes onsite or dump it in the open. In the absence of the requisite infrastructure the provisions for temporary on-site storage – permitted for 90 days under the Hazardous Waste Management (HWM) Rules issued in 1989 - has become a permanent practice. Largely, pollution prevention and waste minimization continues to be expensive and technologically challenging for the industry. This is more so for small and medium enterprises that cannot afford investments in effective pollution mitigation due to small profit margins. In the mid-1990s, recognizing the significance of the hazardous waste issues and in the face of pressure from NGOs, the Supreme Court (SC) of India asked the relevant environmental agencies for information on the amount of hazardous waste in the country (generated domestically and imported), and how and where it was disposed. The SPCB, MOEF and the CPCB had no authentic data to present. As a result, the SC established a High Powered Committee that produced a report\(^4\) in 2001 which estimated that the amount of hazardous waste generated in the country was almost 4.4 million tons per year, as compared to the CPCB estimate of 0.7 million tons. The HPC also found that a particularly serious problem was the unknown quantities of hazardous wastes which were being illegally

\(^2\) Labeling done on the basis of “comprehensive environmental pollution index” (CEPI) prepared by CPCB and Indian Institute of Technology, Delhi. This study has specified CEPI for 88 industrial clusters across the country.

\(^3\) Annual Report (2008-09) Ministry of Micro, Small and Medium Enterprises

dumped outside industrial estates, on abandoned public lands, and within privately owned lands. It noted that few states (e.g. Andhra Pradesh) appeared to have some mechanism for monitoring or even listing of such hazardous wastes dumpsites. The report emphasized the need for an authentic and realistic inventory of wastes generated by all categories and classes of industry, and the need to devise a system for regularly updating this information.

Box 1: Key Findings of Menon Committee Report of Supreme Court of India
The Report of the Menon Committee designated by the Supreme Court presented a grim picture. For instance, in the Gorwa industrial area of the city of Vadodara, Hema Chemicals have been dumping 77,000 metric tons of highly carcinogenic hexavalent chromium waste over the past 20 years. A Study (2001) of the National Institute of Occupational Health of Ahmedabad, health Surveillance of the Workers Exposed to Chromium in the Chemical Industry revealed blood chromium levels in exposed Hema employees to be more than twice as high as in control groups. CPCB\(^5\) reported that in Kanpur, chromium concentrations in the groundwater was as high as 124-258 times higher than the Indian permissible limit in the areas polluted by tanneries and companies producing basic chrome phosphate. Similarly, the levels of other contaminants such as mercury, arsenic, chloride and lead where high. The most dramatic conclusion of the report was that local people continue to use contaminated water for irrigation and drinking as alternative supplies are not available. It was also found that local people blend chromium rich sludge with fly ash to make binding materials for buildings and inert material for building local roads. Pollution from lead-acid battery assembly units, service centers and electronic soldering units led to high levels of trace metals such as cobalt, lead, and cadmium found in soils and river bed sediments, with instances of lead levels as high as up to 100,000 parts per million.

6. A rising public demand for better environmental quality has created a demand for improved compliance and environmental performance obligations. The immense unfinished agenda underpins deepening dissatisfaction with the state of environmental affairs by a growing and increasingly vocal “green” constituency, resembling, in some ways, a historical pattern of the 1960s in industrialized countries. Under public pressure, the concept of “right to life” enshrined in the Indian Constitution, was expanded to include the right to clean and healthy environment. The SC also spurred a major environmental action to protect citizens by closure of industries violating the HWM Rules. It also set up a time schedule for reviewing the list of hazardous wastes, setting up laboratories, and construction of secured landfills for treatment and storage. As result, MOEF amended the HWM Rules in 2000 and 2003 to make them more stringent. In Gujarat, 13 industries set up their waste disposal facilities, and 6 other facilities were built to service clusters of industries. In 2006, the SC also directed the CPCB to draw a plan with regard to 147 hazardous waste sites, to carry out assessments and develop plans for remediation.

7. This demand, however, is yet to be matched by the regulatory capacity of environmental agencies. Despite the interventions of the judiciary, the constitutional obligation for environmental management rests with environmental authorities at central and state level to take measures for reducing the risks from unattended hazardous waste pollution. Under the Environment Protection Act (EPA) of 1986 and other environmental laws in India, the authority for implementation of laws and regulations rests with both the central and state governments. At the national level, the responsibility for developing policies and overseeing environmental programs lies with the MOEF and CPCB. However, the primary responsibility for the day to day management and implementation of environmental policies and programs rests at the state level.

\(^5\) Groundwater Quality in Kanpur, Status Sources and Control measures (CPCB, 1997)
with the SPCBs. The institutional performance of environmental agencies, particularly of the SPCBs has been the subject of independent evaluations in the past several years, including studies by the Planning Commission of India, USEPA, and the World Bank. While the objectives of these studies have varied, the independent findings were unanimous in identifying significant institutional gaps in pollution management and enforcement.

8. With the constant growth of the industrial sector in India, the need for development of a suitable strategy for better compliance with HWM Rules is well recognized by the GOI. The preparation of inventories of hazardous waste sites, illegal dumps and orphan sites and their characterization is lagging behind. In the absence of common effluent facilities, illegal and clandestine dumping of industrial waste is a common practice in many states. The problem grew even after disposal facilities have been built, illegal dumping continued as industries avoided the cost for transportation and disposal. From an environmental management perspective, the above problems constitute a preeminent showcase of weak environmental governance. Arguably, the issue of unattended human health hazards from the polluted sites is a growing urban environmental problem. With pressure from the growing urbanization, the pressure on land will continue. The reuse of previously developed urban and industrial land is not a new practice. The underutilized and contaminated sites in general have potential for redevelopment if the complications from the past use are addressed in a comprehensive and safe way. Most of the complications relate to the cost of cleanup and remediation, and the risks associated with the reuse. Other complications come from the weak institutional capacity to devise effective strategies for reducing the public health risk through cost effective clean up and remediation, in a systemic way, and supported by informed decisions for land reuse.

Box 2: Key Findings of Planning Commission Report of India on the State Pollution Control Boards

An independent evaluation study on the functioning of SPCBs was prepared by the Planning Commission of the GOI in 2000. The key findings of this report concluded that the degree of inventorying of polluting industrial activities by the SPCBs was generally unsatisfactory and the compliance of industrial units with the stipulated pollutant standards was poor. Crucial activities like training of staff and generation of public awareness were found to be low priority items in state budgets and the absence of effective enforcement mechanisms resulted in non-compliance. (Evaluation Study of Functioning of State Pollution Control Boards, Planning Commission, Government of India, September 2000.)

The U.S. Environmental Protection Agency conducted a comprehensive study of the environmental compliance and enforcement programs in India based on international best practices for ensuring compliance with environmental laws. The USEPA found that the primary implementing authority for India’s environmental programs are the SPCBs and a number of factors have placed a strain on the capacity of the SPCB’s to fully implement their responsibilities. These factors include limited number of technically trained staff, lack of resources to manage and track activities, and diversity of responsibilities that prevents systematically addressing priority programs. (Report on Environmental Compliance and Enforcement in India, US Environmental Protection Agency, December 2005)

The World Bank prepared a report on strengthening environmental institutions for sustainable growth in India which analyzed three priority sectors – power, roads, and industry. In the industry sector, the report recommended strengthening staff skills and resources to meet the increased workload from rapid growth, strengthening the use of enforcement deterrents, and expanding the use of innovative incentives and public information for improved performance. (India Country Environmental Analysis, World Bank, December 2006).
9. All of the above indicates that there is a need to demonstrate a replicable model that is technically, economically, socially and environmentally feasible to undertake a remediation of polluted sites at a national level. While the technical aspects of cleanup and remediation require attention, the effectiveness of action for scaling up this effort depends primarily on the institutional capacity and appropriate incentives in the governing framework. Pollution management models which integrate the aspects of economically feasible clean up and management of flow pollution supported by public investments that serve as catalysts for behavioral changes and enhanced compliance need to be developed. In attending to the specific issue of hazardous waste in highly polluted sites, the regulating authorities face: a) a lack of sufficient information on the quality and risks of legacy pollution and accumulated waste; b) no methodology for risk assessment to help establish priorities in clean up investments; c) absence of an effective tracking system for monitoring the process and enforcement of regulations to prevent secondary contamination; d) limited public awareness of the health risks; and e) underdeveloped common infrastructure for safe containment or disposal of hazardous waste. There is a clear need, therefore, to build capacity at the state and national level, and to develop a framework to address these issues in a comprehensive and systemic manner. Until recently, the central and state PCBs did not have any comprehensive plans for strengthening the institutional capacity to address the impact of hazardous wastes, either by requiring the reduction of generated waste, or by reducing the risks through control and mitigation technologies or other measures. Notwithstanding the several isolated initiatives for addressing the pollution from hazardous and solid waste dumps, the problem continues to persist and the regulatory and civic authorities in different parts of the country are struggling with the myriad of problems associated with pollution generated from past and current industrial operation.

2. Rationale for Bank Involvement

10. Supporting GOI plans and commitment to improve environmental sustainability. The 11th Five Year Plan links growth and environmental sustainability, and acknowledges the serious gap in environmental management and pollution control, and the lack of attention to soil pollution and degradation. It also, for the first time, brings up the issue of the large backlog of contaminated and degraded sites that need rehabilitation and remediation. Strategic documents of the Planning Commission point to the need for scientific assessment of the polluted and hazardous waste sites and their regeneration. The project is aligned with the 11th Five Year Plan objective for environmental sustainability by addressing issues of environmental governance and hazardous waste management.

11. Linkages with CAS and GOI’s commitment to international convention. In addition to the fact that the proposed project is strongly aligned with the Government of India’s priorities, it is consistent with the Bank’s strategic focus and Country Strategy for the period FY 2009 - 2012 which points to the need to ensure that development is sustainable and makes the case that sound environmental management and sustainable use of natural resources have the potential to strengthen India’s competitiveness. Furthermore the Country Strategy envisages assistance to

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reduce the burden that environmental degradation poses on vulnerable groups and to demonstrate business models to address key environmental issues including hazardous waste management.

12. The Bank is well-placed to bring international knowledge and experience as India is moving towards MIC status and looks towards state-of-the-art knowledge, both in terms of technology and institutional arrangements, in handling a complex environmental agenda in order to sustain its growth path. The Bank’s experience and specialized skills would play an instrumental role supporting GOI’s objective to establish a National Program for Rehabilitation of Polluted Sites (NPRPS) in developing ‘best practice’ solutions, increasing the capacity of respective agencies and engaging multiple stakeholders in the implementation. The Bank’s engagement in the sector will further promote environmental and socially responsible industrial growth and a safer urban environment.

13. The Bank’s experience in India with multiple sectors and agencies will help in demonstrating an institutionally sustainable model for wider replication. Indian authorities realize that development pressure makes land an increasingly precious commodity as they struggle to locate land suitable for new infrastructure. State authorities also recognize that remediation of legacy contamination and regaining the economic value of contaminated land is a highly complex activity requiring a systemic approach and a high level of technical expertise with adequate financial resources. Under the pressure of the SC, many SPCBs are looking for technical expertise, resources and additional capacity for undertaking remediation which requires active participation of key stakeholders in the planning and implementation process. Capacity enhancement which incorporates the modern concept of learning-by-doing or project-based learning is in high demand at state level. In this context, the proposed project targets the sector capacity issues described above.

3. Higher Level Objectives to Which the Project Contributes

14. **Alignment of Sector Incentives with Environmental Priorities.** The project will facilitate the reduction of environmental and health risks associated with legacy polluted sites. It will provide methodological support for the framework on environmental liability for industrial operations. On a more strategic level, the project will promote better environmental compliance for sustainable development of the industrial sector and greater cross-sectoral coordination, particularly at the state level where sectoral agencies and local governments are typically better positioned to coordinate and ensure that environmental factors are considered at the time of location decisions, spatial planning, project design and technology choices.

15. **Millennium Development Goals.** The project will contribute to MDG 7 on Environmental Sustainability and specifically to meet Target # 9, “Integrate the principles of sustainable development into country policies and programs.” The project will also contribute to the MDG Goals on human health. The project will help reduce the environmental health costs of the surrounding communities, where often the impact of past pollution affects disproportionately women and young children, and will help create new institutional controls of good governance and public accountability. In doing so, the project will support the spirit of and contribute to the implementation of the Right to Information Act. Finally, as the industrial sector increasingly seeks to compete internationally, both the Government and the industry are paying more
attention to the sustainability of industrial investments. The project will contribute towards achieving this vision.

3. **Project Description**

   **a. Lending instrument:**

   16. The proposed lending instrument is a Sector Investment Credit (SIC) which includes IDA and IBRD resources which will be used to finance Technical Assistance activities and pilot investments under the project financing envelope of US$64.15 Million. The rationale for using a larger share of IDA resources for mitigation of human health risks and ecosystem integrity on selected sites is supported by the following argument. Poor and marginalized people, knowingly or unknowingly, are mostly exposed to environmental health hazards from legacy pollution. The natural resources such as soil, water, and livelihoods of communities living in the vicinity of highly polluted sites are threatened and therefore the clean-up and remediation measures will have a direct and positive impact on these people. Without a dramatic increase in the capacity of state authorities to expand the remediation and clean up efforts, the ‘environmental legacy’, in the many sites around India, would continue to accrue social-economic costs and damage to public health. The project would have a life span of five years to allow achieving demonstration results from the remediation effort, and to strengthen human and organizational capacities at central and state level. The project will be financed by an IBRD flexible loan with a variable spread option and total maturity of 30 years, including a 5 year grace period and an IDA credit with a total maturity of 35 years, including a grace period of 10 years.

   **b. Project development objective and key indicators**

   17. The *development objective* of the project is (i) to build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites (ii) to support the development of a policy, institutional and methodological framework for the establishment of a National Program for Rehabilitation of Polluted Sites (NPRPS).

   18. Specifically, the project will pilot an integrated “area-wide” approach to pollution cleanup on selected contaminated sites. More broadly, the project will provide a ‘blueprint’ for handling the issues related to ‘legacy’ pollution in the context of environmental and social sustainability as stated in the National Environmental Policy (2006) (Section 5.2.8).

   19. The project will achieve its objective by (a) using a project-based learning approach and providing support to effective knowledge dissemination; (b) supporting the NPRPS by putting together a methodological framework for inventorying polluted sites, assessing social costs and benefits, public health and ecosystem risks, best practice assessments of national programs in other countries, national consultations, and implementation of plans for cleanup/remediation in accordance with the intended land use, or containment of pollution whichever is feasible; (c) undertaking prototypical investments in remediation of hazardous waste and old dumpsites suitable for scaling up; and (d) providing support for improved industrial compliance in project areas.
20. The project will also promote inclusion of key stakeholders in planning and implementation of project investments, and partnerships for improved environmental conditions of community neighborhoods around the polluted sites. The project will support measures for public awareness and community education to prevent secondary contamination of the sites and encourage behavioral changes. In order to make the project impact tangible it would be translated into measurable project outcome indicators

21. **The key performance outcome indicators** supporting the project development objective are:

   i. Supporting the NPRPS by developing a methodological framework for inventorying polluted sites, establishing ‘best practice’ solutions and engaging multiple stakeholders in the implementation, including cost recovery mechanisms.

   ii. An Environmental Compliance Assistance Center (ECAC) has been established and will be fully functional by end of year 2 in West Bengal (WB) and by end of year 4 in Andhra Pradesh (AP).

   iii. Water quality and soil characteristics at the pilot sites comply with national standards and mechanisms established to monitor in the long term.

   iv. Clean up/remediation technologies have been piloted at orphan hazardous waste sites and municipal dumpsites in selected states and a network of state PCBs established by MOEF for knowledge dissemination and project based training.

   v. Guidelines and standards for remediation developed and supervisory capacity of technical staff at environment agencies to implement remediation plans and monitor environmental conditions strengthened.

Annex 3 provides details of the project monitoring arrangements and outcome indicators by component.

**c. Project Components**

22. The project is designed as a pilot in response to the abundance of contaminated sites located across India and the limitations of the institutional base to tackle the problem. The implicit logic of the project approach is to expand the institutional capacity at state level, ease the regulatory gaps and demonstrate appropriate clean up/remediation techniques, and thus to facilitate scaling up of the remediation effort in other states. With this in mind the project places great importance on investments in institutional development to stave off secondary pollution from ongoing industrial operations in the area. Project investments are organized in the following components:

**Component 1- Strengthening of Environmental Institutions: Building Capacity for addressing pollution remediation** *(Estimated cost including contingencies and taxes US$ 16.74 Million).*

23. The objective of this component is to strengthen the institutional framework, including regulatory policies, management practices, and performance guidelines, for central and state agencies, supporting the remediation of polluted sites. While India has extensive environmental management systems and environmental laws in many areas, the existing institutional framework for addressing orphan hazardous waste sites and illegal dumps has been limited in its scope and effectiveness to support large scale mitigation and preventing environmental degradation caused
by contaminated and abandoned sites. Several factors have been considered when designing the project investments for strengthening the institutional capacity: the lack of a defined national program for the rehabilitation of polluted sites; limited technical capacity and financial resources at the state level to properly assess, classify, and remediate priority sites; and lack of knowledge of innovative regulatory approaches and incentives.

24. This component will assist the government in the development of improved policy and regulatory programs, technical trainings in targeted programmatic skills, and associated institutional infrastructure investments. Specifically, the project will support the central government in the development of the NPRPS which will be implemented by the states. While national laws for hazardous waste management currently exist, they do not address issues of legacy pollution and rehabilitation of orphan sites. In this regard, high priority will be given to support MOEF in the development of a national methodological framework for site assessment, prioritization, clean up/remediation standards, legal framework including liability issues and financing modalities for implementation of the NPRPS; implementation of national training programs and technical assistance for SPCBs in strengthening their capacity to assess, characterize, monitor and ensure compliance of polluted sites especially in states where demonstration investments will not initially be carried out.

25. The component will support specialized state training programs, targeted technical assistance, and institutional infrastructure investments for effective implementation and monitoring of the remediation pilots. The component will also promote adoption of best practices and voluntary incentives for improved corporate environmental compliance with HWM Rules. The component will also support knowledge sharing activities and dissemination of lessons learnt from the pilot remediation sites with the aim of building a state network of expertise in reducing human health risks from legacy sites. This includes technical assistance for building partnerships with industries in the project areas by supporting Environmental Compliance Assistance Centers (ECAC) to promote knowledge exchange and environmental information sharing, technical assistance for meeting regulatory standards, introduction of small scale clean technologies, stakeholder participation and community outreach. The component will support basic infrastructure and equipment for the ECACs in WB and AP, with operational and maintenance cost on a declining basis; environmental monitoring and data collection, and other technical inputs and materials for capacity building as necessary. This component will also assist the ECACs to develop business options for environmental compliance assistance and expanding existing outreach programs to industries. The ECAC in WB (WB-ECAC) will assist the targeted cluster industries, and small and medium size units to implement environment improvement projects and thereby catalyzing investments for improved environmental compliance. ECACs with organize training programs for SMEs; will sponsor sector specific studies (e.g. metallurgical, tanning and leather chemicals (chromium), chemicals and petro-chemical etc.), workshops and seminars, environmental audits, best practice exchanges, public awareness and community outreach activities.

**Component 2 - Investments in Priority Remediation and Environmental Improvements:**
*Rehabilitation of orphan hazardous waste sites and municipal dumpsites (Cost including contingencies and taxes US$52.80 Million).*
26. The objectives of this component is to pilot site remediation which will minimize the environment and health risks by containing the migration of the heavy metals and chemicals from contaminated soil and groundwater to acceptable and safe levels. Typically, in most polluted sites the generation and discharge of industrial waste; domestic discharge of sewer water, as well as discharge of toxic chemicals from abandoned industrial facilities and municipal dumpsites have contributed directly or indirectly to the overall degradation of environmental quality of soil, surface and groundwater in the area. Undoubtedly, this creates a significant health risk to communities and exposed individuals. High concentration levels of heavy metals, exceeding the maximum permissible concentration limits, create a major risk to the quality of the total surface and groundwater system, which is also used by both animals and humans as a source of drinking water. This component will develop risk-based technical solutions to implement measures for intercepting, containing or treating as well as monitoring the environment and health impacts in the project area and prevent further migration of unacceptable contamination levels to sensitive areas and groundwater users.

27. This component will also assist AP and WB to develop and implement area-based plans which include remediation of orphan polluted sites and/or old municipal dumps and measures for overall environmental improvements in the area and better compliance of the nearby industrial units. The project risk-based approach will provide a comprehensive coverage for reducing the major risk in the area to an acceptable and a measurable level. During project preparation, a feasibility study was conducted on the selected sites to delineate the nature and extent of contamination, identify preliminary remediation plans and provide a preliminary cost estimate. The detailed engineering remediation plans will be drawn based on site conditions, waste type, and extent of contamination and evaluation of applicable practices. The plans will provide for fixed and variable costs and performance indicators for assessment of the progress of selected measures.

28. During implementation, this component will provide technical assistance for a more detailed assessment and engineering design of site remediation plans, additional sampling and validation of pollution impacts, environmental audits, development of post-remediation monitoring and after-care plans for the project sites and training. Cleanup standards will need to be developed in

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7 Risk-Based Approach is designed to prevent unacceptable exposure risks. A cleanup solution uses risk-assessment tools to develop site-specific cleanup levels. These levels depend on the nature and extent of contamination, current and reasonably likely future uses of land and water, and related factors.(USEPA)

8 The term ‘orphan site’ is used in the international practice for a site which is contaminated by a release of hazardous substances that poses serious threats to human health or the environment, where the parties responsible for the contamination are either unknown - or unable or unwilling - to pay for needed remedial actions. A typical orphan site is a property with soil and/or groundwater contamination, where the party responsible for the contamination has gone out of business, and may also have left behind hazardous substances in tanks or drums. Sometimes a company is still operating, but is too small to afford the cleanup. Another type of orphan project is an area-wide site where drinking-water wells have been contaminated, but the source of the contamination is unknown. Failure to clean up Orphan Sites may endanger public health and the environment (including groundwater and municipal drinking water sources). Contamination will continue to spread, affecting water, soil, people, and adjacent properties. Costs will increase with time, because the more contamination spreads, the more expensive it becomes to clean up. Conversely, a viable Orphan and Enforcement program encourages careful handling of hazardous substances, and removes any competitive advantage for businesses engaged in sloppy waste-management practices. Finally, contaminated property is economically unproductive land. Contamination that remains will continue to devalue building, land, and water assets on the affected and neighboring properties.(USEPA)
accordance with intended land-use. The component will also finance remediation works, rehabilitation of closed dumpsites, necessary equipment and minor up-gradation of existing disposal and treatment infrastructure, operational and maintenance cost of facilities during project life on a declining basis, monitoring and after-care measure within the project life, and a campaign for community awareness and communication.

29. The basic factors that have influenced the choice of sites for demonstration investments include: severity of environmental impacts and known health and livelihood risks, location of settlements and affected populations in the vicinity of the pilot sites, including upstream-downstream impact of pollution, current and planned land use; applicable choice of technology and potential for meeting cleanup standards within the life of the project; community buy-in, commitment for support of local government and environmental agencies to demonstration investments and sustainability of the investments. The following four pilot sites in the two pilot states are included in the project investment plan:

Site A: Remediation of Noor Mohammad Kunta (NMK), Katedan Industrial Area (KIE) in Ranga Reddy District, AP (US$ 30.93 Million).

30. NMK is a small surface water body located in the Southern suburbs of Hyderabad City. The Kunta (‘Kunta’ means a pond or a small lake) is spread over an area of about 7.6 ha and its catchment extends to an area of about 178 ha. The catchment area drains into the ‘kunta’ through two drainage channels. Residential developments are located beside the industrial activity. The KIE houses variety of industries in the catchment of the lake, dominated by food industries, oil refining units, textile units, lead extraction units and cement industries. Most of the industries (300-400 units) are small-scale units, and most of the pollution comes from textile production—particularly dyes used in production. Sewage contributed by the nearby habitation is another source of pollution for the lake. Outfall of the lake traverses through the land of the nearby Agricultural University. After the closure of polluting industry by the regulator, the condition of the lake has stabilized but not improved. Currently some part of the reclaimed dump area near the lake is being acquired by the local urban body for constructing a sewage treatment plant of 4 million/l/day capacity which will take care of the sewage contributed by the nearby habitations. The sludge characteristic in the lake show high pH value of 10.98 and high concentrations of heavy metals such as copper, chromium, zinc, lead, iron, manganese and nickel. Chlorides and sulfates in the surface and ground water exceed the allowable limit of 250-200mg/l respectively. During the monsoon the overflow into the Shivarampalli tank joins the Voora Cheruvu and flows into Mir Alam Tank, which is a large water body and a principle water source of Hyderabad City. After remediation of the site it would be used for public recreation.

31. Remediation of multi-use 178-ha catchment is not possible to undertake all at once. The site’s feasibility assessment proposes a step-wise area-based management approach consisting of: (a) detailed investigation and profiling of anchor site pollution and detailed remediation design; (b) near-term remediation of critical risks including water and sediment treatment, remedial measures for soil contamination of two hot-spots, addressing sources of surface water contamination and measures for reducing groundwater contamination; (c) long-term impact assessment and area remediation strategy, which includes large-scale mapping and characterization of data gaps; and (d) site monitoring and control (which involves ensuring
residences, businesses and industries are connected to the new Sewage Treatment Plant which was established and made operational in January 2009; providing mechanisms for solid waste collection and disposal, inventorying area industries generating hazardous waste to ensure compliance with regulations for proper disposal, and measures for long-term monitoring of the site by APPCB for at least five years after remediation of the site.

**Site B: Remediation of the Dumpsite in Kadapa, AP (US$3.82 Million)**

32. Kadapa town with an area of 99.18 sq. km and estimated present population 3,350,000 (of which 91,715 are slum dwellers), with main economic activities agricultural markets, mining and business center, generates about 304 MT of waste every day. The Kadapa municipal waste dump site is situated near Akkayapalli village and also surrounded by the residential colonies of Vidyut Nagar and G.K Nagar. The area comes under the Municipal Corporation of Kadapa. The fine drainage density in southeast and southwest part confirms to physiography of the area, which has the lower infiltration levels. The central portion of the watershed with nearly level sloping condition depicts the medium to high infiltration rate resulting into the incremental groundwater levels. The Kadapa Municipal Corporation transports the waste to Ukkayya Palli at Patha Kadapa where 10.85 acres of land (peripheral length: 350 x 230 x 240 meters) is used for open dumping. The dump yard has no protection or physical demarcation. Waste has been dumped for several years, resulting in gross pollution of water, soil and air. Rag pickers burn the waste during summer to retrieve metal scrap; the smoke pollutes the air and causes respiratory problems. During the monsoon the dump yard is a breeding ground for mosquitoes, flies, fleas and other pathogenic organisms. Surface water runoff and percolation of leachate has contaminated the ground water.

33. The proposed plan to close and reclaim the waste dump site will result in significant reduction of pollution in soil; lower incidence of environment-related disease as well reduction in deleterious health effects on the rag-pickers who derive their livelihoods from the dump site. The proposed area is surrounded with large housing colonies that will benefit from improved environmental conditions. The remediation plan includes closure of the site, rehabilitation and converting the area into a public park which will significantly reduce health risks to the surrounding habitations, and will help increase the livability of the urban area and property values.

**Site C: Remediation of Dhapa old municipal dump site adjacent to East Kolkata Wetlands, WB (US$ 8.00 Million).**

34. The East Kolkata wetlands (a registered Ramsar Convention site) were used as a dumpsite (Dhapa municipal dump site)) for mixed waste (both solid and hazardous waste). Dumping and industrial development also have led to massive encroachment of the wetlands buffer zone. Currently there are 10,000 acres of wetlands left, whereas in 1945 there were 20,000 acres. Currently, segregation of waste is strictly enforced, and the wetland serves as a dumpsite for municipal solid waste only. Because hazardous waste from past indiscriminate disposal of mixed waste continues to affect the wetland and hence surface and groundwater, remediation of the site is deemed necessary. Active since the early 1980s, the Dhapa site is adjacent to the Airport Bypass Road of Kolkata and has a total area of 21 hectares. There are two dumping sites in the
total area: one site is 8.2 hectares and the other is approximately 12.8 hectares. It is the major dumping ground for the 3,500 MT of waste generated and disposed daily in Kolkata. The dump site belongs to the Kolkata Municipal Corporation (KMC). The remediation plan for this site will close the 8.21 hectares within the next two years, while the 12.8-hectare area will remain active for another five years and then closed and remediated. The KMC has plans to build a sanitary landfill adjacent to this dumpsite to address the waste disposal requirements.

35. The remediation plan of the site for closure is designed to mitigate health hazards from toxic pollution, which poses risks to community and ecology (especially humans and animals that come into direct contact with the waste and through food chain); reduce water and soil contamination in the land surrounding the site, that is used for small farming. Remediation of the old dump site would improve the aesthetic appearance of the area, help eliminate the nuisance of flies and other insects that breed intensively on the site, and very likely lower the incidence of environment-related disease. The proposed plan to close and reclaim the waste dump site is also expected to result in potential cost-savings with decreased levels of pollution in soil, potential cost savings, lower health care costs from lower incidence of environment-related disease. Improvement/better management of the site would facilitate setting up roadside amenities, which would generate income for local residents.

**Site D: Remediation of chemically contaminated site in the district of Hooghly, WB (US$ 10.06 Million).**

36. Hooghly is a large industrial area where chrome chemical, metallurgical, textile, galvanizing units are localized. They are spread out over a 15-km stretch along the Kolkata-Delhi road. The project sites are on public land, where indiscriminate disposal of chemical, highly toxic heavy metal bearing wastes have taken place in the past. Although, disposal of such waste have ceased, heavily contaminated land and water continues to pose serious threat to human health in the surrounding. Chromium (Cr-VI) wastes had been dumped at all the sites as confirmed by preliminary assessment. In most sites, the chromium contamination is found to be leachable under acidic conditions. The potential for further contamination of nearby land and water body is significant, particularly during rainfall due to spilling and overflow.

37. The site has medium to high hazard potential based on soil and groundwater analyses and assessment of health and environmental risks considering on existence of water body in the area, population density, likely impact on human health, existence of water supply source in the area, ground water table, contamination in soil and contamination in ground water. Hence the remediation plan objective will be to contain the contamination and provide conditions conducive to natural attenuation.

38. The preliminary remediation plans which were developed during project preparation will be refined during project implementation, following a detailed assessment and engineering design of site remediation plans and a separate contract will be issued for each site for civil works related to remediation.
Component 3: Project Management (Estimated US$5.85 Million).

39. The project governance structure is designed to ensure effectiveness and transparency of implementation and compliance with Bank fiduciary requirements. At central level, a Project Director (PD) has been appointed by the MOEF, which is the project implementing agency. The responsibilities of the PD will include overall supervision of the project, development and establishment of the NPRPS, national capacity building, outreach and communications, progress reporting, liaison with participating states and agencies as well as fiduciary, administrative and procurement for centrally managed activities. To support this role, MOEF will contract Management Consultants (MC) who will have adequate resources to produce the deliverables and functions expected of MOEF.

40. The MOEF will prepare semi-annual progress reports for approval by the Project Oversight Committee (POC) chaired by the Secretary of MOEF. On technical and scientific matters, specifically related to Component 2 of the project, the MOEF will be supported by a technical evaluation panel (TEP) constituted, as needed, with experts from CPCB, research institutes and organizations, including international experts.

41. At the state level, the responsibility for project implementation rests with the State Pollution Control Boards of AP and WB, respectively. The APPCB and WBPCB will be responsible for implementation of site remediation/rehabilitation plans and activities for overall improvement of environmental conditions in the project pilot areas. They will work under a common project implementation framework which includes establishing a Project Implementation Unit (PIU) and a system for monitoring and evaluation of project outcomes through field visits, regular exchange of information and progress reporting; auditing of investments and financial accounts, and beneficiary surveys. Each state has appointed project directors and has established Project Steering Committees (PSC), to be chaired by the Secretary Environment and convened by Member Secretary, PCB. The detailed responsibilities of national and state level implementation structures are described in Annex 6.

42. The project will finance the “Incremental Operating Costs” i.e. expenditures incurred by MOEF or the project states, all of which would not have been incurred in the absence of the project, including the hiring, operation and maintenance of motor vehicles, equipment and computer maintenance, office supplies, rent for office facilities, utilities, insurance, travel, honoraria for participating in meetings (at both Central and state level) and TEP, where appropriate, technical reviews, outreach and communication, preparation of publicity materials, and per diem costs for technical staff carrying out training, supervisory and quality control activities.

43. Detailed budgets and staffing for project management at national and state level are included in the Project Operational Manual (POM) prepared by MOEF, WB and AP.

4. Lessons learned and reflected in the project design

44. Importance of linking capacity building efforts with achieving results on the ground: Review of various implementation experiences has shown that uneven effectiveness in projects
for strengthening institutional effectiveness through capacity building where important challenges remain with respect to addressing environmental issues on the ground, and enforcement of and private sector compliance with pollution prevention legislation. Therefore, this project explicitly links capacity building to hands-on tangible investments.

45. **Previous Bank involvement in the sector significantly informed the project design:** With respect to issues of hazardous and municipal waste, and especially pollution from indiscriminate dumping in the past, there has not been any significant effort on record in India. The design of the proposed project greatly benefited from the operational experience of previous Bank involvement (e.g. Environment Management Capacity Building and India Pollution Prevention Project) which could be summarized as follows: a) the magnitude of the environmental problems needs buy-in and political commitment by key stakeholders, and therefore project gestation time could be longer than anticipated; b) the sustainability of capacity building projects, unless linked to concrete and demonstrable improvements in environmental quality could be undermined; and c) project impacts are linked to the leverage and ability to influence environmental protection and bring about actions, rather than to institutional capacity that remains unpracticed.

46. **Focus on a demand driven approach at State leve:** Most of the environmental projects in India experienced significant and unnecessary implementation delays largely due to the decision-making process of executing agencies and project design issues. While this remains a perennial institutional problem the design issues that have been avoided under the proposed project are: (a) excessive project complexity for a single agency; (b) objective is not driven by the social demand for project goals; (c) too many projects and activities without a conceptual linkage; and (d) project inputs focused on building capacity pay little attention to contributing to actual environmental improvements. This has been achieved by narrowing the project focus to targeted capacity building at state level with specific attention on cleaning orphan contaminated sites.

47. **The project design reflects remediation experience worldwide:** Worldwide, sectors associated with contamination of land and water over a wide area are non-ferrous and ferrous metallurgy and mining, chemical and petrochemical, oil production and refineries, thermal power generation etc. At the same time, the same sectors invariably remain the major sources of regional and local economic growth. In developed countries such as the US and Europe, most of the worst contaminated sites have been dealt with through legislation and regulations, such as the Superfund Program in the US; especially those that are affecting human health. Poland, Czech Republic, and Bulgaria have developed national regulations for cleanup of legacy pollution in support of their effort to attract foreign direct investments. On the other hand, developed countries like USA, Canada, Netherlands, Germany, UK, and Denmark have developed institutional structures and legal regimes for addressing legacy pollution under public demand and due to recognized risks. In US in 1970s, under the public demand a federal conservation and recovery legislation (CERCLA, 1980 and SARA, 1986) was enacted to respond directly to orphan contaminated sites which posed risks to public health and environment. Complementary cleanup programs financed by public funds were developed to rehabilitate identified sites and recover costs from responsible private parties when identifiable.

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9 IEG Performance Assessment Report of ECBM Project points to specific quality at entry issues related to design complexity disconnect of multiple project activities etc.
48. The Bank’s experience in similar projects: The proposed project builds on the Bank’s knowledge and experience from other regions and past project involvement. Several Bank projects addressed similar set of issues under specific country conditions. Zambia Copperbelt Project helped address a huge environmental legacy accrued over a seventy years of mining operations. Mitigation of regional environmental externalities in a densely populated and heavily polluted region was addressed as an emergency intervention averting a catastrophic failure of dilapidated tailing dams and removal of PCBs. A larger environmental management program for rehabilitation of Nkana smelter to improve compliance was implemented. China’s Second Beijing Environmental Project used catchment based approach to reduce environmental health hazards from untreated waste infiltrating surface and groundwater aiming at long term downstream benefits in the form of improved quality of water used for irrigation. Bolivia Environment, Industry and Mining Project used risk-based eligibility criteria for selection of investments as its major criteria with regard to reducing public health impacts. Bulgaria Environmental Remediation Pilot Project has undertaken a major effort to clean up one specific legacy site in an effort to attract FDI and ensure future regulatory compliance of a major metallurgical industry.

49. Investments in remediation of contaminated areas are likely to be unsustainable if not accompanied by an institutional development program that is both realistic and owned by the client. Addressing the technical and institutional issues of remediation of hazardous waste and solid waste dumps is both unique and challenging. In doing so, India will draw upon the experience of the Bank and international experts to develop customized technical solutions in order to meet a set of performance indicators and reduce the risks associated with site specific problems. The proposed project will stimulate more effective coordination among key government agencies and concerned parties that mitigate the risk of potential implementation failures. This includes engaging national and state institutions from the earliest stages of the project. Competent and efficient management of investment and capacity building efforts by the MOEF as well as technical experts from the states will be essential in ensuring the viability and sustainability of the project.

50. Community mobilization over environmental issues, involvement of community in a multi-stakeholder compliance mechanism and intensive monitoring and supervision of results directed mainly at meeting development objectives would attest to the Borrower the feasibility of scaling up. Extensive involvement of local institutions and stakeholders—particularly in monitoring of area activities—has also been a critical factor in the success of other environmental remediation projects supported by the Bank (e.g. the Bulgaria Environmental Remediation Pilot Project). International experience in environmental remediation projects confirms the importance of using a risk assessment approach to determine the level of effort. Mitigating or reducing the risk to local environmental resources, public health and the economy to an acceptable level should prevail over policies that are merely based on fixed remediation standards.

51. Given all of the above, the following approaches will be employed to achieve the project development objective:

52. Learning-by-doing approach: Training courses and learning activities will enhance the building of individual skills but more significant outcomes would be derived from practical,
guided application of best practices. This approach will be applied by providing both technical assistance and investment support for tackling real problems in a manner which builds the confidence and capability of key institutional players to expand the approach in other problem areas.

53. **Integrated pollution management:** Pollution problems addressed in the project have several interrelated causes: past dumping of waste, ongoing pollution from public and private sector industries; untreated discharges from SMEs; and often also by untreated municipal solid waste and wastewater. Individual interventions designed to treat one problem often remain less effective as one improvement cannot make a difference to the overall problem. Best practice approaches take an integrated or area-wide approach which involves concerned stakeholder and beneficiaries at every stage. Such is the project approach which is more sustainable in the medium and long term, especially when integrated area measures are supported by institutional capacity.

5. **Alternatives considered and reasons for rejection**

54. **No-project alternative:** The option of having no project and a couple of design alternatives were considered. The option of not having a project was rejected due to the urgency of issues and the negative impact on public health in the areas already listed as “legacy hot spots”. The issues in the purview of the project had attracted considerable public attention. Most highly polluted sites are located in densely populated and economically disadvantaged neighborhoods which continue to be exposed to heavily contaminated soils, surface and ground water. Severe contamination seriously undermines people’s livelihoods, affects public health, thus having both short and long term impact on wage earnings and medical costs. Not having the CBIPM project could result in the following: (a) in the absence of a comprehensive remediation framework, technically inadequate and superficial remedial action may take place which is risky for the environment and public health; and may result in transporting of pollution to another place and inefficient use of public funds; (b) public benefits from creating cleaner neighborhoods will be forgone and the degradation of local environment will continue; and (c) the economic value of polluted land will not be restored nor put into a productive use, instead more “green field” developments will be undertaken; and (d) no capacity is built to deal with future hazardous waste sites, which are bound to develop as India’s economic development progresses so rapidly.

55. **Remediation of chemically contaminated site versus efforts on municipal solid waste management.** The project’s initial proposal was to expand the scope and devote a major part of the project to address municipal solid waste management issues in small towns in highly sensitive ecological settings. It was rejected as it was at best considered less effective in the context of this project. Similarly, part of the initial concept considered some assistance for addressing air pollution issues from ongoing industrial operations in the area. Consequently, this was rejected in view of reducing the complexity of the project.

56. **Traditional capacity building versus ‘learning by doing’**. In addition to the above the alternative to invest in traditional capacity building through training and knowledge transfer was reconsidered in favor of the project-based learning and technology transfer. This is a demand-based model which aims to establish the necessary human capital to pioneer cost effective
remediation of legacy pollution through the practical application of learned skills on site and an informed and rational prioritization that would lead to an uptake of project outcomes.

4. IMPLEMENTATION

1. Partnership Arrangements

57. Partnership for dissemination of good practice lessons and innovative clean up soil reclamation technologies will be explored through the already established cooperation with Blacksmith Institute and the sponsoring Asian Development Bank. A number of development partners such as ADB, USAID and GTZ have undertaken various initiatives to support MOEF through technical assistance activities focusing on enhancing overall capacity of MOEF for improved environmental management. GTZ in partnership with CPCB has been involved in training on site assessment methodologies. In addition, a project partnership has been established with USAID through the Asian Environmental Compliance and Enforcement Network (AECEN), a regional forum that promotes improved compliance with environmental legal requirements in Asia through exchange of innovative policies. AECEN provided a small start up grant for establishing WB ECAC on which the Bank will base its assistance for strengthening and expansion. The extent of institutional and sector objectives of individual development partners are frequently constrained by the limited scope of required investments for remediation of an area. The project will provide an avenue for the efforts of each development partner to be combined to leverage higher level institutional and sector targets that could be supported through various investments. There is clearly a common interest amongst the development partners and the MOEF, CPCB, GOAP and GOWB to ensure that all activities are coordinated and contribute positively to improvement of planning and environmental sustainability in development projects. The partnership with development partners aims broadly to support three strategic areas: (i) strengthening MOEF’s capacity for improved management of hazardous waste management in particular focus on policy framework and institutional structure for remediation of contaminated legacy and active sites, (ii) information transparency and improved project management capacity, and (iii) improved monitoring of key results of such interventions.

2. Institutional and Implementation Arrangements

58. A Project Preparation Cell was established in MOEF since 2006 to handle the preparation of the project. To ensure that an appropriate management structure with adequate staff skills, the MOEF has nominated a Project Director, who will be supported by Management Consultants (MC), to support project implementation. The MOEF will be responsible for implementation of the Governance and Accountability Action Plan (GAAP) and to oversee that respective actions are integrated in the day to day implementation at state level. The Management Consultants will

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10 See http://www.blacksmithinstitute.org

11 GTZ is Government of Germany development aid Agency with has the corporate form of a “GmbH” (closed limited company) in the private sector. It is owned by the German Federal Government.
be in place by October 2010. At state level, APPCB and WBPCB will establish PIUs staffed as per the agreed staffing plan.

59. A Project Operational Manual has been developed, which provides details of implementation and reporting processes and responsibilities of centre and states. It includes details regarding implementation and monitoring of project and activity level plans, including those detailed in the Environmental and Social Management Framework (ESMF). All state level activities will be carried out with an emphasis on regular and substantial involvement of project stakeholders, particularly local communities. At state levels, PIUs have been established in the state PCBs and Project Directors have been designated. The state level project directors will report for administrative purposes to their respective Member Secretaries of PCB. PIUs will be staffed with technical experts, FM, Environment, Social and Procurement specialists and support staff paid by the Project. Each state has established PSCs, to be chaired by the Secretary Environment and convened by Member Secretary. The membership of the PSC will include state departments and agencies that are concerned with project activities (e.g. Municipal Corporations, Industrial Development Corporation, Department of Urban Development, Academia etc.)

60. Overall, the MOEF and participating States through allocations and resources obtained from the Planning Commission would provide counterpart financing to the project, as specified in the POM. Prior to project effectiveness, MOEF will open a project account under the head of Externally Aided Projects and on an annual basis will request as part of the GOI budget cycle the necessary funds to cover the yearly cost of project activity pipeline over a period of 5 years. MOEF will transfer funds directly to the separate project Bank accounts maintained at APPCB and WBPCB, which will receive and utilize funds to implement the project investments. The project funds will be operated at national level through a special account operated by Controller of Aid Accounts and Audit (CAA&A) and replenished on a reimbursable basis. The GOAP and GOWB will contribute funds for state-level investment programs, according to the POM.

61. Capacity building activities related to preparation of the NPRPS will be managed by MOEF. State specific capacity building activities supporting pilot remediation of hazardous waste sites and closure of old dumpsites will be carried out by the two states. These will include technical assistance, training, monitoring, consultancies, knowledge dissemination and proper functioning of project oversight and management structures. Project funds may also be used to reimburse the cost of studies required for preparation of new sub-projects (i.e. sub-projects other than those developed during the preparation of CBIPM project) that are found to be eligible and are technically feasible for future funding. It will be important to build a bank of “good practices” and skills at state level for rolling on the NPRPS once the program is launched.

3. Monitoring and Evaluation of Outcomes/Results

62. Monitoring and Evaluation (M&E) of Project Outcomes. The project will be monitored from project start, with a mid-term review and final evaluation at completion. Indicators have been selected which cater to the specific institutional, economic, social and environmental context of the pilot investments. The baseline for monitoring remediation outcomes will be established during the detailed profiling and mapping of the pollution. During implementation, depending on the indicator, periodic updates should be undertaken.
63. The project will also strengthen the regulatory and implementation capacity of environmental institutions in the methods used for the economic and financial analyses. This will include engaging stakeholders from the public and private sector entities (e.g. SMEs), including NGOs and representatives from other interest groups (e.g. local indigenous peoples such as scheduled castes, scheduled tribes, or other backward castes. This will allow for a transparent assessment of the current pollution situation on the ground, and recording what intervening mechanisms can be used to remediate them (i.e. at what costs), the benefits of remediation and of the lessons learned.

64. MOEF will be responsible for the overall monitoring and supervision of the project on behalf of the Government. A series of reports will be prepared to allow M&E of project outcomes.

- **Project indicators**: MOEF will report on a quarterly basis to the Bank on the implementation of all the components of the project, in particular: (a) implementation schedules updated by component; (b) commitment and disbursement by component; and (c) findings, recommendations, agreement reached, main issues and decisions sought. Interim quarterly reports fed from the State PIUs and final semi-annual reports issued by the MOEF on the achievement of key performance indicators included in the Results Framework and Monitoring Indicators will also be provided.

- **Performance indicators**: MOEF will report on an annual basis the achievement towards the targets stipulated in the Results Framework. These indicators will be reviewed on a six-monthly basis.

65. **Project supervision and periodic reviews**. The Bank’s supervision will include field visits and discussion with relevant stakeholders (local agencies, farmers, community, NGO etc), government agencies and implementing agencies. Supervision missions at least twice a year will monitor implementation, compliance with environmental and safeguard provisions, and will evaluate project performance according to established performance monitoring indicators. The Bank will also review progress/audit reports to evaluate the overall progress in preparation of the NPRPS. All project monitoring reports, including the results of audits, would be made public in accessible forms, including on MOEF’s website. A Mid Term Review (MTR) of project performance will be carried out together with MOEF, the DEA, States, and the Bank about three years after project effectiveness. Prior to this review, MOEF will carry out a review of the project progress and implementation performance that would include proposals for immediate and/or longer term remedy of issues, if needed. An Implementation Completion Report will be prepared within six months of the project closing. MOEF and the Government will contribute their own evaluation of the project.

4. **Sustainability**

66. From a development perspective, the project will support environmentally sustainable local development. From an operational perspective the project will equip the Indian institutions with methodological tools and technical skills through the NPRPS for addressing environmental legacy problems related to weak enforcement of HWM Rules accrued during rapid industrialization. It will thus increase the long-term institutional capacity to address potential risks to sustainability. It is expected that the capacity established through the project will
continue to raise the demand for effective remediation of hazardous waste sites and for the associated funding across India. Ultimately, more effective involvement of local authorities and neighboring communities will promote sustainable use of rehabilitated sites and will diminish the extent of indiscriminate disposal of hazardous wastes.

67. The project has a significant development value in terms of learning and innovation. The approach used to address the sector issues is designed to respond to the evolving needs of environmental agencies and key stakeholders by promoting innovative approaches and incentives through project-based learning during implementation of demonstration investments that will serve as models for other state governments and industries and ensure sustainability and replicability. One frequent issue related to projects involving environmental protection and management is continuation of monitoring activities over longer term when project support will end. The approach adopted for project implementation and longer-term support to the NPRPS allows for continuous reviews and feedback, thus enhancing the chances of success at every phase and reducing the risk of unsustainable investment. Furthermore, the project, in aiming to find a permanent solution for the problem with legacy sites, will demonstrate economically, environmentally and socially sustainable approaches to restore the degraded local environmental settings of communities which will then be self sustaining. For these reasons, the likelihood of project outputs and outcomes continuing beyond the life of the project is high.

5. Critical risks and possible controversial aspects

68. Risk identification. The project supports the remediation of contaminated areas for mitigating health and environmental risks and the strengthening of the institutional and governance framework. During project preparation, extensive effort was put on operational, institutional and governance risk identification and mitigation. These assessments include (i) project specific operational and fiduciary assessments carried out by the Bank; and (ii) wider institutional assessments carried out by the Bank. These have pointed to various risks and weaknesses at the project, implementing agency and sector levels.

69. Operational Risk Mitigation. Mitigating measures would be put in place to help ensure that the project achieves its development objectives and targeted results. Where the identified risks stem from MOEF’s weak capacity or experience, appropriate mitigation measures such as the provision of capacity building and training (e.g. in financial management, procurement, environmental and social safeguards, operation and maintenance), hiring implementation assistance consultants would be put in place. Since operational complexities pose long-term sustainability or reputational issues and where the magnitude of future risks cannot be easily ascertained in advance (e.g., remediation of contaminated sites with expected reduction of health and environmental impacts), the project will undertake these activities as manageable demonstration pilots with limited and realistic scope to balance the potential project benefits against the risks involved. Hedging the risk at state level where actual pilot remediation will be carried out is also considered by mirroring the oversight over the state implementing agency and making accountable to State Governments. Consideration for scaling up would be taken outside the project activities where budget support would be designed as part of the analytical and technical assistance activities such as NPRPS and taking account of the lessons learned.
70. **Institutional and Governance Risk Mitigation.** To mitigate the wider institutional and governance risks, a GAAP (Annex 15) and institutional strengthening framework were designed and discussed during project preparation. The limited ability of a Specific Investment Credit to comprehensively address risks beyond the project level or scope is recognized. Consequently, a multi-pronged approach would be applied, utilizing the project construct as well as partnership arrangements with the MOEF and GOAP and GOWB to mitigate these risks and thus strengthen the MOEF and state level institutional and accountability frameworks, and contribute to improving institutional wide governance and accountability. The following principles would be adopted:

- **Project level risks:** The project would include various investment, procurement and financial management risk control actions to safeguard project funds against misuse and ensure that they are utilized in an efficient way and for their intended purposes; and

- **Institutional level risks:** The project implementation arrangements, monitoring and evaluation arrangements, conditionality, covenants and communications activities would be utilized to improve the overall institutional and accountability structures of implementing agencies.

71. It is expected that with the mitigation measures, the risks would be manageable during implementation. Nevertheless, the team is taking precautionary approach by rating the overall project risk as **substantial.** Institutional strengthening measures will require time to stabilize and become established. To ensure the adequate implementation of risk mitigation actions, the Bank will maintain close oversight of project implementation (including implementation support for close and continuous supervision). The Table below summarizes the key potential implementation risks and mitigation measures:
<table>
<thead>
<tr>
<th>Risk and Institutional Capacity</th>
<th>Symptoms of risk</th>
<th>Rating</th>
<th>Risk Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy framework for hazardous waste management is well developed, but remains less effective in supporting rehabilitation of polluted sites.</td>
<td>S</td>
<td>The project preparation includes the development of a comprehensive methodological framework for risk assessment and preparation of implementation plans for rehabilitation and remediation of polluted sites. The framework will be used to train national and state implementing agencies to carry out demonstration pilots and develop a NPRPS. Project-based learning will complement the traditional training to ensure state and national implementing agencies acquire basic understanding and skills necessary how to address the sector issues beyond the command and control approach. Also implementation arrangements at central level will be mirrored by similar arrangements at state level. The oversight function for the entire project will remain with a Project Oversight Committee chaired by Secretary MOEF and members from CPCB, Planning Commission and high level officials of the participating states. The POC will be established by an official notification of MOEF.</td>
<td></td>
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<tr>
<td>Stakeholder institutions fail to fulfill their roles due to lacking capacity and lack of internal coordination.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical/ Design</th>
<th>Symptoms of risk</th>
<th>Rating</th>
<th>Risk Mitigation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional weakness of local environmental/urban bodies jeopardizes the effort for sustaining cleanliness of the sites after rehabilitation.</td>
<td>M</td>
<td>Local stakeholders’ engagement will be central to the success of the rehabilitation efforts and protecting the sites from secondary contamination and indiscriminate waste disposal. Site ‘after care’ monitoring plans will be mandatory elements of the remediation/rehabilitation implementation plans. The project will provide technical assistance to SPCBs for improved compliance of the SMEs in project areas, and will encourage public disclosure of information. To do that arrangements to develop capacity and provide adequate resources to WB ECAC to effectively engage SMEs in the area will be made during years 1 and 2. Validation of pollution parameters will be undertaken prior to undertaking detailed engineering solutions to determine site performance indicators. Performance indicators will allow for tracking trends in pollution reduction depending on the nature of implemented measures. Sites which will be selected will be with clear ownership, and for all demonstration pilot states or municipality owned.</td>
<td></td>
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<tr>
<td>Private sector (SMEs) in the area resists cooperating with the project.</td>
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<td></td>
<td></td>
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<tr>
<td>Demonstration projects meeting performance standards at a slower pace than anticipated.</td>
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</tr>
<tr>
<td>Financial management</td>
<td>Lack of fiduciary controls in the systems of implementing agencies could expose the entire project objectives at risk.</td>
<td>S</td>
<td>Entry level: Clarity on roles and responsibilities of MOEF, APPCB and WBPCB from FM perspective while finalizing the project design. Preparation of financial guidelines by MOEF to be part of POM. Financial management assessment has been completed and an agreement on future steps to strengthen fiduciary controls in the implementation of the project has been made during appraisal. Project controls: In accordance with the agreed financial arrangements documented in project financial guidelines, it would need to be ensured by the client that they are implemented and therefore provide assurance on the use of funds for intended purpose. Financial reporting: Acquisitions of software by APPCB acceptable to the Bank, adequate staffing and training of FM staff at MOEF, APPCB and WBPCB in order to ensure reliability of accounting and financial information; and adequate monitoring by MOEF for the expenditure incurred at all levels. Display of project’s IUFRs and audited financial statements on MOEF’s web site for transparency</td>
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</tr>
<tr>
<td>Procurement</td>
<td>Delays in procurement due to multiple levels of approvals in MOEF and States. Turn-over of procurements staff or lack of adequate skills Lack of clear and streamlined communication and correspondence on procurement and disbursement issues</td>
<td>M</td>
<td>Close monitoring by the MOEF and State PIUs for their respective proposals to ensure that the same are cleared without delay. A procurement file containing all up-to-date procurement documents (guidelines, templates, standard bidding documents, standard evaluation reports) shall be prepared and shared with the PIUs in addition to training of at least two staff in each PIU. Joint project launch workshop which covers review of procurement plans and responsibilities. To avoid any confusion a clear communication procedure on procurement and disbursement matter will be agreed that correspondence should be routed to the Bank directly by State PIUs and copied to MOEF. This will allow the Project Director to keep track of all timeline and take corrective measures</td>
</tr>
<tr>
<td>Social and environmental safeguards</td>
<td>ESMF implementation is in place, but if not managed properly could create false expectations on the part of communities on and/or surrounding the project sites.</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>Transport of waste can create a problem if not handled properly.</td>
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</tbody>
</table>

| Implementation | Implementation performance varies as a result of lack of institutional incentives to implement. |
| Lack of prior experience and slow learning curve at state level slows down the implementation of demonstration pilots. |
| Implementing agencies may not be willing to make the project truly participatory and engage affected communities. | M |
| Create an information window in the implementing authority (SPCB, and other related agencies) that will enable the public and especially downstream users of resources, to have access to project information. |
| Publish site details in the local media. |
| Establish adequate oversight structure, project management system, implementation assistance services and progress reporting requirements with clear responsibilities and accountability provisions. |
| Capacity Building Component will support a network of SPCB professionals and project based learning. |
| The provisions of the RTI Act will be integrated in the project design and GAAP. |
| Project monitoring will be done by a third party (similar scheme implemented by Gujarat Pollution Control Board). |

| Sustainability | The Bank support yields positive demonstration results but the GOI fails to support the uptake of the outcomes by delaying the mobilization of the necessary financial support for implementation of the NPRPS. | M |
| Leadership by the MOEF and States strongly engaged in oversight of the project results and briefed regularly during supervision. |
| Economic and Financial justification for the GOI financing developed using project information derived from the pilot demonstration sites will support the GOI approval of NPRPS. |
| Provide updated information on a regular basis to secure support of key Government agencies (DEA, Planning Commission) and officials, and NGOs during project implementation. |

| Overall Risk | S |
6. **Loan/Credit Conditions and Covenants**

i). Establish and maintain a Project Oversight Committee throughout the period of project implementation, which shall be chaired by the Secretary MOEF or a designated official in the Secretary’s absence and which shall include designated representatives from the CPCB, Planning Commission, Department of Economic Affairs, Ministry of Urban Development, Ministry of Industry and the chairpersons of the state steering committees as *ex-officio* members;

ii). Designate and maintain throughout the period of project implementation, a Project Director, who shall be responsible for the effective and timely coordination and implementation of project activities at the central level and provide guidance to the PIUs to be established in WB and AP and engage such management consultants as may be necessary to assist the Project Director in the carrying out of responsibilities;

iii). Ensure that the Project’s activities are consistent with the POM; and

iv). Ensure that the Project Director shall have adequate decision-making authority required for the effective, efficient and timely implementation of project activities.

5. **APPRAISAL SUMMARY**

   a. **Economic Analysis:**

   72. This capacity building project includes both capacity building and investment components. The economic analysis here focuses on quantifying in monetary terms the benefits derived from the pilot investments. While caution should be used in the interpretation of the analysis, as it only provides an indication of the economic benefits generated by one component of the project, it nevertheless provides an important indication of the benefits that the project is expected to generate not only from its investment, but by enabling national and state authorities to undertake future such investments.

   73. Component 1 of the project supports capacity building of environmental institutions at the state level. Improving environmental monitoring and enforcement will undoubtedly generate substantial social benefits. The preparation of the NPRPS or ECACs will not generate direct economic benefits by itself. However, the implementation of the program and the proper functioning of the environmental compliance assistance centers will generate long term environmental and social benefits. These benefits will be mainly associated with a reduction in air, water and soil pollution and hence an improvement in human health and quality of life of the Indian citizens. Undoubtedly, the benefits of implementation of the NPRPS will extend well beyond the project life. Similarly, the improved compliance of industries with environmental norms and regulations will also carry significant long term benefits. These benefits will accrue both to the industries: many companies have found that modifying their business practice to reduce pollution load and be less wasteful, can be cost effective and beneficial to their public image (and also to the public at large by reducing health hazards and improving quality of life).
74. Component 2 of the project funds the clean-up and rehabilitation of four polluted sites. The economic analysis has selected one legacy hazardous waste site (NMK Lake) and one old municipal dumpsite (Kadapa Dumpsite) to undertake a rapid cost benefit analysis (CBA). The objective of these two CBAs is to illustrate the potential economic benefits that can be generated from the clean up and rehabilitation of polluted sites.

75. The NMK lake has witnessed strong industrial pollution over the past years; it is now basically a dead lake and cannot support any kind of aquatic life. The analysis looks at the cost of improvements in the lake area which include: (i) technical assistance and investment costs needed for the clean-up and rehabilitation of the lake as identified under this project, (ii) investment, operation and maintenance costs needed for the sewage treatment plant currently operating in the Kunta lake area and (iii) pollution abatement costs that need to be incurred by remaining industries to reduce their pollution loads either by installing abatement technology or by relocating to more suitable industrial zones. The benefits include: (i) recreational benefits that will be generated from cleaning up the sites, (ii) reduction in public health hazards, (iii) generation of employment especially for unskilled labors, (iv) increase in agricultural productivity for the AP Agricultural University and (v) reduction in water supply costs. Using a time frame of 35 years and a discount rate of 10%, the net present value was estimated at Rs. 186.7 million (US$ 4.2 million) and the benefit cost ratio at 1.28. A more detailed analysis is provided in Annex 9.

76. The years of uncontrolled dumping at Kadapa site has resulted in gross pollution of water, soil and air. The proximity of the dump to residential areas poses a serious health hazard, in addition to odor, insects and visual disturbance. By rehabilitating the dumpsite, the project will result in significant environmental and health benefits to nearby localities as well as global benefits, through the reduction of greenhouse gas emission. The benefits generated by such action include (i) employment generation especially to unskilled labors, (ii) improvement in health, aesthetic and recreational value to nearby residential areas (this benefit has been estimated using the hedonic property price method during a rapid onsite survey), (iii) reduction in greenhouse gas (since the primary component of landfill gas are methane and CO₂, flaring of landfill gas will convert methane to carbon dioxide and through this conversion reduce the global warming potential of methane by approximately 21 times) and (iv) marginal agricultural benefits. The net present value was estimated at Rs 44 million (or US$ 0.8 million) and the benefit cost ratio was estimated at 1.65.

77. Given time and budget constraints to undertake this economic analysis, benefit transfer methods and secondary data sources have been used and the analysis is limited to quantifying benefits that were easily identifiable. Despite these limitations, estimates show that the rehabilitation of these polluted sites provide positive net present social benefit and a high benefit cost ratio. A more detailed analysis using primary data will provide a more accurate and probably higher estimate of potential benefits.

78. The cost benefits analysis of cleaning up NMK Lake and Kadapa dumpsite show that both direct and indirect benefits are significant. This includes public type of services such as: recreational and aesthetic values, disposal of pollution; private type of goods and services such
as health benefits; improve agricultural productivity, fishery production and employment generation; as well as global benefits such as the reduction of greenhouse gas.

b. Technical

79. Remediation of legacy pollution could be technically complex specifically with regard to cleaning of soil and groundwater to acceptable levels, which are commensurate with the risk reduction targets. The preliminary quantitative risk assessment generally prescribes methods and assumptions to ensure that exposure and risks are not underestimated. The detailed design of site specific remediation measures will be determined by the remedial objective and requires a detailed investigation and profiling of site pollution to determine the extent of contamination and contaminant levels which varies and is location specific. It is determined by the nature of past activities, size, types of processes that were used, types and amounts of waste materials and substances, hydro-geological, level of ground water table, present and future land uses, and targets at risk. In some cases it may be neither economically or technologically feasible to achieve “green field “ cleanliness within a short time and considering the limitation of economic value addition of the reclaimed land and it future land use. While the project will facilitate the development of adoption of acceptable and feasible standards for cleanup of contaminated soils and groundwater, for the project remediation pilots a set of agreed performance benchmarks consistent with national standards (when available) and international best practices will apply. The contaminated sites need monitoring post remediation. Planning and establishing of a monitoring system will be a component of each remediation plan and will be used to measure whether the remediation measures were effective and the remediation objective achieved. The remedial approach is also site specific and determined by the availability of infrastructure for proper treatment and disposal of hazardous waste in the area. Both AP and WB have scientifically designed Hazardous waste management facilities developed and operated by private sector.

c. Fiduciary

80. The project will be coordinated by the MOEF. State plans for remediation of polluted sites and activities for strengthening of PCBs will be implemented by the PIUs established in APPCB and WBPCB. The implementation arrangements are designed in a manner which will ensure maximum transparency and efficient fiduciary arrangements and will be adequate to account and report for project resources and expenditures.

81. The funds for the project will be handled by the MOEF at the central level and will be recorded in its books and accounts. At state level, the PIUs will incur expenditures for procurement of services, goods and works and project management. State PIU will receive and authorized allocation in a designated project bank account which will be replenished on reimbursable basis by the MOEF/MC based on annual activity plan and the expenditures incurred. A POM outlines the financial and operational controls under the project for various cost centers. Annual external audit will be conducted by independent firm of chartered accountants acceptable to the Bank under agreed Terms of Reference included in the POM. Each PIU will hire qualified one FM specialist and one accountant. Off the shelf accounting software has been installed in the PIUs to enable timely preparation of project financial statements and
interim financial reporting. Disbursement will be based on IUFR. Annual activity plans prepared by the PIUs and approved before December each year will provide for annual project expenditure forecasts and cash requirements. The audit at the central level will be conducted by CAG and MoEF will be responsible for submission of consolidated audited financial statements of the project to the Bank.

82. Specific procurement capacity assessments have been carried out for MOEF, APPCB and WBPCB, who will be responsible for implementing the activities identified. A full time procurement Specialist will be hired in each of the state PIUs in WB and AP by September 1, 2010 and will be retained through the project life. Three APPCB procurement staff has completed the recommended procurement training and procurement staff from WBPCB will be trained as soon as possible. Procurement plans have been prepared by APPCB, WBPCB and MoEF.

83. Procurement capacity assessment studies for various entities and procurement post reviews of projects in India have pointed out that procurement capacity needs some strengthening. Therefore, the APPCB and WBPCB included specific units overseeing procurement and financial management and will engage full-time procurement specialists for the entire project implementation period. The relevant procurement risk mitigation measures are discussed in detail in Annex 8. Procurement will be done in accordance with the Procurement Manual for the project, which is consistent with the following:

- World Bank Guidelines: Procurement under IBRD Loans and IDA Credits (dated May 2004 and revised in October 2006);
- World Bank Guidelines: Selection and Employment of Consultants by World Bank Borrowers (dated May 2004 and revised in October 2006);
- provisions stipulated in the Financing Agreement.

84. The Bank’s Standard Bidding Documents for international competitive bidding (ICB), Requests for Proposals, and Forms of Consultant Contract will be used. For procurement works and goods following national competitive bidding (NCB) procedures, the India Specific Bid documents for NCBs (with updated fraud and corruption clauses as per latest Procurement Guidelines) will be used. In case of conflict or contradiction between the Bank’s Procurement/Selection Guidelines/Procedures and any national rules and regulations, the Bank's Guidelines: Procurement Under IBRD Loans and IDA Credits / Guidelines: Selection and Employment of Consultants by World bank Borrowers will take precedence. A summary of the procurement capacity assessment of the implementing agencies and precise arrangements are presented in Annex 8.

85. Retroactive Financing: The project has initiated agreed preparatory activities by the central levels and the state implementing agencies. Therefore retroactive financing of expenditures under Category 1 will be provided subject to a limit of US$ 2.5 million from IBRD resources and US$ 3.9 million from IDA. These will be claimed by the project as part of the financial report for the 12 month period prior to signature. Claims may be submitted provided that the implementing agencies have followed Bank’s procurement procedures.
86. A Project Preparation Facility for the project was established for US$ 570,000 (reference: Q5270) for the project, which was valid until March 31, 2010. Audit reports for the expenditures incurred under PPF until 31 March 2010 will need to be submitted by 30 September 2010.

d. Social

87. With regards to social impacts at the sites, the Social Management Plans (SMPs) were prepared for each pilot site but they will be updated as necessary and re-disclosed during the process of developing detailed engineering remediation plans. The implementation of site SMPs will help ensure that activities under the project will (i) avoid negative impacts on the social and socio-economic welfare of project-affected peoples (PAPs); (ii) raise health awareness among PAPs; (iii) restore income streams to those whose livelihoods have been interrupted by project activities— for example, through compensatory measures such as providing training to PAPs for improved livelihoods; (iv) restore shelter in the unlikely event that any PAPs must move as a result of project activities; and (v) be targeted so that protective and compensatory measures are directed to only those who objectively qualify as PAPs. The implementation progress will be reported in the semi-annual progress report issued by PIUs.

e. Environment

88. Overall, the project activities will yield significant environmental improvements and long term public health benefits. The nature of the project is to address the impact of past inaction and lack of proper environmental management. In that sense project investments will result in better managed and healthier local environment. The project has been classified as a Safeguards Category “A” primarily to reflect some temporary risks during remediation/rehabilitation works, designed to eliminate the environmental health hazards.

f. Safeguard Policies

89. Under the Environmental and Social Assessment (ESA) all project sites have been screened for potential environmental and social impacts. The system to support the process of environmental review and clearance is defined through the Environmental and Social Management Framework (ESMF). The ESMF provides general policies, guidelines, and procedures for the management of environmental and social issues to be integrated into the implementation of site remediation activities. Prior to appraisal, the ESMF was disclosed by the MOEF, APPCB and WBPCB on their websites, according to the applicable Bank disclosure policies.

90. The site implementation plans, EMPs will be refined based on the detailed design of remediation plans and re-disclosed, in accordance with ESMF. The implementation of site EMPs will help ensure that activities under the project will (i) protect human health; (ii) enhance positive environmental outcomes; and (iii) prevent negative environmental impacts as a result of either individual project components or their cumulative effects. Implementation of EMPs will be monitored by APPCB and WBPCB. The implementation progress will be reported in the semi-annual progress report issued by PIUs.

12 “Environment” is broadly defined to include the natural environment (air, water and land), and human health and safety.
91. Details on the safeguards policies triggered by project activities are provided in Annex 10.

<table>
<thead>
<tr>
<th>Safeguard Policies Triggered by the Project</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Assessment (OP/BP/GP 4.01)</td>
<td>[X]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Natural Habitats (OP/BP 4.04)</td>
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<td>Pest Management (OP 4.09)</td>
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<td>Cultural Property (OPN 11.03, being revised as OP 4.11)</td>
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<td>Involuntary Resettlement (OP/BP 4.12)</td>
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<td>Indigenous Peoples (OD 4.20, being revised as OP 4.10)</td>
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<td>Forests (OP/BP 4.36)</td>
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<td>Safety of Dams (OP/BP 4.37)</td>
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<td>Projects on International Waterways (OP/BP/GP 7.50)</td>
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**g. Policy Exceptions and Readiness**

92. A project readiness matrix has been included which provided details on the implementation readiness during the first year of the project.
Annex 1: Country and Sector or Program Background

INDIA: India - Capacity Building for Industrial Pollution Management

1. Robust Economic growth in India is creating opportunities for people but also presents serious environmental challenge. The Indian economy is one of the fastest-growing in the world with a consistent average growth of above 9% over the past four years. The country aspires to achieve and sustain an average annual growth rate of 8% or higher, much needed for eliminating poverty, in which still 354 million of its people live, representing 27% of the world poor. While poverty, disparity and challenges remain, India’s story over the past decade has been, overall, that of success and hope. Robust economic growth has already allowed millions of people to come out of the poverty trap, with the national poverty ratio halving from 36 to 18% in less than 10 years - from 1994 to 2002 (NIRD, 2003). Estimates suggest that about 300 million, out of roughly 1 billion people, have joined middle class ranks in India. A report by Goldman Sachs concludes that, among Brazil, Russia, India and China, India is likely to grow the fastest over the next 30 to 50 years by leveraging its demographic advantages and through continued development. Rapid economic growth and the respective changes in consumption patterns are also drastically changing the nature and scale of impact on environment and natural resources, and testing the carrying capacity of the natural ecosystems upon which much of the country’s economic growth depends. Growth of the India’s economy is led by robust performance of the industry sector. Impressive growth in manufacturing sector (7% average over the past 10 years) is a reflection of growth trends (Reserve Bank of India, 2005), in addition to electronics and information technology sectors, in textiles, pharmaceuticals, and basic chemicals.

2. A large portion of growth in industrial manufacturing includes environmentally polluting sectors. The production of petrochemicals, pesticides, pharmaceuticals, textiles, dyes, fertilizers, leather products, paint, and chlor-alkali has grown significantly. These industries produce hazardous wastes containing heavy metals, cyanides, pesticides, complex aromatic compounds (such as polychlorinated biphenyls), and other toxics. Several toxic waste hot spots—such as the industrial belt of Vapi and Vadodara in Gujarat, Thane-Belapur in Maharashtra, and Patancheru-Bollarm in AP—developed in this period. These industries, belonging to the so-called “Red category” of major polluting processes designated by the Central Pollution Control Board (CPCB), have significant environmental externalities in terms of water effluent and/or air emissions, and hazardous waste. A notorious case illustrating a “dark” side (literally) of the India’s glorious growth story, is looming pollution of ground water and land from the indiscriminate disposal of chemically hazardous wastes (for example Chromium pollution in Kanpur, Chennai and Hooghly; Organic chemical pollution in Hyderabad, Thirupur, Surat, Acid and dyes related issues in Gujarat etc).

3. Management of environment and health impacts from hazardous waste disposal needs serious attention. The issue of hazardous wastes management has been identified as a major thrust area under the 11th Five Year Plan of the country. Management of hazardous waste including transfer, storage and disposal has been identified as a requirement under the Hazardous Waste Management Rules, 1989, and MOEF Guidelines (1991). The CBIPM project will assist

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13 Defined as those living on less than one US dollar (PPP) per day
14 UNEP defines middle class as those earning in excess of $7,000 per annum. Source: ADB (2005)
MOEF to prepare a National Plan for Rehabilitation of Polluted Sites (NPRPS) based on national wide identification, inventory, characterization of hazardous wastes dumpsites including an assessment of health and environmental risks posed by these illegal, abandoned and contaminated sites. Today more than 13,000 licensed industries generate about 4.4 million metric tons of hazardous waste every day according to the estimates of the Ministry of Environment and Forest. The hazardous waste generated by industries has to be disposed of in secured landfills and the toxic organic fraction of the waste needs to be incinerated. However, industries continue to store hazardous waste on their premises in improperly designed facilities or dispose the waste illegally in abandoned sites. According to a report, in many states due to unavailability of appropriate hazardous waste land filling facilities, industries have surreptitiously continued to dump their hazardous wastes along with the municipal solid waste on road sides, low lying areas and public/private land. The number of such illegal dumpsites has increased in last few years as hazardous waste generating industrial units have not able to properly store the hazardous waste within their premises. Many states have undertaken development of an inventory of illegal hazardous wastes dumpsites in their states, which has indicated that illegal hazardous wastes dumpsites exist in almost all the states.

4. Improved enforcement of hazardous waste rules need to be supplemented by replicable models demonstrating clean-up of contaminated sites. MOEF recognizes that there is a huge potential for hazardous waste reduction/ minimization in many of industry sector, particularly Small and Medium Enterprises (SMEs), which is often constrained by lack of scientifically designed hazardous waste disposal facilities and ineffective enforcement. Reportedly, there are more than 160 contaminated sites, mostly on government land in the country that are abandoned and continue to present serious health and environment risks to the surrounding communities. Also the absence of a national standard for cleanup of contaminated sites as well as the absence of environmental liability and responsibility aspects in the contract lease of industrial sites/plots in the past has led to contamination of public land particularly of sites with no clear legal titles. Supplemented by lax enforcement of environmental compliance, many industries did not find significant economic incentive to invest in treatment of hazardous waste or to demand common hazardous waste disposal facilities. While the problems of hazardous waste management are enormous requiring much longer term engagement, the project is expected to assist the MOEF on the following three fronts:

5. First, assist the MOEF in developing a medium strategy to improve capacity for enforcement and compliance in each state with respect to the existing Hazardous Waste regulation. This institutional strengthening will consider all aspects of waste management cycles, starting from its generation to its handling, segregation, transportation, treatment, and disposal. This will also include a plan for in each state for working with industries, particularly with SMEs to help develop capacity for waste minimization/reduction that would reduce the cost of treatment and disposal for industries to meet standards.

6. Second, assist MOEF and CPCB in the characterization and assessment of risks posed by more than 100 abandoned and active contaminated sites spread across the country. This will lead to finalization of a NPRPS. This would include criteria for prioritization of contaminated sites,

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15 This does not include small-scale businesses such as backyard smelters.
16 High Power Committee Report appointed by the Supreme Court of India
remediation options; institutional arrangements; methodologies for assessment of feasibility and an estimate of budget for remediation and monitoring.

7. Third, undertake demonstrative investments in two states to establish replicable institutional models, environmental management best practices, technical and technology options, and socio-environmental benefits of remediation, which can potentially inform the national plan before it is endorsed by the GoI for implementation in other States.

8. Environmental regulations in India are sound but there is a need to strengthen implementation and enforcement capacity. By any benchmark, India has an extensive policy and legal system with a comprehensive set of environmental laws, specific statutory mandates, regulatory instruments, and institutional frameworks to implement and enforce environmental policy objectives. Environmental legislation is on the national list. However, it involves a shared responsibility between the center and the states, with the central government having the responsibility for policy and regulatory formulations and the State governments for ensuring implementation and enforcement of national policies and laws. At the central level, the MOEF and the CPCB are the nodal agencies responsible for environmental compliance and enforcement. Similarly, the State Government’s Departments of Environment and Forests and the State Pollution Control Boards (SPCB) are the designated agencies to perform these functions at the State level. Despite this strong policy and institutional framework, environmental degradation continues in many areas and a public dissatisfaction with the situation grows. This has resulted in citizens increasingly resorting to public interest litigation to resolve environmental problems, because of the perceived inability or lack of political will by the regulatory agencies to enforce environmental laws and regulations. As a consequence, in addition to existing statutory responsibilities, regulatory agencies are faced with an increasing number of court directives establishing new environmental policies and mandates for both central and state governments to meet often within prescribed timeframes and requirements. An institutional assessment of environmental agencies indicates that the current focus in enforcing environmental regulation does not match the scale and severity of the hazardous waste disposal problems.

9. Several studies have been conducted independently in the past decade evaluating the institutional performance of these agencies in meeting their responsibilities, which have included studies by the Planning Commission of the GOI, U.S. Environmental Protection Agency (USEPA), and the World Bank. The Planning Commission report reviewed all 25 SPCBs in the country studying their structure, organizational set-up, staffing pattern, finances, training requirements, and functioning to fulfill their statutory mandates. The report concluded that the SPCBs are characterized by a dominant presence of non-technical staff, differential availability of staff for monitoring polluting industrial units, large staff vacancy positions, vast variations in financial positions, and prohibitive spending restrictions imposed by state governments. As a result, the compliance of industrial units with the stipulated pollutant standards is poor. The overall national compliance level for industries is approximately 50%, and the primary focus of the SPCBs has been on highly polluting large industries and not on SME’s which contribute a more significant portion of the total industrial pollution load. The degree of inventorization of polluting industrial activities, particularly SMEs, by the SPCBs is generally unsatisfactory and compliance monitoring and enforcement is deemed inadequate. Crucial activities like training of
staff, generation of public awareness, and promotion of pollution prevention were identified as high priority items for improving the functioning of the SPCBs.

10. The USEPA, in collaboration with MOEF, conducted a comprehensive study of the environmental compliance and enforcement program in India, meeting with various governmental and nongovernmental organizations and visiting several CPCB and SPCBs offices. The USEPA report found that a number of factors have placed a serious constraint on the capacity of the SPCBs to effectively implement environmental laws and programs. These factors include the lack of standardized national guidelines and procedures for compliance and enforcement, limited number of technically trained staff, lack of resources to manage and track activities, and diversity of responsibilities that prevents systematically addressing priority programs. Furthermore, an institutional assessment of environmental agencies by the World Bank indicated that the current focus in applying environmental regulation does not match the scale and diversity of the India’s economy, with its multiple pollution sources often outside the industrial sector but with impacts in the area, and is not responsive to changing priorities brought by the country's accelerated growth. This requires an area-wide based approach to rehabilitating degraded areas which looks at multiple sources of pollution, credible enforcement deterrents, extensive compliance assistance and environmental awareness. For the SPCBs, they will need to: (i) explore new regulatory programs and approaches, targeting different pollution sources; and (ii) exercise greater flexibility in applying regulatory standards; (iii) promote the use of innovative and voluntary incentives for improved performance; and (iv) upgrade technical skills and advances in technology to address priority concerns.

11. A national level program for remediation will establish a framework for addressing legacy hazardous waste contamination in a comprehensive way. GOI recognizes the localized nature of hazardous waste generators and some progress has been made in identifying sources of hazardous waste. The project will help MOEF inventory, quantify and characterize the volume of waste residues generated by industries. The NPRPS would include updating waste inventories annually so that appropriate interventions can be incorporated. A risk based management approach would be designed to assist with decision-making to define remediation methodologies (such as for pollution containment, reclamation of sites, remediation of ground water or soil using appropriate techniques). This is being considered particularly important by MOEF in light of the new amended hazardous waste rules introduced in 2000 and 2002, which has expanded the definition of hazardous waste and incorporated hazardous waste streams identified in the Basel Convention. A strategy for implementation of NPRPS will strengthen the use of existing EIA tools by elaborating on are standard technical guidelines for assessment and evaluation of risks and health impacts of inappropriate disposal of hazardous waste on surrounding ecosystem and communities.

12. The project will demonstrate management of legacy pollution and preventive approaches. A frequent argument from the industrial community has been that the legacy of the past belongs to the past while new investments in large industrial projects bring modern and clean technologies, particularly those with global market outreach; increasingly adhere to sound management practices. A real-life picture, however, is more nuanced and complicated. An estimated 70% of the total industrial pollution load is attributed to SMEs many of which, especially small-scale units, continue to use obsolete technologies with no or primitive pollution
controls. With about 40% of the total value of industrial production and over 4.5 million units across the country, the SME sector is a major engine of growth, employment and poverty reduction, raising a dilemma of balancing economic and environmental objectives. Furthermore, the cumulative impacts particularly of those SMEs set up before deregulation started in 1990s, fell outside the jurisdiction of either the local Industrial Authority or the SPCB, have induced severe contamination of ground water and land often in unwieldy urban setting, which has often outpaced the capacity of supporting environmental infrastructure. The State Governments and the SPCBs have lately started paying much attention to the pollution generated by these activities. Given the fact that the on-site and off-site remediation will depend upon complex matrices of hazardous waste lying on that site including topography, climatic conditions of the region, the proximity to human residences, to surface and groundwater, extent of dispersion, and specific types of contaminant, the cleanup solutions are likely to be site specific. Recognizing these requirements, the project will assist the pilot states to develop specific guidelines and protocols defining the methods of determining the nature and extent of contamination, ownership, health risk and effects, and sources of funding for remediation.

13. **Clean up requirements will be consistent with health and environment risks as well as with the future land use.** Use of any treatment or clean-up action requires cleaning of soil and groundwater to acceptable level which minimizes the exposure risk. It may be neither economically or technologically feasible to achieve a zero level cleanup considering the limitation of economic value addition of the reclaimed site. Therefore, an acceptable and feasible standard will be developed for the disposal of waste on land and for the cleanup of contaminated soils and groundwater, in accordance with intended land use. GOI recognizes that any action on remediation may require development of infrastructure for proper treatment and disposal of hazardous waste considering key challenges related to ownership, financial mechanisms to finance such ventures and extent of private sector participation to ensure sustainability of such investments. GOAP and GOWB have demonstrated leadership in addressing these issues and have scientifically designed hazardous waste management facilities developed and operated by private sector.

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As per 3rd All India Census of small scale industries, there are around 4.4 million units employing 24.9 million persons
## Annex 2: Major Related Projects Financed by the Bank and/or other agencies

### INDIA: India - Capacity Building for Industrial Pollution Management

<table>
<thead>
<tr>
<th>Development Agency/Organization</th>
<th>Project name</th>
<th>Objective/Description</th>
<th>Status</th>
<th>OED Review Rating:</th>
</tr>
</thead>
<tbody>
<tr>
<td>USEPA</td>
<td>Memorandum of Understanding with MOEF Support for environmental management</td>
<td>Framework agreement on Technical assistance from USEPA in several areas including management of hazardous waste</td>
<td>2008</td>
<td>N/A</td>
</tr>
</tbody>
</table>
| GTZ                              | Advisory Services in Environmental management (ASEM) Program                 | (i) Support to project relating to industrial and urban environmental protection. Provides support to MOEF and the Ministry of Consumer in implementing projects with the aid of building strategic alliances. Partnership with the CPCB and State PCBs  
(ii) Pilot project on HW management in Karnataka for carrying state wide survey of industries on quantities and qualities of HW | August 2002  | N/A               |
| GTZ                              | Eco Cities Project                                                          | (i) Systematic documentation on environmental situation in selected cities in partnership with MOEF. Several interventions in cities have been completed (e.g. waste and wastewater).  
(ii) In Delhi air quality management system set up in cooperation with German companies and CPCB.  
(iii) In industrial clusters consumption of energy and raw materials has been reduced due to introduction of EMS and use of modern technologies  
(iv) A system of Green Accounting in AP has been established  
(v) A Trace Organics Lab was planned and constructed in CPCB. | 2006         | N/A               |
<p>| GTZ                              | Indo-German Corporate Social Responsibility (CSR) Initiative                 | Selected stakeholder from public institutions and private companies implement the first stage of CSR policy which is tailored to the needs of the country and various sectors of the economy. The National Foundation for Corporate Governance is tasked with promoting CSR. | Launched June 2008 | N/A               |
| World Bank                       | Environment Capacity Building                                               | To assist the GOI to implement the environmental priorities outlined in                                                                                                                                               | Completed June 30, | Outcome: Moderately |</p>
<table>
<thead>
<tr>
<th>Project</th>
<th>the Environmental Action Plan of India</th>
<th>2004</th>
<th>Satisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>World Bank</strong></td>
<td>Industrial Pollution Prevention Project</td>
<td>To promote cost effective pollution abatements from industrial sources</td>
<td>Completed November 30, 2002</td>
</tr>
<tr>
<td><strong>World Bank</strong></td>
<td>Country Environmental Analysis</td>
<td>Report on institutional strengthening in India which identifies need for building capacity of SPCBs in industrial pollution management</td>
<td>Completed April 2007</td>
</tr>
<tr>
<td><strong>ADB/Blacksmith Foundation</strong></td>
<td>Technical Assistance Project</td>
<td>Report for CPBP on Highly Polluted Sites in India which lists sixty eight sites in India as highly polluted sites</td>
<td>Completed in 2006</td>
</tr>
</tbody>
</table>
### Annex 3: Results Framework and Monitoring

**INDIA: India - Capacity Building for Industrial Pollution Management**

<table>
<thead>
<tr>
<th>PDO</th>
<th>Project Outcome Indicators</th>
<th>Use of Project Outcome Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To build tangible human and technical capacity in selected state agencies for undertaking environmentally sound remediation of polluted sites</td>
<td>i) Clean up/remediation technologies have been piloted at orphan hazardous waste sites and municipal dumpsites in selected states and a network of state PCBs established by MOEF for knowledge dissemination and project based training &lt;br&gt; ii) Guidelines and standards for remediation developed and supervisory capacity of technical staff at environment agencies to implement remediation plans and monitor environmental conditions strengthened. &lt;br&gt; iii) An Environmental Compliance Assistance Center has been established and fully functional by end of year two in WB and by end of year four in AP &lt;br&gt; iv) Water quality and soil characteristics at the pilot sites comply with specified standards and mechanisms established to monitor in the long term.</td>
<td>To measure progress on achieving PDO throughout the project life, specifically on strengthening the institutional framework for rehabilitation of contaminated sites</td>
</tr>
<tr>
<td>2. To support the development of a policy, institutional and methodological framework for the establishment of a National Program for Rehabilitation of Polluted Sites (NPRPS).</td>
<td>i) Supporting the NPRPS by developing a methodological framework for inventorying polluted sites, establishing remediation procedures and solutions and engaging multiple stakeholders in the implementation, including cost recovery mechanisms.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermediate Outcomes</th>
<th>Intermediate Outcome Indicators</th>
<th>Use of Intermediate Outcome Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 1: Strengthening of Environmental Institutions: Building Capacity for addressing pollution remediation</td>
<td>a. Methodological guidelines for risk assessment, prioritization and plans for remediation of polluted sites are in place to support the preparation of NPRPS. &lt;br&gt; b. Human resources and organizational capacity of State PCBs for undertaking remediation of contaminated sites strengthened in the pilot states.</td>
<td>To measure progress, record, discuss with client and agree on corrective measures</td>
</tr>
<tr>
<td></td>
<td>i) Guidelines and standards for remediation developed and adopted by participating states and Ministry of Environment &lt;br&gt; ii) Analysis of existing environmental legislation related to liability and international experience on remediation of contaminated sites and formulation of policy framework. &lt;br&gt; iii) Development of procedure for remediation orders for ‘orphan and non-orphan sites’ which pose urgent risk to human health and environment &lt;br&gt; iv) Technical staff of State PCBs trained to supervise the implementation of remediation plans and monitor area environmental conditions. &lt;br&gt; v) ‘Good practice notes’ on site rehabilitation disseminated to the SPCB network; conduct knowledge dissemination</td>
<td>To assess the capacity of states to undertake and scale up remediation projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>To measure the uptake of remediation initiatives by other states and scale up remediation</td>
</tr>
<tr>
<td>vi) The extent of indiscriminate disposal of hazardous wastes in the pilot states drastically diminished and verified through data collected by State PCBs and verified through an end of project beneficiary survey. vii) Community monitoring implemented in two states viii) GAAP Milestones are met</td>
<td>To monitor the capacity of participating PCBs and change of behavior of industrial units in the pilot areas</td>
<td></td>
</tr>
</tbody>
</table>

**Component 2: Investments in rehabilitation of orphan hazardous waste sites and municipal dumpsites**

| a. Clean up/remediation technologies will have been piloted on orphan sites in AP and WB with lessons derived and available for replication to other states. | i) Area-based remediation plans demonstrating effective technologies for pollution reduction under implementation in WB and AP. 
ii) Pollution hazards reduced to acceptable level using remediation/containment technologies at two pilot HW sites. 
iii) Measurable improvements of the environmental conditions around old dumpsites in two states monitored by SPCBs 
iv) Post-remediation monitoring system with appropriate infrastructure and agreed indicators established at three remediated sites by end of year 4. 
v) Environment and Social assessment acceptable to the Bank carried out and disclosed for pilot projects implemented in year one and two prior to negotiations. vi) Involvement of local authorities and neighboring communities and level of support to rehabilitation of sites. | To determine the progress of remediation and measure it to specific performance indicators in the pilot sites. To record ‘best practice’ and lessons learned from remediation pilots. To monitor progress of implementation of pilots and ensure compliance with technical safeguards. To monitor implementation progress, discuss with client and agree on corrective measures to ensure compliance with Bank safeguard policies. To determine progress towards achieving project impacts and influence behavioral changes at community level. |

| b. A ‘blueprint’ for addressing legacy pollution with adequate environment and social safeguards provisions will have been developed | Project implemented according to agreed timeline PIUs fully adhere to project implementation agreements | i) State PIUs maintains adequate staff with expertise and skills throughout project life and follow up the provisions of POM. 
ii) State PIUs participate in supervision missions. | To monitor implementation. |
## Arrangements for Results Monitoring

<table>
<thead>
<tr>
<th>Project Outcome Indicators</th>
<th>Baseline</th>
<th>Mid term</th>
<th>Project completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. National Program for Remediation of Polluted Sites using risks assessment methodology for prioritizing polluted sites, supported by public consultations is developed</td>
<td>Nil</td>
<td>Approval of NPRPS by POC</td>
<td>Submission of a NPRPS to Planning commission</td>
</tr>
<tr>
<td>2 Pilots for remediation using area based approach ready for implementation including pollution profiling and mapping, indicators, detailed engineering plan, monitoring and after-care program</td>
<td>0%</td>
<td>25% of site remediation/ closure completed at 2 HW sites; 20% of closure of MSW sites completed</td>
<td>100% of site works completed at four pilot sites</td>
</tr>
<tr>
<td>3 Establish national clean-up standards and monitoring mechanisms</td>
<td>Nil</td>
<td>Continuous monitoring of pilot sites using monitoring protocols and compliance with standards specified for pilot sites</td>
<td>Continued compliance of remediated pilot sites with standards specified for pilot sites</td>
</tr>
<tr>
<td>4. Establish Environmental Compliance Assistance Center to promote measures for voluntary industrial compliance</td>
<td>Nil</td>
<td>- Fully staffed and operational WB ECAC - Stakeholder consultation completed for dissemination of best practices in HWM shared among PCBs</td>
<td>- Sustainable funding mechanism for ECAC in place - Fully staffed and operational AP ECAC - Programs for EM and compliance of SMES in Chrom/metallurgical, petro-chemical industries under implementation - Clean Technology Fair</td>
</tr>
<tr>
<td>2.b. Establish knowledge dissemination network for SPCBs</td>
<td>Annual Meeting of SPCBs</td>
<td>- Documentation and dissemination of lessons learnt from remediation good practices shared at workshop with state PCBs</td>
<td>- Training completed for technical staff of SPCBs in states with identified orphan hazardous waste sites - Dissemination of protocols (monitoring, liability, remediation technology) under NPRPS at workshop with state PCBs</td>
</tr>
<tr>
<td>Project Outcome Indicators</td>
<td>Baseline</td>
<td>YR1</td>
<td>YR2</td>
</tr>
<tr>
<td>---------------------------</td>
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</tr>
<tr>
<td>1.1 Methodological framework for risk assessment developed as enabling framework for implementation of the NPRPS</td>
<td>Nil</td>
<td>i) Detailed studies to define policy and legal framework including analysis of best international practices initiated; ii) Remediation and cleanup standards initiated</td>
<td>i) Detailed studies to define policy and legal framework including analysis of best international practices completed ii) Remediation and cleanup standards developed iii) Completed study on economic analysis of avoidance of social cost by undertaking remediation</td>
</tr>
<tr>
<td>1.2. Human resources and organizational capacity for undertaking remediation of HW and old dumpsites strengthened in the pilot states</td>
<td>Nil</td>
<td>15 officials in SPCBs trained in remediation &amp; post monitoring of sites</td>
<td>40 technically qualified staff in SPCBs trained in analysis of data, remediation technologies, and monitoring of land fills</td>
</tr>
</tbody>
</table>
### 1.3. Disseminate good practices through knowledge dissemination events

| Nil | i) 4 sector specific workshops and seminars held by WB ECAC and WBPCB  
ii) WB ECAC website launched  
iii) Quarterly newsletter and annual report published by WBECAC | 25% of industries aware of good practices as measured by their participation in the workshops/dissemination of guidelines  
WB ECAC Newsletter and annual report | 4 sector specific workshops and seminars held by APPCB  
50% of industries aware of good practices as measured by their participation in the workshops/dissemination of guidelines  
WB ECAC Newsletter and annual report | 80% of industries aware of good practices as measured by their participation in the workshops/dissemination of guidelines  
WB ECAC Newsletter and annual report | 50% increase in industry’s compliance with sound waste management practices  
WB ECAC Newsletter and annual report | Progress report  
Supervision report | Publication material  
PCB reports  
ECAC Annual report | MOEF with WB PCB AP PCB |

### 1.4. GAAP milestones are met

| Nil | APPCB and WBPCB create a project web site linked to their websites | Regular reporting on implementation of project activities | Neighboring communities involved in monitoring of remediation | Neighboring communities involved in monitoring the area to prevent illegal dumping of waste at all project sites | Beneficiaries survey on all project sites undertaken | Progress implementation reports  
Surveys  
FRM reports | In-house reporting | MOEF WB-PCB and APPCB |

### Component 2: Investments in rehabilitation of priority Hazardous Waste Sites and overall environmental improvements in the area

| 0% | Detailed engineering studies commissioned | i) Detailed engineering studies completed;  
ii) Contractors hired | i) 25% of site remediation works completed in Hooghly  
ii) 20% of closure of Dhapa dump | i) 60% site remediation at Hooghly completed  
ii) 50% of closure of Dhapa dump site | 100% of site remediation and closure works completed | Semi-annual progress reports  
Quarterly FMR | In house reporting, certification of site works | APPCB, WBPCB |
<table>
<thead>
<tr>
<th>2.2. Measurable reduction of pollution hazards at two HW legacy sites</th>
<th>Nil</th>
<th>Establish the current environment profile of the area</th>
<th>Establishment of monitoring program</th>
<th>Reduce heavy metals contaminants in soil quality in surrounding</th>
<th>Remediation works completed; Monitoring continued and shared with the community</th>
<th>Improvemen t in water quality of NMK and cascading lake inside Agricultural University</th>
<th>Study to establish impacts of remediation on crops with respect to heavy metal and organic contaminants</th>
<th>APPCB, WBPCB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3. Measurable improvements of the environmental conditions around the old dumpsites</td>
<td>Nil</td>
<td>Establish the current environment profile of the area</td>
<td>Establishing ground and surface water monitoring system</td>
<td>Continue monitoring program</td>
<td>Reduction of heavy metals contaminants in soil quality in surrounding</td>
<td>Remediation works completed; Monitoring continued and shared with the community</td>
<td>Monitoring continued and compliance with standards</td>
<td>Stakeholder satisfaction survey</td>
</tr>
<tr>
<td>2.4. Post remediation after care monitoring systems in place at the four sites</td>
<td>Nil</td>
<td></td>
<td>Continue monitoring program</td>
<td>2 sites with post-remediation monitoring infrastructure</td>
<td>4 sites with post-remediation monitoring infrastructure</td>
<td>Semi-annual progress reports</td>
<td>In-house reporting Certification of Site monitoring system</td>
<td>APPCB, WBPCB</td>
</tr>
<tr>
<td>2.5. EMP and Social safeguards measures effectively implemented on four project sites</td>
<td>0%</td>
<td>20% of rag pickers on 2 MSW sites trained in alternative livelihoods</td>
<td>40% of the rag pickers on 2 MSW sites trained in alternative livelihoods</td>
<td>Universal 20% of school-age PAPs on 2 MSW and 2 HW sites attending school</td>
<td>10% decrease in community reporting of pollution effect on a ambient environment (baseline annual reports of APPCB and i) 100% of PAPs rehabilitated as per ESMF stipulations for pilot sites ii) 50% decrease in community</td>
<td>State Progress Reports Supervision reports</td>
<td>In-house reporting Independent impact assessment Mid- term and end of</td>
<td>APPCB, WBPCB</td>
</tr>
<tr>
<td>2.6. Local authorities and neighboring communities involved and support remediation and closure of dumpsites</td>
<td>No community awareness and no multi stakeholder mechanism</td>
<td>Communities around the pilots sites including NGOs broadly approve remediation plans</td>
<td>In each of 4 sites on community members / CSO / NGO volunteers to take part in the local multi-stakeholder monitoring mechanism</td>
<td>Community/ CSO representative in monitoring mechanism regularly reports to local authorities on pollution activities in the project areas</td>
<td>For each 4 sites more than one local organization per site (e.g. local NGO, CBO, LAEC) is part of MMM</td>
<td>Regular reporting and regular meetings between community members of MMM incl. local authority</td>
<td>Progress reports MTR</td>
<td>Field visits and random discussions with population in the project areas</td>
</tr>
</tbody>
</table>
1. The CBIPM project will use a risk-based approach for assessment and design of plans for rehabilitation of orphan sites. On one hand, it will use risk assessment to provide qualitative or quantitative evaluation of the risk posed to human health and the environment by the actual or potential presence of pollutants. There are a number of reasons to do that including: to establish whether an ecological risk exists or not; to identify the need for additional data collection; to focus on the dangers of a specific pollutant or the risks posed to a specific site use and affected populations; and to help develop remediation plans or appropriate responses to pollutant releases. On the other hand, the project will employ risk management which is the decision making process in which an action is developed once a remediation level has been determined. Risk management integrates the risk evaluation with technical, political, legal, social, and economic issues to develop risk reduction and mitigation strategies. The process will evaluate the likelihood that adverse effects may occur or are occurring as a result of exposure to a stressor. A site-specific risk assessment will recommend a remediation level of contamination that will meet the goals of the site management strategy. Risk assessment also plays a key role in the development and implementation of the NPRPS and pertaining clean-up standards in accordance with intended land use and the project will support such actions.

2. Many of the polluted sites are located in urban or peri-urban areas which continue to grow. As the scale and complexity of development challenges continue to increase, market pressures are starting to stimulate increased interest in “brown field” redevelopment in and around major urban centers. This issue is coming into play in the business and municipal local government decisions, triggered by the growing demand for land. The project will explore the opportunities for redevelopment of abandoned, underutilized and polluted industrial sites with higher potential and commercial value where the clean up combined with a redevelopment option could be a ‘win-win’ solution or qualifies for a “public good”. The Indian regulatory system for undertaking such projects is fragmented and incomplete. Nor is there a framework for integrating risk assessment approaches in decisions for mitigation and remediation of pollution from old dumpsites. Component one, will look into this issue and will provide support for developing remediation models which include the following types of sites: (a) where pollution is in a passive form, polluter is unknown and environmental, social and economic impacts of pollution release are rather high, require immediate intervention as result of emergency or public concern; (b) where pollution is high, the land is suitable for demonstration of clean up and where changed land use of the contaminated site could lead to significant public gains in economic terms; and (c) where issues of contamination are significant, but pollution is in active form and hence short term or immediate interventions are required.

3. Remediation Standards. The guiding principles for developing strategies for managing contaminated sites will be determined by MOEF’s mandate and policy requirements. The roles and responsibilities of Central and State government agencies will be clearly defined so as to influence the management strategy at a site. Not all contaminated sites may raise public concerns and the degree of public/stakeholder participation in the remediation of contaminated sites can
vary greatly across sites. An important step in contaminated site management is to establish the future land/water use for a site. Site remediation may not always require the restoration of pristine conditions. Rather, the remediation of land and water can be to levels that support particular uses. The land use selected for protection may be the current or potential land uses and therefore may involve anticipating the consequences of possible changes in land use. Defaulting to the least restrictive use (i.e., industrial) may require the least amount of remediation but future uses will be limited to industrial development under provision for preventing a secondary contamination. The importance of maintaining future use options will be considered when establishing land/water uses. Again, public input and departmental mandates may define the uses. In cases, where the costs of remediation and technology are not limiting, clean-up to background levels may be the most feasible option. There is no fundamental standard for cleanup of contaminated sites in India, and therefore the project will use applicable standards for protection of public health, safety and environment which are available (nationally and internationally) to eliminate unacceptable risks.

4. Remediation options. Through the preparation of this project, MOEF developed a set of criteria to help assess the contaminated sites based on associated environmental and health risks and to decide the level of intervention in terms of remedial options. Classification of contaminated sites is an effective screening tool for determining the relative priority that should be placed on individual sites. In addition, the information collected and evaluated during the site assessment process was used to guide whether a detailed investigations at high priority sites, would be needed especially when those were associated with an environmental or human health risks. Once the site-specific remediation objectives have been established, the available remediation options were be identified. The principles on which clean up/remedial actions should be based are: effectiveness, implementability, long-term reliability, a measurable implementation risk, and a reasonable cost. Remediation options can include technological methods to clean the site to meet the remediation objectives, methods that contain the contamination and eliminate exposure of the contaminant to site receptors and of course the no-action option. The no-action option could also be included for further evaluation to ensure that cure is not worse than the disease. Cleanup will have to protect people’s health, restore property values, and strengthen the ecological vitality of the selected project areas.

Component 1: Strengthening Environmental Institutions: Building Capacity for Remediation (US$ 16.74 Million)

5. The objective of this component is to strengthen and integrate the institutional framework, including regulatory policies, management practices, compliance incentives, and performance guidelines, for central and state governments in the remediation of polluted sites. While India has extensive environmental management systems and environmental laws in many areas, the existing institutional framework for addressing hazardous waste sites, illegal dumps, and orphan sites has been limited in its scope and effectiveness in mitigating the environmental degradation caused by contaminated and abandoned sites. This is a consequence of the combination of several factors, including the lack of a defined national program for the rehabilitation of polluted sites; limited technical capacity and financial resources at the state level to properly assess, classify, and remediate priority sites; and lack of knowledge of innovative regulatory approaches and incentives. The component will provide investments for technical assistance, training for
Sub-component 1.a. National Program for the Rehabilitation of Polluted Sites (US$3.44 Million)

6. This sub-component will support the MOEF in the development of a NPRPS. Although the Hazardous Waste Management Rules were enacted in 1989, the rules have not been implemented resulting in the indiscriminate and improper generation, storage, and disposal of hazardous waste throughout the country. As more sites become abandoned it becomes more difficult to implement the “polluter pays” principles as it becomes impossible to identify polluters. This has led to the filing of numerous public interest litigation cases and the issuance of court order directives for central and state environmental agencies. As a consequence, the MOEF and CPCB according to the SC rulings are in the process of developing a NPRPS which will include the promulgation of policies and plans to address the remediation and rehabilitation of contaminated hazardous waste sites, both active and abandoned. The NPRPS will provide the required regulatory, technical and financial framework to the concerned statutory authorities for identifying and assessment of contaminated sites to prepare and implement remediation of sites and area affected.

7. The project will provide technical assistance to the MOEF/CPCB in the preparation of these policies and plans, including the establishment of site assessment guidelines, clean-up standards, response action criteria, environmental performance indicators, liability protections, and rehabilitation and reuse planning strategies. This will be done through technical consultancies to develop methodologies for risk assessment; clean-up standards for remediation based on soil, land use, and ambient conditions; and feasibility studies for the preparation of remediation plans at selected sites. In addition, an inventory of best available remediation technologies and strategies within the country and internationally will be prepared. The MOEF will also establish a network of SPCBs to launch national training programs and provide technical assistance for strengthening the planning, monitoring and enforcement capacity of SPCBs in states with priority sites in areas such as source identification, risk assessment, transport and fate of contaminants in soil and groundwater, and inspection and enforcement of hazardous waste sites. This will include an assessment and strengthening of existing national and state programs, introduction and adoption of international best practices, and exchange program with international practitioners, such as the USEPA. In addition, the activities and lessons learned in sub-components (b) and (c) will be reviewed and incorporated as best practices in the development of the NPRPS. In consultation with SPCBs and MOEF, CPCB has compiled a long list and information on hazardous waste dumpsites in India. This information will be used to complete the NPRPS by the end of year 3 of project implementation and submit it to the authorities for approval. Prior to rolling on the implementation of the NPRPS in future, certain adjustments will be made deriving on the project experience to ensure that it has the right methodological and financing framework in place.

Sub-component 1.b. Environmental Compliance Assistance Centers (US$ 5.21 Million)

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18 see [http://www.cpcb.nic.in/Hazardous%20Waste/Inventory_of_HW.html](http://www.cpcb.nic.in/Hazardous%20Waste/Inventory_of_HW.html)
8. This sub-component will support the establishment of Environmental Compliance Assistance Centers (ECAC) in AP and WB. To ensure effective industrial pollution management, environmental institutions must rely not only on traditional “command and control” measures but also introduce compliance tools and incentives to better inform and reward good environmental performance. The ECACs will be created as independent umbrella institution to pro-actively promote and assist industries with environmental compliance in pollution management. The centers will essentially serve three primary functions: (1) to provide information regarding the regulatory laws, standards, and best practices for industrial pollution management, including sector wide and sector specific information for new investors and existing industries; (2) provide information on pollution abatement technologies and cleaner production systems, including the referral of verified vendors dealing with the appropriate abatement technologies; and (3) offer hands-on technical assistance to individual industries where there is a knowledge gap of regulatory norms, pollution prevention measures, and achieving compliance goals, particularly targeting small and medium enterprises in priority sectors.

9. The project will support the establishment of the ECACs through the funding of infrastructure facilities (building, furniture, etc.), hardware support (computers, servers, copiers, etc.), information systems (web-based information network), quick response desk (checklists, guidelines, virtual plant tours, etc.), outreach programs (stakeholder workshops, newsletters, exchanges, technology fairs, etc.) and training programs (in various technical disciplines, problem industry sectors, or area wide approaches). To ensure effective operation of the ECACs, the involvement of key stakeholders will be incorporated into its institutional structure which will include the designation of a steering management committee, technical review committee as well as key management and operational staff for the ECAC, and development of a detailed business plan. AP will explore the opportunity to incorporate environmental compliance assistance function in the APPCB’s ongoing outreach activities for SMEs.

Sub-component 1.c. Institutional Capacity Building of State Pollution Control Boards (US$8.09 Million)

10. The implementation and enforcement of national environmental laws and policies are entrusted to the SPCBs at the state level, including ensuring compliance with industrial pollution and hazardous waste standards. However, to meet these mandates and responsibilities, the SPCB’s require the technical knowledge and skills, particularly in conducting risk assessments and guiding remediation actions that are necessary to turn huge hazardous waste liabilities into sustainable development opportunities in their states.

11. The project will provide specialized and targeted technical assistance to the selected states with demonstration investments through a “learning by doing” approach. While these states have been selected by criteria which evaluate the overall institutional capacity for project management, the “learning by doing” approach will focus on strengthening the capacity of SPCB’s to implement and monitor the demonstration investments in Component 2 in an environmentally sustainable and socially responsible manner. This would focus on providing technical assistance on the inventorying and characterization of hazardous waste and illegal dumpsites, assessment and preparation of priority contaminated sites, and regulatory best practices and incentive based approaches and stakeholder involvement, which will in turn, could
be shared and replicated in other states. The ECACs will also serve as the knowledge hub for other states for information sharing of lessons learned, clean technologies, regulatory best practices, and innovative incentives. In addition, the project will support the development of a specialized capacity building training programs for the SPCB’s in pilot states in technical skills related to implementation of investment demonstrations, including operation of laboratory and monitoring equipment, statistical methods for interpretation and validation of data, use of modern tools to assess and characterize legacy sites, remediation technologies for contaminated sites, and monitoring and enforcement of impacts from legacy sites. To bring together these activities and establish a platform for knowledge dissemination among SPCBs, this component will also support the establishment of a network of best practices for SPCBs and scaling up of remediation programs in other states.

Component 2: Investments in Priority Remediation and Environmental Improvements in orphan hazardous waste sites and municipal dumpsites (Estimated cost including contingencies: US$ 52.80 Million).

12. The component will demonstrate remediation which minimizes to acceptable and safe levels the environment and health risks by containing the migration of the heavy metal and chemical bearing of contaminated soil and groundwater. Typically, in most polluted sites the generation and discharge of industrial waste; domestic discharge of sewer water, as well as discharge of toxic chemicals from abandoned industrial facilities and the municipal dump site have contributed directly or indirectly to the overall degradation of environmental quality of soil, surface and groundwater in the area, thus posing significant human health risks. Specifically, the high concentration levels of heavy metals, exceeding the maximum permissible concentration limits, create a major risk to the quality of the total surface and groundwater system, which is also used by both animals and humans as a source of drinking water. This component will develop a technical solution to implement adequate measures for intercepting, containing or treating as well as monitoring the environment and health impacts in the project area and prevent further migration of unacceptable contamination levels to sensitive areas and groundwater users.

13. This component will assist AP and WB to develop and implement area-based plans for remediation of orphan polluted sites and/or old municipal dumps which include also measures for overall environmental improvements in the area and better compliance of nearby industrial units. Specifically, this component will provide technical assistance for detailed pollution profiling and engineering design of site remediation plans, additional sampling and validation of pollution impacts, environmental audits, development of post-remediation monitoring and after-care plans for all project sites and training. The component will also finance remediation works, equipment, and minor up-gradation of treatment infrastructure as needed for safe disposal of toxic waste, operational and maintenance cost on a declining basis, implementation of safeguard provision during remedial works and a campaign for community awareness and communication.

14. Many of India’s polluted sites are located in urban or peri-urban areas which continue to grow. As the scale and complexity of development challenges continue to increase, market pressures are starting to stimulate increased interest in “brownfield” redevelopment in and around major urban centers. Often addressing serious environmental threats can maximize the future redevelopment prospects. This issue is coming into play in the business and municipal
local government decisions, triggered by the growing demand for land. The project will explore
the opportunities for redevelopment of abandoned, underutilized and polluted industrial sites
with higher potential and commercial value where the clean up combined with a redevelopment
option could be a ‘win-win’ solution. The Indian regulatory system for undertaking such projects
is fragmented and incomplete. Nor there is a framework for integrating risk assessment
approaches in decisions for mitigation and remediation of pollution from old dumpsites. Many of
the risks come from the lack of control in cases when residential development projects are rushed
regardless of the well known risk of contamination of sites under the impetus of tapping quick
profits gains by developers and lack of awareness of the long-term consequences. Under the
existing law, national and environmental agencies have the leverage to control and ensure
implementing and monitoring of remediation program. Depending on the success of this pilot
program, the MOEF is committed to develop policy and regulatory guidelines for assessment and
addressing the environmental liability issues.

15. The overall benefits of project remediation/cleanup activities financed under the project fall
in three categories: (a) Social benefits which include reduced pollution exposure associated with
deleterious health effects to rag-pickers who derive their livelihoods from the dumpsites and
households in the settlements near the hazardous waste and dumpsites. It also includes
improvements in the area such as piped water supply to the villages when justified by the
significance of risks from contamination of groundwater used for drinking and irrigation; (b) Environmental benefits which include mitigation of health hazards from toxic pollution, that
poses risks to community and ecology (especially humans and animals that come into direct
contact with the waste); reduced water and soil contamination in the land surrounding the site,
used for small farming. Remediation also would improve the aesthetic appearance of the area,
help eliminated the nuisance of flies and other insects that breed intensively on the site, and very
likely lower incidence of environment-related disease; (c) Economic benefits which include
employment generated during remediation; appreciation of property values, potential cost-
savings with decreased levels of pollution in soil, potential cost savings with decreased health
budget from lower incidence of environment-related disease. Improvement/better management
of the old dumpsites would make it easier to set up transportation facilities and roadside
amenities, which would generate income.

16. Sufficient information on the technical feasibility of the sites was collected and analyzed
during project preparation. The basic factors which influenced the choice of sites for
demonstration investments include: severity of environmental impacts, number of population
directly exposed to pollution hazards, including upstream-downstream impact of pollution, current and planned land use; applicable choice of technology and potential for meeting cleanup
standards within the life of the project, community buy-in, support of local government, and
likely sustainability of the investments. The long list prepared by the MOEF included twelve
highly polluted sites in seven states (Ranga Reddy, Hooghly, Patalganga, Talchar, Angul, Valad,
Vatva, Kanpur, Daman). All these sites are included in the preparation feasibility studies. Four
pilot sites were selected for pilots under the project.

17. Most of the sites have baseline information on the key parameters regarding level and type of
contaminant, geographic location and acreage, and known health impacts from secondary
sources. The feasibility studies carried during preparation provide the background on the socio-
economic, technical, financial and environmental impacts of the proposed site remediation. During preparation the various levels of technical and financial assistance from state agencies for implementation were determined.

**Site A: Remediation of Noor Mohammad Kunta, Katedan Industrial Area (KIE) in Ranga Reddy District, AP (US$ 30.93 Million).**

18. NMK is a small surface water body located in the Southern suburbs of Hyderabad City. The Kunta (‘Kunta’ means a pond or a small lake) is spread over an area of about 13.6 Ha and its catchment extends to an area of about 178 Ha. The catchment area drains into the kunta through two drainage channels. Residential developments are located besides the industrial activity. The KIE houses variety of industries in the catchment of the lake, dominated by food industries, oil refining units, textile units, lead extraction units and cement industries. Most of the industries (300-400 units) are small-scale units. Sewage contributed by the nearby habitation is another source of pollution for the lake. Outfall of the lake traverses through the land of the nearby Agricultural University (AU). After the closure of polluting industry, in the industrial estate the condition of lake has improved. An STP is in place since December 2008 for treatment of domestic wastewater. Most of the polluting industries in KIE have been closed and hence at present lake is not an active site. Drainage from the surrounding area leads to the lake and further downstream passing through the land of the AU. Currently some part of the reclaimed dump area near lake is being acquired by the local urban body for constructing a sewage treatment plant of 4 million/l/day capacity. After remediation, the site will be used for public recreation. Under the public pressure of concerned residents relating to ground water and surface water contamination, the government has decided to remediate the site and reclaim the lake. Site remediation will include three sub-components: i) terminate the primary source of contamination, which is from illegal discharge of industrial effluents, and secondary sources, which is from random dumping of municipal wastes and industrial hazardous wastes; (ii) options to be explored for treatment of lake and groundwater and pilot remediation measures like excavation, replanting, slope stabilization and remediation of bottom sludge, soil and sediments, build a drainage collection, inlet and outlet structure; (iii) establishing a monitoring system to measure effectiveness of remediation system, and (iv) preparation of an ‘after-care plan’ for prevention of secondary pollution. Finally, the project will help establish support of the neighborhood community to project measures, by helping them to understand the health impacts of pollution and change behavior.

19. The NMK area is characterised by contaminated soil, polluted surface and ground water which poses sever risks to residents and cattle as they continue to use the groundwater for drinking, washing and other domestic uses. The contamination of ground water in the AU grounds indicates that the plume continues to move and the intervention strategy must take into account the assessment of the groundwater, need for stopping the movement of the plume and to develop plans for removal and cleanup of the water and recharge of the aquifer with clean water to continuously clean the aquifer. The following represents hotspot of heavy metal (primarily lead) contamination around NMK Lake. The remediation plan for NMK site includes the following measures:
20. **Soil decontamination** - While widespread soil contamination is evident, the detailed mapping and profiling of pollution in the catchment area will determine the remediation effort. It is understood that immediate cleanup without the implementation of waste management controls for the long-term use of the area will not be effective. Evidence of continued dumping of solid and industrial waste was still evident in September 2008. However, since this area is now occupied, soil sampling will be undertaken during year 1 to delineate the contaminated areas prior to remediation. Through localized sampling, only those areas exceeding appropriate human health based standards would be identified, dug out, and backfilled with appropriate measures to cause as little disturbance to the residents as possible.

21. **Groundwater decontamination** - The groundwater contamination in the catchment area is widespread. Lead, nickel and zinc exceeded the Indian Drinking Water Standard in most of the groundwater wells sampled in the catchment area. In order to prevent exposure to contaminants from the groundwater through use of wells within the contaminated aquifer, existing private water supply wells will be reassessed and probable options for treatment and usage will be explored. Alternate water supply will be brought in from the municipality, as is the case in many of the settlements in the catchment area. Simultaneously, the local residents will be educated regarding the health impacts of the contaminants, the present remediation activity and the ill effects of the continued use of groundwater. Wells used by AU for irrigation purposes will be maintained and the use of treated groundwater for irrigation purposes will be explored.

22. **Surface-water decontamination** - With the closure of primary polluting industries to the south, and the commissioning of a new 4-MLD sewage treatment plant, the surface water quality within the NMK is improving gradually. The reported impact of the discharge of the lake to the AU through open drains is the focus of the near term surface water remediation program. In order to prevent the stream connecting NMK and Chilan Lake from over flowing into the AU lands, the surface water stream will be conveyed in an open concrete-lined culvert. This will prevent overflow into the university grounds.

23. **Sediment decontamination** - With the commissioning of the new sewage treatment plant, the sediment regime in NMK will change. The effects of that change will not be known prior to the operation of the plant, however, the planning of the sediment remediation program will proceed assuming that NMK, the connecting channel to Chilan Lake and the Chilan Lake itself contain the majority of contaminated sediments, which in turn, result in being the sources of contamination for surface water and groundwater. Options will be explored for treating the contaminated sediments and the end use of treated sediments.

24. **Development of remediated site into public greenery** – The project will support the development of the vacant land around the lake into recreational facilities to improve the aesthetics of the area and also to pose a deterrent to the nearby industrial and domestic areas from continued waste/ effluent discharge. This will involve clearing of existing bushes and weeds and preparation of the site for plantation. Tree plantation is proposed in the south-west side to buffer the grave yard while fencing may be provided on the south western side. Drinking water and sanitation facilities will be extended for the graveyard users in addition to fencing.
25. **Measures to prevent waste generation and source monitoring** - Remediation of contamination is not effective unless measures are put in place to control the re-introduction of contaminants to the watershed. The waste generation of the industries, businesses and residents of the drainage area will be evaluated to determine where the contaminants are being generated, and where they are being disposed. Area-based pollution management measures to be put in place to prevent further contamination and re-contamination of the drainage area include: constituting planning and monitoring committee with partnership of APPCB, local Industries and Residence Association to ensure that the effective implementation of remediation plan An ongoing program of monitoring of groundwater, surface water and sediment will be implemented to evaluate whether the near-term and long-term area-based pollution management approach has been effective in mitigating the adverse environmental impacts previously observed in the drainage area. The reference against which the monitoring program will be based as follows:

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<tr>
<th>S. No.</th>
<th>Environmental Component</th>
<th>Parameters</th>
<th>Frequency</th>
<th>Standard</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| 1      | Surface water           | pH, TDS, BOD, Pb, Cu, Fe, Mn, Zn, Ni, Cr | Six monthly | *CPCB Surface water quality – Class C*  
  pH – 6.5 – 8.5  
  BOD – 3 mg/L | PMC                        |
| 2      | Groundwater             | pH, TDS, Hardness, BOD, COD, DO, Lead | Six monthly | *IS 10500 Drinking water standard*  
  pH – 6.5 – 8.5  
  TDS – 500 mg/L  
  Hardness - 300 mg/L  
  Lead – 0.05 mg/L | PMC                        |
| 3      | Soil                    | pH, Cu, Fe, Mn, Ni, Pb and Zn     | Six monthly | Uncontaminated soil quality in the study area                             | PMC            |
| 4      | Wastewater discharge/ solid waste dumping | Visual inspection               | -          | -                                                                         | PMC            |
| 5      | Discharge from STP      | pH, TDS, BOD, COD, Free NH₃      | Monthly     | *CPCB General Standards* For Discharge (To inland surface water)  
  pH – 5.5 to 9.0  
  TDS - ,  
  BOD – 30 mg/L  
  COD – 250 mg/L  
  Free NH₃ - 5.0 mg/L | PMC                        |
| 6      | Education               | Local people to be educated on the proposed remediation activities | -          | -                                                                         | APPCB          |

The benefits of remediation of NMK are as follows:

26. **Environmental Benefits**: Mitigation of risks from contamination and exposure to health hazard; reduced surface water, ground water, soil contamination in the immediate neighborhood as well as downstream, lower incidence of environment-related disease.
27. Economic Benefits: Employment generated during remediation, potential cost-savings with decreased pollution levels in water and soil, potential savings with lower incidence of related illness.

28. Social Benefits: Remediation would be warmly welcomed and very rewarding to community, local NGOs, and the AP AU (which is separated from the lake only by a road), as this is a high-profile contaminated site and a target of active protest by civil society for more than 5 years. Now that the SC order has resolved the legal issues and closed the site, follow-up with remediation would reflect very well on state and environmental agencies, strengthening the bond between government and communities over environmental issues. The AU also would directly benefit because the site’s polluted water has been undermining their agricultural experiments for years. Residents of surrounding communities would benefit from clean-up of contaminated waters (e.g., in lakes downstream from NMK) they still use for washing.

Site B: Remediation of old municipal dump in Kadapa District, AP (US$ 3.82 Million)

29. The Kadapa municipal waste dump site is situated near Akkayapalli village and also surrounded by the residential colonies of Vidyut Nagar and G.K Nagar. The area comes under Municipal Corporation of district Kadapa. The fine drainage density in southeast and southwest part confirms to physiography of the area, which has the lower infiltration levels. The central portion of the watershed with nearly level sloping condition depicts the medium to high infiltration rate resulting into the incremental groundwater levels. Because of the erratic nature of rainfall and impermeable nature of rocks, shallow stream channels are formed. Water quality related health problems have been reported by local inhabitant during public consultation. The contamination of groundwater was also reported during public consultation in the concern area due to increased chloride concentration. Surface water runoff and percolation of the leachate from Ukkayapalli Dumpyard also contaminate the ground water leading accumulation of dangerous elements like arsenic, mercuric, lead, phosphorous etc., which are carcinogenic. Beyond the boundary of waste dumping sites towards Kadapa, many small water bodies found to be polluted by waste disposal. Total waste generated in the Kadpa municipal area is about 164 tons/day out of which 6 ton per day of solid waste is generated from Akkayapalli area. The Kadapa Municipal Corporation (KMC) area contains organic waste from household and markets and commercial waste like paper, plastic, rags and inert material from street sweeping. People from various social categories reside near the landfill site. The proposed plan to close and reclaim the waste dump site will result in significant reduction of pollution in soil; lower incidence of environment-related disease as well reduction in deleterious health effects on the rag-pickers who derive their livelihoods from the dump site. The proposed area is surrounded with large housing colonies who complain of public nuisance. The remediation plan which includes converting the area into a public park will significantly reduce health risks to the surrounding and help increase the livability of this urban area. A detailed monitoring plan will be developed as part of the detailed design for the APPCB to monitor the long term effect of the closure and rehabilitation.

30. Site rehabilitation works will involve removal of site structures; additional compaction, completions of capping; vegetation establishment; leachate management; landfill gas management; surface water controls. Post-closure maintenance program will be established to
prevent emission to water, air and protection of land use and local amenity. Site maintenance program will be implemented under the supervision of APPCB and will include maintenance and servicing of the leachate collection and landfill gas extraction systems, surface water sediment controls or any additional measures required to prevent any failure of the maintenance. Monitoring should address the following issues: ground and surface water quality; leachate generation and discharge, landfill gas emissions, surface settlement and vegetation. A maintenance schedule and monitoring regime will be developed as part of the detailed engineering design.

31. **Environmental Benefits**: Mitigation of risks from contamination and exposure to health hazard; Expanded energy capacity in the area generated by a clean technology; reduced surface water, ground water, and soil contamination in the immediate vicinity as well as nearby neighborhoods; improved air quality and ambient environment for communities near the site; significantly lower incidence of environment-related disease, given the currently high incidence and broad variety of environment-related illness caused by this pollution.

32. **Economic Benefits**: Employment generated during remediation; potential cost-savings with use of biogas and revenue from use; potential revenue from composting; potential cost savings with lower incidence of environment-related disease; potential revenue to landholders in the area when cleaned-up site increases value of dumpsite and surrounding land area.

33. **Social Benefits**: The direct improvement in quality of life for those living near the site would be considerable, given the very likely decreased incidence of air and water pollution as well as related disease. Increase in land value due to remediation could indirectly benefit slum dwellers and other low-income households by increasing job (e.g., as domestic help in relatively wealthier households) and other opportunities; creating a brighter environment draws in higher-income people and increases network contacts for the poorest segment of the population.

**Site C: Remediation of old municipal dumpsites adjacent to East Kolkata Wetlands, WB (US$8.00 Million).**

34. The East Kolkata wetlands (registered in the Ramsar Convention in November 2002) were used as a dumpsite (Dhapa municipal dump site) for mixed waste (both solid and hazardous waste) in the past. Most of the wetlands are man-made and consisting of intertidal wetlands such as salting and salt meadows. Domestic effluents from Kolkata city enter the wetland area to the east of Kolkata Wetlands. Dumping and industrial development have led to massive encroachment of the wetlands buffer zone. Currently there are 10,000 acres of wetlands left, whereas in 1945 there were 20,000 acres. Currently, segregation of waste is strictly enforced, and the wetland serves as a dumpsite for municipal solid waste only. Because hazardous waste from past indiscriminate disposal of mixed waste continues to affect the wetland and hence groundwater -- the source of drinking water for Kolkata City, remediation of the site is deemed necessary.

35. Active since the early 1980s, the Dhapa site lies adjacent to the Airport Road Bypass of Kolkata and has a total area of 21 hectares. There are two dumping sites in the total area: one site is 8.2 acres and the other is approx. 12.8 acres. It is the major dumping ground for the 3500
MT of waste generated and disposed per day in Kolkata. About 350 vehicles, making three trips per vehicle per day, bring waste to the site. At present, the height of the dumpsite is about 17m. The dump site belongs to the Kolkata Municipal Corporation (KMC) and it will close the dump site in early 2010 and hand it over to WBPCB for rehabilitation\textsuperscript{19}. The remediation plan for this site will close the 8.2 acres within the next two years, while the 12.8 acre area will remain active for another five years and then closed and remediated. The KMC has plans to build a sanitary landfill adjacent to this dumpsite to address the waste disposal requirements.

36. The rehabilitation plans are designed to mitigate health hazards from toxic pollution, which poses risks to community and ecology (especially humans and animals that come into direct contact with the waste); reduce water and soil contamination in the land surrounding the site, which is used for small farming. Remediation also would improve the aesthetic appearance of the area, help eliminated the nuisance of flies and other insects that breed intensively on the site, and very likely lower the incidence of environment-related disease. The proposed plan to close and reclaim the waste dump site is also expected to result in potential cost-savings with decreased levels of pollution in soil, potential cost savings with decreased health budget from lower incidence of environment-related disease. Improvement/better management of the site would make it easier to set up transportation facilities and roadside amenities, which would generate income. The project will finance closure and rehabilitation includes capping of the site, building of a leachate collection system, sloping and re-vegetation, installation of gas recovery and collection system to capture land fill gas, venting and flaring equipment, and installation of monitoring system for implementation of site after care program. Though the calorific value of the waste samples at the disposal site is found to be in the range of 800-900 cal/g further validation for the purposes of the project design should be carried out as part of the detailed design engineering. Monitoring of the closure and rehabilitation and long term effects on the local environment will be carried out on the basis of a plan developed as part of the detailed design. The future land use of the site after closure and rehabilitation should be in compliance with the provisions of the East Kolkata Wetlands Management Plan and East Kolkata Wetlands Conservation Act, wherever required.

37. The post-closure monitoring of the site will be carried out in four zones: on the disposal area; in the unsaturated subsurface zone (vadoze zone) around the disposal site; ground water (saturated) zone around the disposal site and ambient air around the sites. The parameters to be monitored regularly include leachate head within the landfill; leachate and gas quality within the landfill; long term movements of the landfill cover; quality of pore fluid and pore gas in the vadoze zone; quality of ground water in the saturated zone and air quality above the closed site and in the ambient air covering predominant wind direction.

38. Social benefits include reduced pollution exposure associated with deleterious health effects on the approximately 500 rag-pickers who derive their livelihoods from the dump site, as well as approximately 300 households in settlements near the site. There is no piped water supply to the villages; the corporation supplies water on alternate days via tankards, but the supply is inadequate for consumption. The contaminated ground and surface water is used by local residents (few of whom have access to clean, piped water) for washing and for agricultural

\textsuperscript{19} In a letter to Member Secretary WBPCB, dated December 6, 2008, Municipal Commissioner confirms that the site will be handed over for rehabilitation works to WBPCB with effect from September 2010.
purposes. Cattle and other domestic animals also use the water for drinking and bathing, and are poised as a result.

39. **Environmental benefits** include mitigation of health hazards from toxic pollution, which poses risks to community and ecology (especially humans and animals that come into direct contact with the waste); reduced water and soil contamination in the land surrounding the site, which is used for small farming. Remediation also would improve the aesthetic appearance of the area, help eliminated the nuisance of flies and other insects that breed intensively on the site, and very likely lower the incidence of environment-related disease.

40. **Economic benefits** include employment generated during remediation; potential cost-savings with decreased levels of pollution in soil, potential cost savings with decreased health budget from lower incidence of environment-related disease. Improvement/better management of the site would make it easier to set up transportation facilities and roadside amenities, which would generate income.

**Site D: Remediation of 7 chemically contaminated sites in Hooghly district, WB. (US$10.06 Million)**

41. These sites are part of a large industrial area where chrome chemical, metallurgical, textile, galvanizing units are localized. The sites are on the public land, where indiscriminate disposal of chemical, heavy metal bearing wastes have taken place in the past. Although, disposal of such waste have stopped heavily contaminated land and water continues to pose serious threat to human health and the environment in the surrounding. Chromium bearing wastes had been dumped at all the sites as confirmed by preliminary assessment. Additional site investigation will be required to confirm the level of soil and groundwater contaminated which at this stage is not known. However, in most sites, the chromium contamination is found to be leachable under acidic conditions. The potential for further contamination of nearby land and water body is significant, particularly during rainfall due to spilling and overflow. All the chosen sites have medium to high hazard potential based on soil and groundwater analyses and assessment of health and environmental risks considering on existence of water body in the area, population density, likely impact on human health, existence of water supply source in the area, ground water table, contamination in soil and contamination in ground water.

42. The soil and surface water in the Hooghly project area are contaminated. The ground and surface water is used by local residents for washing and other purposes as not all have access to clean, piped water. The water is also being used for agricultural purposes and thus poses a severe risk to human health. The livestock in the area such as cattle and other animals also drink the contaminated water. The waste present at the sites contains leachable constituents as identified in the TCLP (Chromatographic test) test and continues to contaminate both ground and surface water. The risk to the community and ecology is evident.

43. **Site1:** Near Ghosh and Sarkar Weigh Bridge, Delhi Road, Village Simla/Madpur,

**Site description:** It is located on the right side of the Delhi Road while moving from M/s Bhusan Power & Steel Ltd., Bangihati towards Serampore. It is about 1 km away from M/s Bhusan Power & Steel Ltd., and near Ghosh & Sarkar Weigh Bridge. The site is a low lying
land on which chromium containing waste had been dumped. The area of the site is about 1600 sq. m. and thickness of the filled material containing chromium is 4 m approx.

44. **Site-2:** Netaji More, Delhi Road (1.7 km from Baidyabati)
   **Site description:** The site is located on the right side of Delhi Road and at a distance about 20m from Netaji More. The site consists of two approach roads leading to the entrance of two industries, namely M/s Shivam Trexim Pvt. Ltd. and M/s Balaji Veneers Pvt. Ltd. These approach roads are built up by chrome waste. The approximate area of the site is about 960 square meters.

45. **Site-3:** Near Netaji More, Delhi Road
   **Site description:** This is a large disposal of waste found by side of Delhi road about 100m from the Netaji More. Two “dhabas” are constructed on dumpsite by the side of the road. One weighbridge is situated behind these “dhabas” from which the approach road has been constructed with the chrome waste. The old waste on the site may be 4 to 5 years old. The area of the site has been estimated as 1,140 sq. m.

46. **Site-4:** Near Zenith Timber Products, Netaji More
   **Site description:** This is a small approach road made by chrome waste and situated at a distance about 200m from the Netaji more. The site may be 4 to 5 years old. The area of the site has been estimated as 780 sq. m.

47. **Site-5:** Near Pashupati Seong and East India Flour Mills, Delhi Road
   **Site description:** This is a small approach road made by chrome waste and situated at a distance about 250m from the Netaji More. The site may be 4 to 5 years old. The area of the site has been estimated as 200 sq. m.

48. **Site-6:** Ashalata Brick Field, Near Indotan Industries
   **Site description:** This is a brickfield developed by partly filling up of low-lying area with chrome waste. Few yellow patches are observed on the ground though no waste was visible. Residential areas of Bodo Garji are also located in proximity of the site. The area of the site has been estimated approximately 400 sq. m.

49. **Site-7:** Near M/s Shivam Gases Ltd., Chakundi Industries Area, Chakundi
   **Site description:** A small pit bound by brick wall in front of M/s Shivam Gases has found to be disposed off with various types of hazardous wastes containing chromium and other toxic metals.

50. An upgrading and/or closure of the existing Chakundi HW landfill is foreseen in year 3 as an alternative to transportation of untreatable waste. Technical provisions for containment and cover system have to be designed and approved by WBPCB before any action take place.

51. **Environmental benefits:** Mitigation of health hazards from toxic pollution, which poses risks to community and ecology; reduced soil contamination in the immediate neighborhood; lower incidence of environment-related disease.
52. **Economic benefits:** Employment generated during remediation, potential cost-savings with decreased levels of pollution in soil, potential cost savings with lower incidence of environment-related disease.

53. **Social benefits:** The mixing of hazardous waste into materials for constructing approach roads poses high health risks. At some sites, the ground and surface water is used by local residents (not all of whom have access to clean, piped water) for washing and for agricultural purposes. The analysis shows levels of Chromium VI approximately 3,000 times the limit for agricultural water quality. Cattle and other domestic animals also use the water for drinking and bathing.

**Component 3: Project Management (Estimated Cost including contingencies US$5.85 Million).**

54. *The* project governance structure is designed to ensure effectiveness and transparency of implementation. At central level, under the overall oversight of MOEF, the Project Director assisted by management consultants will be responsible for supervision of project implementation, in accordance with the POM. MOEF, assisted by the Management Consultants, will perform the following core functions: (i) Project Management; outreach and communications; procurement for the MOEF managed Capacity building activities, financial accounting and reporting; liaise with participating States and agencies. MOEF/MC will prepare annual reports for approval to the POC chaired by the Secretary of MOEF. On technical and scientific matters, the POC will be supported by a Technical Evaluation Panel (TEP). The MOEF/MC will organize and implement the capacity building activities by identifying and contracting appropriate agencies; taking responsibility of the procurement and contract management, recording and supervision of activities.

55. The Management Consultants will have a team with adequate number of consultants specialized in Technical, Finance and Procurement areas and also support staff. The project will finance the operational, managerial and other costs towards the management consultants for the life of the project.

56. At the state level, the APPCB and WBPCB will be responsible for implementation of remediation/rehabilitation plans and activities for overall improvement of environmental conditions in the project area will be carried out by. Both PCBs have established PIUs, which will implement the project in compliance with the POM. A Project Steering Committee, chaired by Secretary, Environment and convened by Member Secretary, will oversee project implementation, which will be undertaken under a common project implementation framework which includes a system for monitoring and evaluation of project outcomes through field visits, regular exchange of information and progress reporting; auditing of investments and financial accounts, and beneficiary surveys. The responsibilities of the PIUs are described in Annex [6]. The project will finance the cost of operation and maintenance of the PIUs during project implementation, essential equipment and office supplies; operational travel expenses; hiring implementation consultants; training of project implementation staff, communication cost, beneficiary surveys and audits, cost of independent supervision of works, samples and laboratory analysis for validation of results, implementation of safeguards provisions for all pilot sites and related income restoration measures.
57. Strategic communication will be a key activity supported as part of the project management activities. It will help establish common understanding of the benefits of the project. It will be used for empowerment of the project stakeholders and targeted beneficiaries. The project is the first of the kind in India and though active communication it will present a holistic and comprehensive picture of project benefits and “public good” produced by the project. In many ways, project communication is also central to promoting accountability and transparency, participation and outreach. The project will finance the cost of hiring a communication specialist, preparation of a comprehensive communication strategy, which includes, conferences, workshops, seminars; using mass media and audio-visuals; promotion materials, publications, and targeted education activities in participating communities. Detailed budgets and procurement plans by state and by activities, including project management cost for national and state has been prepared during appraisal. On that basis, the PIUs will prepare an annual activity plan and will submit it to PSC for approval and further to MOEF for financing.
Annex 5: Project Costs

India - Capacity Building for Industrial Pollution Management

Project Costs
1. Total project costs including contingencies and taxes (US$15.88 Million), over five-year implementation period, are estimated at US$75.39 million. This includes the 15% cash contribution from the states. The foreign exchange component amounts to US$3.67 million while the local currency content of the Project totals to US$71.72 million. A description by components, sub-components and by sources of funds and respective percentages are provided in the tables below:

Table 1.1: Project Cost Estimate – Breakdown by Foreign and Local

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Costs Incl. Cont. &amp; Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Foreign US$ Mill</td>
</tr>
<tr>
<td>1</td>
<td>Component 1: Strengthening of Environmental Institutions: Building capacity for addressing pollution remediation</td>
<td>3.21</td>
</tr>
<tr>
<td>2</td>
<td>Component 2: Investments in Priority Remediation and Environmental Improvements: Rehabilitation of orphan hazardous waste sites and municipal dumpsites</td>
<td>1.07</td>
</tr>
<tr>
<td>3</td>
<td>Component 3: Project Management</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td><strong>Total:</strong></td>
<td><strong>4.28</strong></td>
</tr>
</tbody>
</table>

Table 1.2: Project Costs: Component-wise Cost Breakdown by Implementing Agency

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>AP</th>
<th>WB</th>
<th>MoEF</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Component 1: Strengthening of Environmental Institutions</td>
<td>4.70</td>
<td>8.60</td>
<td>3.44</td>
<td>16.74</td>
</tr>
<tr>
<td>2</td>
<td>Component 2: Investments in Priority Remediation and Environmental Improvements</td>
<td>34.75</td>
<td>18.06</td>
<td>0.00</td>
<td>52.80</td>
</tr>
<tr>
<td>3</td>
<td>Component 3: Project Management</td>
<td>1.24</td>
<td>2.40</td>
<td>2.21</td>
<td>5.85</td>
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<tr>
<td></td>
<td><strong>Total:</strong></td>
<td><strong>40.69</strong></td>
<td><strong>29.05</strong></td>
<td><strong>5.65</strong></td>
<td><strong>75.39</strong></td>
</tr>
</tbody>
</table>

Table 1.3: Component-wise Cost Breakdown (across IDA, IBRD and Government)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Total US$ Mill. (Incl Cont.)*</th>
<th>World Bank</th>
<th>Gov</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>IDA (US$ Mill)</td>
<td>IBRD (US$ Mill.)</td>
<td>Total (US$ Mill.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IDA (US$ Mill)</td>
<td>IBRD (US$ Mill.)</td>
<td>Total (US$ Mill.)</td>
</tr>
</tbody>
</table>
## Table 1.4: Component-wise Breakdown – IDA, IBRD and MOEF (Percentages)

<table>
<thead>
<tr>
<th>S.N o.</th>
<th>Description</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>IDA</td>
</tr>
<tr>
<td>1</td>
<td>Component 1: Strengthening of Environmental Institutions</td>
<td>85%</td>
</tr>
<tr>
<td>2</td>
<td>Component 2: Investments in Priority Remediation and Environmental Improvements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hazardous Waste Sites:</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>Municipal Waste Sites:</td>
<td>0%</td>
</tr>
<tr>
<td>3</td>
<td>Component 3: Project Management</td>
<td>85%</td>
</tr>
</tbody>
</table>

## Table 1.5 Financing Plan by Components and sub-components (US$ Million)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>US$ Mill. (Incl Cont.)*</td>
</tr>
<tr>
<td>1</td>
<td>Component 1: Strengthening of Environmental Institutions: Building Capacity for addressing pollution remediation</td>
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</tr>
<tr>
<td></td>
<td>National Plan for the Rehabilitation of Polluted sites:</td>
<td>3.44</td>
</tr>
<tr>
<td></td>
<td>Environmental Compliance Assistance Centers:</td>
<td>5.21</td>
</tr>
<tr>
<td></td>
<td>Institutional Capacity Building of SPCBs:</td>
<td>8.09</td>
</tr>
<tr>
<td></td>
<td>Sub-total (1):</td>
<td>16.74</td>
</tr>
</tbody>
</table>
2 Component 2: Investments in Priority Remediation and Environmental Improvements: Rehabilitation of orphan hazardous waste sites and municipal dumpsites

<table>
<thead>
<tr>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remediation of Noor Mohammed Kunta Lake HW Site:</td>
<td>30.93</td>
</tr>
<tr>
<td>Closure &amp; Rehabilitation of Kadapa MSW Site:</td>
<td>3.82</td>
</tr>
<tr>
<td>Remediation of Hooghly HW Site:</td>
<td>10.06</td>
</tr>
<tr>
<td>Closure &amp; Remediation of Dhapa MSW Site:</td>
<td>8.00</td>
</tr>
<tr>
<td>Sub-total (2):</td>
<td>52.80</td>
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</table>

3 Component 3: Project Management

<table>
<thead>
<tr>
<th>Location</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>1.24</td>
</tr>
<tr>
<td>West Bengal</td>
<td>2.40</td>
</tr>
<tr>
<td>MoEF</td>
<td>2.21</td>
</tr>
<tr>
<td>Sub-total (3):</td>
<td>5.85</td>
</tr>
<tr>
<td>Total:</td>
<td>75.39</td>
</tr>
</tbody>
</table>

Table 1.6 Cost Breakdown as per Procurement and Categories (US$ Million)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>IDA</td>
<td>IBRD</td>
</tr>
<tr>
<td>1</td>
<td>Services</td>
<td>11.49</td>
<td>2.05</td>
</tr>
<tr>
<td>2</td>
<td>Works</td>
<td>17.99</td>
<td>23.10</td>
</tr>
<tr>
<td>3</td>
<td>Goods</td>
<td>4.54</td>
<td>0.00</td>
</tr>
<tr>
<td>4</td>
<td>Training &amp; workshops</td>
<td>1.41</td>
<td>0.00</td>
</tr>
<tr>
<td>5</td>
<td>Incremental operating costs</td>
<td>2.94</td>
<td>0.00</td>
</tr>
<tr>
<td>6</td>
<td>Project preparation costs</td>
<td>0.57</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-total (1-6):</strong></td>
<td><strong>38.94</strong></td>
<td><strong>25.15</strong></td>
</tr>
<tr>
<td>7</td>
<td>IBRD Front End Fee</td>
<td>0.00</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td><strong>Total (1-7):</strong></td>
<td><strong>38.94</strong></td>
<td><strong>25.21</strong></td>
</tr>
</tbody>
</table>
Annex 6: Implementation Arrangements
India - Capacity Building for Industrial Pollution Management

Project Management and Oversight at Central Government Level

1. The Ministry of Environment and Forests at New Delhi will be the implementing agency at the central level for the project, with the overall responsibility for its management and implementation. The project will be implemented in two pilot states responsible for carrying out a set of capacity building activities supported by project-based learning in remediation of hazardous waste sites. At national level, while the MOEF will have the prime role for overall project oversight and coordination, and specifically for developing the national framework for scaling up the remediation of polluted sites across other states through activities for development of methodological framework, guidance to states on site assessment, application of remediation standards, monitoring of results and dissemination of best practices. The project’s institutional arrangements are designed to provide support at the site/district level, and at state and central levels.

2. For the purpose of the project, MOEF will establish a Project Oversight Committee, chaired by Secretary, MOEF or a designated official in his absence. The POC will include members from the Central Pollution Control Board, Planning Commission, Department of Economic Affairs, Ministry of Urban Development, and Ministry of Industry. The Chairpersons of the state Project Steering Committees where clean up/remediation investments (AP and WB) will be also be members of this Committee.

3. MOEF has designated a Project Director who will be responsible to coordinate implementation of activities at central level and provide guidance to the state PIUs. The Management Consultants (MC) assisting MOEF will put together a team of consultants along with support staff, so that MOEF can discharge its responsibilities as per the POM. The team of MC will include Technical Specialists with experience in hazardous and solid waste management, financial specialist, and Procurement specialist, an M&E specialist and adequate number of support staff. TORs for the management consultants will be completed and they should be in place by October 1, 2010. MOEF will also have a panel of technical experts (TEP) who will provide quality technical inputs during project implementation and specifically with regard to preparation of remediation guidelines and clean-up standards.

Project Management at the State level

4. In both WB and AP, State Project Steering Committees (PSCs) have been established under the chairmanship of the Secretary, Department of Environment to oversee the implementation of projects activities in each state. In WB, the members of the PSC will include representatives of the WBPCB, Department of Finance, Department of Environment, and district administrations of the identified sites for remediation, Industrial Development Corporation (IDC), urban local bodies, industry associations and academia. The Member Secretary, WBPCB will be the member convener. In AP, the members will include representatives from the Departments of Finance, Industry and Municipal Administration and Urban, Andhra Pradesh Industrial Infrastructure
Roles and Responsibilities of Oversight Committees

<table>
<thead>
<tr>
<th>Project Oversight Committee (POC) at Central Level</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Providing overall policy guidance and direction to the project</td>
<td></td>
</tr>
<tr>
<td>• Approving national level plans for capacity building on annual basis</td>
<td></td>
</tr>
<tr>
<td>• Participating and approving national strategy and plans for remediation of contaminated sites</td>
<td></td>
</tr>
<tr>
<td>• Provide guidance on approval and adopting a methodological framework for risk-based assessment and clean-up of contaminated sites in the country</td>
<td></td>
</tr>
<tr>
<td>• Providing strategic support and guidance to program implementation</td>
<td></td>
</tr>
<tr>
<td>• Approve guidelines and clean-up standards</td>
<td></td>
</tr>
<tr>
<td>• Approve annual progress report prepared by MOEF/MC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Steering Committee in AP and WB (PSCs)</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Review and monitoring project implementation and achievement of project performance indicators</td>
<td></td>
</tr>
<tr>
<td>• Providing strategic support and guidance as well as coordinating with different government departments and agencies</td>
<td></td>
</tr>
<tr>
<td>• Approving overall human and financial resource requirement for State wide implementation of remediation plans.</td>
<td></td>
</tr>
<tr>
<td>• Defining and reformulating project strategies based on emergent experience from project implementation</td>
<td></td>
</tr>
<tr>
<td>• Approve bi-annual progress reports of APPCB and WBPCBs</td>
<td></td>
</tr>
</tbody>
</table>

5. Both states will establish fully functional PIUs at their state PCBs, which will have the responsibility for day to day project implementation and coordination with other stakeholder agencies. The PIUs will serve as Secretariat for the PSCs. The TOR for the PIU will be included in the POM which details the implementation and institutional arrangements procedures for management of technical, financial and technical aspects of the project. The Project Director in both the States are already in place.

6. The state project director, heading the PIU, will be operationally and managerially in charge of the entire organization structure established at the State level for implementing the project. The PIU will be supported by a team of technical specialists (4) responsible for different functions and support staff (2). The specialists will be responsible for providing inputs in areas such as policy, project management aspects including remediation techniques, hazardous and soil waste pollution, environmental monitoring and sustainability, social impact monitoring etc. In addition, project management functions such as M&E, financial management, procurement management; project administration, communications and other functions would have dedicated specialists responsible for these functions. This includes monitoring of capacity building activities and remediation pilots to be implemented by the States in a timely manner. A Technical Coordinator/Manager with strong technical background in industrial pollution and HW management will be appointed. It could be technical staff on a deputation assignment from CPCB.

Responsibilities of the MOEF
7. On behalf of the GOI, the MOEF will be responsible for overall project implementation in all its aspects and for achieving the PDOs of this project. The MOEF will implement various tasks encompassing institutional capacities building measures, and will record the lessons learned from implementation of state pilot projects on remediation and rehabilitation. MOEF will establish a network of SPCBs which will benefit from the training activities to acquire skills necessary to carry out state remediation projects when the NPRPS is ready for implementation.

8. The learning experience of the pilot investment program will continue to be an important part of the capacity building strategy in each state and at the central government level. The project will promote cross learning within states and with other participating states through scheduled workshops, project related discussions among implementation entities, monitoring the results of pilot case studies of best practices in project and sharing of the same, documenting learning and disseminating them on different project forum and establishing system for information flow among implementation entities. The implementation will be sequenced to pace the capacity of implementing agencies. A major project effort will be made during the first two years to strengthen the framework for institutional capacity in the project pilot areas. Lessons will be drawn from the implementation of remediation demonstrations in two states which will feed in the development of methodological and regulatory framework. For instance, remediation guidelines and standards for rehabilitation of solid contamination will be developed. On that basis, a wider government engagement and support for scaling up the rehabilitation effort across other states will follow. The platform for that will be the NPRPS. The CPCB, in consultation with State PCBs and MOEF has compiled a long list and information on hazardous waste dumpsites in India\textsuperscript{20}. This information will be used to complete the draft NPRPS by the end of year 2 of project implementation and conduct national wide consultations.

9. The MOEF through allocations and resources obtained from the Planning Commission would provide as counterpart funding [15\%] of the project financing envelope on an annual basis to cover the cost of projects in the annual pipe line. GOAP and GOWB would contribute 15\% of the funds for the state investments, including compensation for loss of livelihood. These project funds will be operated by the MOEF at national level using the country systems through a special account to be replenished on a reimbursable basis. Through the project special account, the states will receive and utilize funds to implement the project investments. The annual activity plan will be approved by the POC in December of each year. Measures for strengthening of capacity of PCBs implemented at national level measures may include technical assistance, training, monitoring equipment, industrial compliance assistance centers etc. The MOEF will also undertake routine monitoring and assessment of state projects related tasks including preparation of various reports.

10. \textit{Criteria for selection of projects for remediation}: In line with the project approach, the project has developed ranking / screening criteria for remediation. These criteria would be applied to the basket of contaminated sites identified by MOEF/CPCB and included in the feasibility studies to be financed under the project.

11. \textit{Implementation of ESMF}: MOEF, APPCB and WBPCB will be responsible for the implementation of the ESMF to ensure that policy and procedures are in place for the

\textsuperscript{20} see http://www.cpcb.nic.in/Hazardous\%20Waste/Inventory_of_HW.html
environmental and social screening and assessment of sites. MOEF and state PCBs will be responsible to ensure stakeholder consultations and communication, disclosure, engagement of beneficiary communities, public interest organizations, industry and the regulatory authorities at various stages including monitoring of supervision. Learning from the experience of the Bank’s projects in India and elsewhere, the consultation process will take into account the external political economy surrounding disposal of hazardous and solid waste, including social context, potential vested interests and formal and informal systems, while seeking compliance with the Bank’s internal safeguards systems. The process will handled with the utmost care and transparency in order to avoid raising unreasonable expectations of concerned communities.
Annex 7: Financial Management and Disbursement Arrangements

India - Capacity Building for Industrial Pollution Management

Summary
1. Financial management assessment is completed for all implementing entities (MOEF, AP Pollution Control Board referred as APPCB and WB Pollution Control Board referred as WBPCB) and there are adequate financial management arrangements to account for and report on project expenditures for the Bank funded project.

(A) MOEF as implementing entity for CBIPMP at the central level

Brief Project Description
2. **Project Financing:** The proposed lending instrument is a Sector Investment Credit (SIC) which includes IDA and IBRD resources under the project financing envelope of US$ 64.15 million, GOI and two states of WB and AP will contribute up to 15% of project investments. The project will have a life span of five years.

3. The objective of the project is: (i) to support the development of institutional and methodological framework for implementing of pilots for rehabilitation of highly polluted sites resulting from rapid industrialization; and (ii) build tangible capacity of selected state and national institutions for taking the primary role in reducing the risks to public health, livelihoods and ecosystem integrity from past environmental damage.

4. The project will have the following components:

5. **Component 1: Strengthening of Environmental Institutions:** Building Capacity for addressing pollution remediation at state level. This component will provide support to the development of a methodological framework supporting development and implementation of the National Program for Rehabilitation of Polluted Sites. It will include, *inter alia*, institutional capacity at state and national level for inventorying of polluted sites, assessing public health and ecosystem risks and economic, social and environmental benefits derived from project activities.

6. **Component 2: Investments in Priority Remediation and Environmental Improvements:** Rehabilitation of abandoned contaminated/polluted sites: Project demonstration activities will be implemented in AP and WB. Project investments for remediation will be defined on the basis of Area-wide Management Plans focusing on hazardous waste legacy sites and old solid waste dumpsites, where the pilot area management plans for remediation will be developed and implemented with stringent social and environmental safeguards in place.

7. **Component 3: Project Management:** This will include project management activities at central level and in the two states.

Implementation Arrangements
8. At national level, MOEF will have the responsibility of overall project oversight and coordination, and specifically for developing the national framework for scaling up the remediation of polluted sites across other states. The project will be implemented in two pilot states (AP and WB).
9. MOEF will establish a Project Oversight Committee, Chaired by Secretary, MOEF or a
designated official in his absence. The Committee will include members from the Central
Pollution Control Board (CPCB), Planning Commission, Department of Economic Affairs,
Ministry of Urban Development, and Ministry of Industry. The Chairpersons of the State
Steering Committees where clean up/remediation investments will be implemented (AP and
WB) will be members of this Committee.

10. Under the charge of Project Director, MOEF will contract Management Consultants
(MC) to coordinate implementation of activities planned under the project at central level and
provide guidance to the project implementation units (PIUs) to be established in the two states.
This will include monitoring of capacity building activities and remediation pilots to be
implemented by the States in a timely manner. APPCB and WBPCB are the implementing
entities for the states of AP and WB respectively.

Financial Management at Central level
11. MOEF will have the overall responsibility for financial management of the project and
ensuring that funds flow, accounting, internal controls, financial reporting, disbursement and
audit are carried out in accordance with project legal agreements and financial guidelines of the
project. Key FM task of the MOEF will be: (a) annual budgetary provision for the project and
monitoring of project expenditure against project budget; (b) approval of annual work plan and
budgets of WBPCB and APPCB; (c) ensuring sufficient and timely funds flow for activities at
state level and for MOEF level activities; (d) regular financial reporting at all levels of the
project and compilation of quarterly financial reports and annual financial statements of the
project; (e) timely submission of annual reimbursement claims to the Bank; (f) conducting
regular financial reviews of state pollution control boards; and (g) ensuring annual external
audits at MOEF, APPCB and WBPCB for the project as per the agreed TOR with the Bank,
consolidation of implementing entities’ audited financial statements and audit observations,
submitting consolidated annual audit report of the project to the Bank and ensuring compliance
to auditor’s observations.

Budgets
12. At GOI level, project’s funding requirements will be provided within the budget of the
MOEF as a separate budget line under Externally Aided Projects. Adequate provision will be
made by MOEF in the budgets for the year 2010-11 onwards to ensure appropriate funds flow
for the implementation of the project. MOEF will also ensure that adequate budget provision is
made at the state levels for the respective state shares for the implementation of the project
activities in AP and WB.

13. Annual work plans and associated procurement plans will be submitted by APPCB and
WBPCB to MOEF at the beginning of every financial year based on which MOEF shall release
advance funds to the Boards. The MOEF will prepare a consolidated work plan for the year for
the project, including a work plan for activities at the central level and state levels. The MOEF
will carry out overall monitoring of project expenditure against project budget and the
implementing entities in the state will monitor expenditure against their own budget as well.
Bank’s procurement procedures will be followed by all implementing entities.
Funds Flow
14. MOEF will implement the project as per treasury mode at the level of MOEF using the existing system of Pay and Accounts Office (PAO) for project related payments.

15. For implementation of the project at the state level, adequate funds will be advanced by MOEF to APPCB and WBPCB. MOEF will release funds to State Pollution Control Boards as per the following installment schedule and criteria:

<table>
<thead>
<tr>
<th>Financial Year</th>
<th>Criteria for releases of funds by MOEF to PCBs (and indicative date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>Advance to be released by November 1, 2010 based on approved work plan for 2010-11.</td>
</tr>
</tbody>
</table>
| 2011-12 and onwards  | 1) 70%: by May 1, based on approved work plan for the year; and submission of progress report and financial report with utilization certificate (UC) for the previous year.  
                     | 2) 30%: by September 30 or the date of receipt of audit report and audited financial statements of the previous year whichever is later, along with financial report with UC for the expenditure incurred out of the first installment. |

Please refer to diagram below for flow of funds to State Pollution Control Boards.

Accounting and Internal control
17. Accounting: Accounting and maintenance of records for MOEF/MC level activities will be carried out as per General Financial Rules (GFRs). For project purposes, cash basis of accounting will be followed. However any advances paid will be classified as advances for the
project and charged to expenditure only upon confirmation of receipt of goods/services. Standard books and records will be maintained at MOEF, such as Sanctions File, Expenditure Control Register, Year-wise expenditure details of Pollution Control Boards, Reimbursement Claims and Asset Register. Financial records at MOEF will form the basis of preparation of the Interim quarterly and Annual Financial reports for submission to the Bank the formats of which are included in the operational manual of MOEF.

18. **Internal Controls:** Internal controls at MOEF for the project will be as per Financial Guidelines for the project and GFRs. Releases by MOEF to State PCBs will be done with concurrence of IFD (Integrated Finance Department) of MOEF. A system of annual physical verification of assets procured out of project funds at the MOEF will be established. Internal Audit Unit of MOEF will be authorized to carry out internal audit of the project at MOEF level as per its own discretion.

**Finance Staffing**
19. It has been agreed to have the position of a finance manager at the MOEF who will be responsible for ensuring adequate financial management arrangements for the project at the centre and monitoring financial management arrangements at the states during the implementation of the project. Given the critical role of the financial manager in the proposed MOEF, ToR for this position has been agreed and is included in Financial Guidelines. The position of financial manager will be an integral part of the MOEF for the project at the central level and maintenance of this position throughout the project life will be a financial covenant in the project financing agreement.

**Financial Manual/Guidelines**
20. A Project Operations Manual (POM) prepared by MOEF includes Financial Guidelines. It includes key FM procedures such as budgeting; funds flow; accounting including chart of accounts; internal controls; financial reporting, including formats of Interim Unaudited Financial Reports (IUFRs); monitoring and supervision; and audit. MOEF will organize a formal training cum orientation on the project’s financial procedures for all financial staff (including PCBs) at the beginning of the project.

**Financial Reporting**
21. The MOEF will submit a consolidated quarterly interim unaudited financial report (IUFRs) in the agreed formats to the Bank within 45 days of the end of each calendar quarter. This will be prepared by the MOEF based on expenditure reported in the quarterly IUFRs submitted by APPCB and WBPCB to the MOEF. In addition, consolidated reports on Audited Financial Statement (AABS) of the project will be submitted annually to the Bank.

**Disbursement**
22. The Government of India will open a Designated Account (DA) in Reserve Bank of India to receive advances from the Bank. This account will be operated by CAAA/MOF. This account will be used to later receive funds from the Bank and will be available to MOEF for the expenditures reported through the IUFRs. The initial DA Advance will be based on forecasted cash flow of one year at the beginning of the project and will be provided to GOI. The limit of the advance has been established at US$ 5 million. The reimbursements made annually will be
annually reconciled by MOEF with the consolidated annual audited financial statements submitted to the Bank as elaborated under the “External Audit” paragraph below.

Project Preparation Facility
23. A Project Preparation Facility (PPF) for the project was established for US$ 570,000 (reference: Q5270) for the project, which was valid till March 31, 2010. Audit report for the expenditures incurred under PPF until 31 March 2010 will need to be submitted by 30 September 2010.

External Audit
24. Annual audited project financial statements will include: (i) actual expenditure at the implementing entity at central level, i.e., MOEF; and (ii) actual expenditure at each implementing entity at state level, i.e., APPCB and WBPCB. MOEF will be responsible for consolidation of all implementing entities’ audited financial statements and audit observations and submit reports on consolidated annual audited financial statements to the Bank, along with a summary of audit observations as well as actions taken to address such observations. This consolidated information along with a reconciliation of the audited expenditure with the reimbursement claims submitted to the Bank on the basis of IUFRs will be submitted to the Bank within six months of the close of the financial year. The audit will be done by private chartered accountants at the states and by C&AG at MOEF. A project specific TOR for audit has been agreed with MOEF and are included in Financial Guidelines of the project. The audit for the central level expenditure will be conducted by C&AG as per the TOR already agreed with the DEA and Bank.

25. The following audit reports will be received by the Bank and monitored in ARCS:

<table>
<thead>
<tr>
<th>Audit Report</th>
<th>Implementing Agency</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual consolidated audited financial statements and summary of audit observations (along with a reconciliation of the audited expenditure with the reimbursement claims submitted to the Bank on the basis of IUFRs)</td>
<td>MOEF/MC, MOEF (based on consolidation of audited financial statements for expenditure incurred at MOEF, APPCB and WBPCB)</td>
<td>30 September</td>
</tr>
<tr>
<td>Special Account</td>
<td>DEA/GoI</td>
<td>30 September</td>
</tr>
</tbody>
</table>

Public Disclosure
26. Necessary financial information such as annual budgetary provision by MOEF and states, funds released to WBPCB and APPCB, IUFRs and annual audit reports (including for the expenditure incurred at APPCB and WBPCB) will be displayed on the project website. These disclosure requirements are included in Financial Guidelines.

Significant Risks and Mitigation Measures
27. Based on the above arrangements and the fact MOEF will be responsible for supervising the PIUs and also consolidating the financial reports and audited financial statements, the FM risk for the project at MOEF level is assessed as “Substantial”, break up of which is as under:

<table>
<thead>
<tr>
<th>Risk</th>
<th>Residual Risk Rating</th>
<th>Risk Mitigation Measures</th>
<th>Condition of Negotiations</th>
</tr>
</thead>
</table>

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Inherent Risk

| Inherent Risk | Country Level | Modest | Entity Level (MOEF) | Substantial | The MOEF will need to establish control over the state pollution control boards by providing them guidelines for monitoring. Financial Guidelines have been developed by MOEF. A qualified financial staff at MOEF as per TORs agreed with the Bank, will play a critical role in the effective implementation of FM procedures for the project. | Maintenance of Financial Manager position in MOEF to be a legal covenant |
|---------------|---------------|--------|---------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • Budgeting   | Low           |        |                     |             |                                                                                      |                                                                 |
| • Accounting  | Substantial   |        | Accounting for MOEF level as per existing GOI system of Pay and Accounts Office. Expenditure at the states will be tracked in the computerized softwares in the states; and later consolidated in MOEF’s records. |             |                                                                                      |                                                                 |
| • Internal Control | Substantial   |        | Internal controls at MOEF level as per GOI’s existing system. Releases to states will be linked to approval of annual work plans and submission of financial reports and utilization certificates. |             |                                                                                      |                                                                 |
| • Funds Flow  | Low           |        | Funds will flow directly from MOEF to state PCBs, so no delays are expected. |             |                                                                                      |                                                                 |
| • Financial Reporting | Substantial   |        | Standardized IUFRs at central and state level included in Financial Guidelines so that the reports are received in the common formats. Their consolidation at MOEF is an acceptable challenge. |             |                                                                                      |                                                                 |
| • Auditing    | Substantial   |        | Terms of reference for the external audit have been agreed and are included in the operational manual (and financial guidelines), which will provide an adequate assurance that funds have been used for intended purposes. |             |                                                                                      |                                                                 |
| Overall Risk  | Substantial   |        |                     |             |                                                                                      |                                                                 |

Project Covenants:

- MOEF will establish and retain during project implementation a financial management cell at the central level with a finance professional with qualifications acceptable to the Association.
- Submission of quarterly consolidated IUFRs within 45 days of the close of the quarter
- Annual consolidated audited financial statements; and summary of external auditor’s observations along with compliance reports on the audits conducted at MOEF, APPCB and WBPCB to be submitted within six months of the closure of the financial year.

Bank Supervision

27. The Bank supervision will include desk reviews of the results of the oversight arrangements by MOEF, review of IUFRs and annual audited project financial statements; and two field visits on annual basis.

(B) Andhra Pradesh Pollution Control Board (APPCB) as implementing entity for CBIPMP in the state of Andhra Pradesh

28. The implementing entity in the state, subject to items agreed for actions, has adequate financial management arrangements to account for and report on project expenditures.
Background
29. Andhra Pradesh Pollution Control Board (APPCB) is the implementing entity for the project in the state of AP. APPCB is a Board constituted under The Water (Prevention & Control of Pollution) Act 1974 passed by the Parliament, is financially very sound with positive reserves of more than Rs 100 crores as of date.

Description of Project
30. The following activities will be implemented by APPCB under the project: (1) building capacity for addressing pollution remediation, which will include technical support, laboratory equipment, establishment of an Environment Compliance Assistance Centre and training; (2) remediation of NMK HW site and closure and containment of Kadapa old MSW site; and (3) project management.

Implementation Arrangements
31. APPCB as an implementing entity of the project in the state will manage financial expenditure in line with the agreed annual project budgets over the project period of September 2010 to September 2015.

32. The APPCB will establish a Project Implementation Unit (PIU) which will have responsibility for day to day project implementation and coordination with other stakeholder agencies. It will also serve as a Secretariat for the State Steering Committee.

33. APPCB will ensure adherence to Financial Guidelines of the project. Key FM tasks of APPCB for the project will include: (a) preparing annual budget and work plan for the project and submitting it to MOEF; (b) receipt of funds from MOEF and the state government (15% share, including for cash compensation if any); (c) ensuring funds flow for project activities; (d) maintaining appropriate accounts and internal controls; (e) submission of quarterly financial reports to MOEF in the agreed formats; (f) timely completion of financial audit for project expenditure in the state by an acceptable independent firm of Chartered Accountants as per terms of reference agreed with the Bank and submission of annual audit report to MOEF; and (g) maintaining a fully staffed FM cell for the project in the state.

34. APPCB will follow the Bank procurement guidelines for awarding contracts, (including for financial audit by an independent firm of Chartered Accountants), as well as procuring necessary equipments and services.

Budgets and Funds Flows
35. At GOI level, the project’s funding requirements will be provided in the budget of the MOEF. Funds to APPCB for the project will be provided in the ratio of 85% and 15% from MOEF funds and state funds respectively. The state government will also make provision for its share (15%) in its annual budget. APPCB will include annual estimate for the project in its annual budget as per its standard procedures and inform MOEF/MC about the same.
36. Funds will be provided by MOEF to APPCB on the basis of forecast of expenditure as elaborated above. APPCB will open a separate bank account for the project in a nationalized bank.

Accounting and Internal controls
37. **Accounting Center**: The central office of APPCB in Hyderabad is supported by 5 zonal offices and 19 regional offices in the state, all of which are accounting centers of APPCB. At present, recording of expenditure and financial reporting from these centers needs to be further strengthened. APPCB also needs to prepare a financial manual to provide necessary guidance to field staff on accounting, internal controls and reporting aspects. APPCB proposes to prepare a financial manual to guide its staff.

38. For the purposes of the Bank project, it is agreed that all the expenditure for the project in the state will be incurred directly by the central office of APPCB based at Hyderabad. While zonal offices/ regional offices may be engaged in necessary implementation efforts for the project, they will not incur expenditure under the project. Therefore central office in Hyderabad will be the only accounting center in the state under the project.

39. **Basis of Accounting**: APPCB follows cash basis of accounting with any advances paid being classified as advances and charged to expenditure only upon confirmation of receipt of goods/services. The same accounting policy will be followed for execution of the project.

40. **Software**: APPCB currently uses a customized accounting software package which has been reporting bugs since a long time, is currently not serviced and therefore not considered reliable for accounting and reporting on expenditure of the project\(^21\). APPCB proposes to use an ‘off the shelf’ accounting package “Tally” for recording and reporting on project expenditures to MOEF, which is acceptable to the Bank. It is informed in April 2010 that this software has been purchased and is already operational.

41. **Internal Controls**: APPCB will maintain a separate bank account for the project funds under joint signatory mechanism. For expenditure for project activities, after receiving administrative sanction of the State Steering Committee, each proposal will be submitted by technical in-charge to Special Secretary through Chief Accounts Officer and then to Member Secretary. Finance staff of MOEF/MC, MOEF will undertake regular visits and reviews of financial management arrangements of the project at APPCB.

Finance Staffing
42. The existing financial management wing at APPCB is headed by a Chief Accounts Officer (CAO). Although the CAO is very experienced and knowledgeable, he lacks the required skilled staff for the execution of all departmental jobs effectively. This is considered as a high risk and APPCB has agreed to institutionalize a financial management cell for CBIPMP project under the CAO, which will consist of an Accounts Officer and an Accountant with qualifications acceptable to MOEF and the Bank. The FM cell will be fully staffed before the implementation.

\(^21\) APPCB is spending considerable time in manually finalizing its accounts as of now. Reportedly, NIC has been requested to look into the bugs of the existing customized accounting software, but it may take long before the problems are sorted out.
begins, so that staff can also receive necessary orientation on “Tally” accounting software. Maintenance of this FM cell throughout the project life will be a covenant in the financing agreement of the project.

**Financial Reporting**

43. APPCB will submit quarterly interim unaudited financial reports (IUFR) in the agreed formats to MOEF within 30 days of the close of each quarter, which will reflect expenditures incurred at state level for the implementing entity. APPCB will also submit utilization certificates to MOEF as per standard GOI procedure. In addition, Audited Financial Statement (AAFS) of the project will be submitted annually by APPCB to MOEF as per the agreed guidelines.

**External Audit**

44. External audit of APPCB is conducted by a firm of Chartered Accountants appointed on the recommendation of C&AG. Although the auditor was appointed, financial statements of APPCB were to be audited from FY 1999-00 to 2007-08 at the time of appraisal. While APPCB agrees for separate audit arrangements for the Bank funded project, from an institutional perspective, it is a reputation risk if the implementing entity’s financial statements are pending for statutory audit. It was therefore important that APPCB ensures clearance of backlog of audits for the period 1999-00 to 2007-08 and shares these audit reports with the Bank, including an action plan for dealing with any observations in the audit reports. The completion of these audits was agreed to be a condition for negotiation, which has since been met.

45. The annual audited project financial statements at the state level will include actual expenditure at the implementing entity in the formats specified by MOEF. Such financial audit will be conducted by an acceptable independent firm of Chartered Accountants as per terms of reference agreed with the Bank and audit report will be submitted by APPCB to MOEF.

**Risk Assessment**

46. Even though APPCB is technically very sound, based on the fact that financial audit of the entity was pending for 8 years at appraisal, which has now been completed, the FM risk for the implementation of the project by APPCB at the state level (at this stage) is considered high, detailed break up of which is provided underneath. During the supervision missions, the risk could be reviewed again and modified as required.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Residual Risk Rating</th>
<th>Risk Mitigation Measures</th>
<th>Condition of Negotiations (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inherent Risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Country Level</td>
<td>Modest</td>
<td>The MOEF may not have regulatory control over the states. It is however moving in a positive direction by introducing an operational manual including financial guidelines.</td>
<td></td>
</tr>
<tr>
<td>• Entity Level (MOEF)</td>
<td>Substantial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• At the state level (APPCB)</td>
<td>High</td>
<td>At APPCB, all project related expenditures will be incurred only at the central level. APPCB shall maintain a financial management cell at the central level consisting of an Accounts Officer and Accountant, for recording and reporting on the Maintenance of FM cell throughout project period will be a legal</td>
<td></td>
</tr>
<tr>
<td>Covenant</td>
<td>Level</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Budgeting</td>
<td>Low</td>
<td>Currently funds are expected to flow directly from MOEF to state PCBs.</td>
<td></td>
</tr>
<tr>
<td>Accounting</td>
<td>High</td>
<td>The existing software is continuously reporting bugs and is also not serviced. Implementation of Tally software for project expenditure will ensure that APPCB can be in a position to account for project expenditure in a timely manner.</td>
<td></td>
</tr>
<tr>
<td>Internal Control</td>
<td>High</td>
<td>As there is no internal audit mechanism in place at present, project expenditure will be limited to the central level in APPCB and will therefore not be subject to the internal control weaknesses at the zonal and regional offices. Also, expenditure will be incurred only for the agreed expenditure items. APPCB will maintain a separate bank account for the project.</td>
<td></td>
</tr>
<tr>
<td>Funds Flow</td>
<td>Low</td>
<td>The funds will flow directly from MOEF to the PCB.</td>
<td></td>
</tr>
<tr>
<td>Financial Reporting</td>
<td>High</td>
<td>Implementation of Tally will ensure that APPCB will be in a position to prepare account for project expenditure in a timely manner and prepare regular expenditure reports for submission to MOEF.</td>
<td></td>
</tr>
<tr>
<td>Auditing</td>
<td>High</td>
<td>Separate audit arrangements for the Bank funded project as per agreed terms of reference will provide an assurance that the funds have been used for intended purposes.</td>
<td></td>
</tr>
</tbody>
</table>

Overall Risk | High |

PAR 47. **Project Covenants for the implementing entity at the state level – APPCB**

At the APPCB level, the following covenant will be included in the financing agreement:

- APPCB will establish and retain during project implementation a financial management cell with two financial staff with qualifications acceptable to the Association.

**ACTION PLAN: APPCB**

<table>
<thead>
<tr>
<th>Actions</th>
<th>Timeline</th>
<th>Proposed Responsibility of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. FM Staffing and Training: Create a financial management cell at APPCB for the project by recruiting/assigning an Accounts Officer and Accountant with qualifications acceptable to MOEF and the Bank.</td>
<td>June 30, 2010</td>
<td>APPCB</td>
</tr>
<tr>
<td>2. Accounting Software: Train the necessary staff in operational aspects of accounting software</td>
<td>June 30, 2010</td>
<td>APPCB</td>
</tr>
</tbody>
</table>

(C) **West Bengal Pollution Control Board (WBPCB) as implementing entity for CBIPMP in the state of West Bengal**

PAR 48. The implementing entity in the state, subject to items agreed for actions, has adequate financial management arrangements to account for and report on project expenditures.
Background
49. West Bengal Pollution Control Board (WBPCB) is the implementing entity for the project in the state of WB. WBPCB is a Board constituted under The Water (Prevention & Control of Pollution) Act 1974 passed by the Parliament, is financially very sound with positive reserves of more than Rs 120 crores as of date.

Description of Project
50. The following activities will be implemented by WBPCB under the project: (1) building capacity for addressing pollution remediation, which will include technical support, laboratory equipment, establishment of an Environment Compliance Assistance Centre and training; (2) remediation of legacy pollution at Hooghly HW site and Dhapa old solid waste dumpsite; and (3) project management.

Implementation Arrangements
51. WBPCB as an implementing entity of the project in the state will manage financial expenditure in line with the agreed annual project budgets over the project period of September 2010 to September 2015.

52. WBPCB will establish a fully functional Project Implementation Unit (PIU) which will have responsibility for day to day project implementation and coordination with other stakeholder agencies. It will also serve as a Secretariat for the State Steering Committee.

53. WBPCB will ensure adherence to Financial Guidelines of the project. Key FM tasks of WBPCB for the project will include: (a) preparing annual budget and work plan for the project and submitting it to MOEF; (b) receipt of funds from MOEF and the state government (15% share); (c) ensuring funds flow for project activities; (d) maintaining appropriate accounts and internal controls; (e) submission of quarterly financial reports to MOEF in the agreed formats; (f) timely completion of financial audit for project expenditure in the state by an acceptable independent firm of Chartered Accountants as per terms of reference agreed with the Bank and submission of annual audit report to MOEF; and (g) maintaining a fully staffed FM cell for the project in the state.

54. Certain activities of the project may be supported by additional efforts from West Bengal Industrial Development Corporation (WBIDC) under the guidance of WBPCB. It has however been agreed that this will be supported by a valid MOU to be cleared by the Bank in advance; and any expenditure under the MOU will be recorded by WBPCB and its records will also be maintained at WBPCB.

Budgets and Funds Flows
55. At GOI level, the project’s funding requirements will be provided in the budget of the MOEF. Funds to WBPCB for the project will be provided in the ratio of 85% and 15% from MOEF funds and state funds respectively. The state government will also make provision for its share (15%) including for cash compensation for loss of livelihood in its annual budget. WBPCB will include annual estimate for the project in its annual budget as per its standard procedures and inform MOEF, MOEF about the same.
56. Funds will be provided by MOEF to WBPCB on the basis of forecast of expenditure as elaborated in the annexure above. WBPCB will open a separate bank account for the project in a nationalized bank.

**Accounting and Internal controls**

57. The central office of WBPCB is supported by 2 circle offices and 11 regional offices in the state. Financial management is however centralized as accounting for all the expenditures is recorded at and paid from the central office in Kolkata. While the circle offices/ regional offices may be engaged in the necessary implementation efforts, the same centralized financial management arrangement will be followed for the Bank funded project and is considered adequate. WBPCB follows cash basis of accounting with any advances paid being classified as advances and charged to expenditure only upon confirmation of receipt of goods/services. The same accounting policy will be followed for the execution of CBIPM project. WBPCB will be using Bank procurement guidelines for awarding contracts (including for financial audit by an independent firm of Chartered Accountants) as well as procuring necessary equipments and services. WBPCB uses customized accounting software and is presently implementing a new in-house developed accounting software package which was under testing stage and is fully implemented now. While WBPCB will maintain a separate bank account for the project funds under joint signatory mechanism, the new software will also provide a value addition facility to create a separate project account and record all the expenditures incurred under the project in this project account.

**Finance Staffing**

58. The existing financial management wing at WBPCB is fully staffed and includes two professionally qualified Finance Managers who are very experienced. While the project may hire a junior level additional staff for the project, it is agreed that these two managerial staff will handle the additional responsibility pertaining to the financial management matters of the project and constitute the financial management cell for the CBIPM project at the state level under the Member Secretary. Maintenance of the financial management cell will be a covenant in the financing agreement.

**Financial Reporting**

59. WBPCB will submit quarterly interim unaudited financial reports (IUFR) in the agreed formats to MOEF within 30 days of the end of each quarter, which will reflect the expenditures incurred at the state level for the implementing entity.

**External Audit**

60. The external audit of WBPCB is conducted by a firm of Chartered Accountants appointed on the recommendation of C&AG. The financial statements of WBPCB were being audited for FY 2006-07 at the time of appraisal. The audits for 2006-07 and 2007-08 were therefore in the backlog at that time. The audit reports for 2003-04, 2004-05 and 2005-06 were reviewed\(^\text{22}\), which prima facie did not indicate any qualifications or weaknesses that may affect

\(^{22}\) While these are clean audit reports, these indicate two internal control areas for improvement – (1) clear old outstanding advances of employees, and (2) improve the maintenance of record of physical assets and conduct regular physical verification of assets. WBPCB has agreed that under the Bank project, no staff advances will be
the implementation of the Bank funded project. It was however important that WBPCB ensures clearance of backlog of audits for the period 2006-07 to 2007-08 and shares these audit reports with the Bank, including an action plan for dealing with any observations in the audit reports. The completion of these audits was agreed to be a condition for negotiation to ensure mitigation on account of reputation risk, which has since been met. WBPCB agrees for separate audit arrangements for the Bank funded project and the annual audited project financial statements at the state level will include the actual expenditure at the implementing entity in the formats specified by MOEF. Such financial audit will be conducted by an acceptable independent firm of Chartered Accountants as per the terms of reference agreed with the Bank.

61. WBPCB has initiated an internal audit system and it is agreed that during the implementation of the project, the internal audit reports will be shared with the Bank team during supervision missions.

Risk Assessment
62. For WBPCB, there may not be any issues that would prima facie affect the implementation of the project from FM perspective. The completion of the statutory audits for 2006-07 and 2007-08, which was agreed to be a condition for negotiation to ensure mitigation on account of reputation risk, has since been met. The FM risk for the implementation of the project by WBPCB at the state level (at this stage) is considered modest; detailed break up of which is provided underneath.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Residual Risk Rating</th>
<th>Risk Mitigation Measures</th>
<th>Condition of Negotiations, Board or Effectiveness (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inherent Risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Country Level</td>
<td>Modest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Entity Level (MOEF)</td>
<td>Substantial</td>
<td>The MOEF may not have regulatory control over the states. It is however moving in a positive direction by introducing an operational manual including financial guidelines.</td>
<td></td>
</tr>
<tr>
<td>• At the state level (WBPCB)</td>
<td>Modest</td>
<td>WBPCB shall maintain a financial management cell at its central level consisting of two qualified staff for recording and reporting on the project expenditure.</td>
<td>Maintenance of FM cell throughout project period will be a legal covenant</td>
</tr>
<tr>
<td><strong>Control Risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Budgeting</td>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Accounting</td>
<td>Modest</td>
<td>In case, the new software which is being tested by WBPCB is not implemented by the effectiveness of the project, the project records could be maintained in its existing accounting software through a sub ledger.</td>
<td></td>
</tr>
</tbody>
</table>

kept pending for more than three months, a separate record of physical assets will be maintained; and annual physical verification of assets will be done.
- **Internal Control**: High
  - As elaborated above, identified internal control weaknesses would be addressed as WBPCB has agreed that under the Bank project, no staff advances will be kept pending for more than three months, a separate record of physical assets will be maintained; and annual physical verification of assets will be done.

- **Funds Flow**: Low

- **Financial Reporting**: Low

- **Auditing**: High
  - Separate audit arrangements for the Bank funded project as per agreed terms of reference will provide an assurance that the funds have been used for intended purposes.

| Overall Risk | Modest |

63. **Project Covenants (for the implementing entity at the state level – WBPCB)**

At the WBPCB level, the following covenant will be included in the financing agreement:
- WBPCB will maintain during project implementation a financial management cell with two financial staff with qualifications acceptable to the Association.
Annex 8: Procurement Arrangements
India - Capacity Building for Industrial Pollution Management

A. General

1. Procurement for the proposed project would be carried out in accordance with the World Bank’s "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004; revised October, 2006 and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, revised October, 2006 and the provisions stipulated in the Legal Agreement. Procurement under different components is described below. For each contract to be financed by the Loan/Credit, different procurement methods, consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank and stipulated in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

2. Procurement: The project comprises of three major components: (i) Strengthening of Environmental Institutions: Building capacity for addressing pollution remediation at state level; (ii) Investments in rehabilitation of priority Hazardous Waste and Old Dumpsites and overall environmental improvements in the area, and (iii) Project management.

2.1.1 Institutional Capacity Strengthening Component: This component focuses on strengthening of institutional capacity of Pollution Control Boards [PCB] of two States, viz. WB and AP, and a number of activities will be implemented through the respective PIUs of these States which will be specifically established for this Project. This includes: procurement of consultant services for inventorization and characterization of the hazardous waste, sampling and analysis of HW, detailed assessment and engineering design for remediation of contaminated sites, soil and water quality monitoring, site supervision, community communication, monitoring and awareness building. This component will provide technical assistance and support for the establishment and operation of the Environmental Compliance Assistance Centers (ECAC). The WB ECAC has already been set up under the WB Department of Environment, in collaboration with WBPCB, while the AP ECAC will need to be established. This support will be provided for preparation of the ECAC’s business strategy and Plan and sector studies, technology assimilation studies and workshops. For the needs of the PCBs and ECACs several items of goods will be procured which include office furniture and equipment, upgrading of existing server and network devices, GPS mapping of HW units, information system, and laboratory equipment.

2.1.2 Investments in rehabilitation of Hazardous Waste and Old Dumpsites and overall environmental improvements in the area.

Under this component, the following pilot remediation of sites as under:

[a] APPCB will undertake:
- Remediation of Noor Mohammed Kunta Lake in Ranga Reddy District
Containment of pollution and closure of Kadapa Old Dump Site

WBPCB will undertake:

- Remediation of Hooghly HW sites (see detailed site description in Annex 4), and
- Containment and Closure and Dhapa Old Solid Waste Dump site near East Kolkata Wetlands.

2.2 **Procurement of Works**: Works procured under this project would include, procurement of works for remediation and containment of the sites which includes excavation of sludge, transportation and disposal to TSDF, sloping and laying HDPE, landscaping, soil removal and stabilization, construction of culverts and canals, laying water supply pipes, installation of monitoring wells, capping and re-vegetation, planting greenery etc. The procurement will be done using the Bank’s Standard Bidding Documents (SBD) for all ICB, and NCB Bidding documents as agreed with the Bank for all NCB contracts.

2.3 **Procurement of Goods**: Goods procured under this project would include: purchase of lab equipment such as GC-MS-MS, CH-NS Analyzer, Gas Chromatograph, Solid waste extract assembly, sampling apparatus for dioxin and furnace, Atomic Absorption Spectrophotometer etc. These procurements are expected to be of low value except a few high value contracts like gas chromatography mass spectrometry (GC-MS) equipment which shall be carried out following NCB/ICB procedures depending on the value of the contract. SPCBs will procure all equipments and high value items as mentioned above following Bank’s ICB/NCB procedure and bidding documents. Besides, MOEF will purchase its office equipment, computers and furniture adopting DGS&D rate contract or shopping method.

2.4 **Direct Contracting**: This project visualizes procurement of [i] GIS remote sensing digital maps from National Remote Sensing Agency (NRSA) under the Department of Space [ii] of Manual/topographic maps from Survey of India, and [iii] spare parts, filter papers, etc. Items (i) and (ii) will be ineligible for Bank financing and as such would be procured using GOI funds. However item (iii) satisfies the provisions of paragraph 1.8 (c) of Procurement Guidelines May 2004 as amended October 2006. and as such qualifies for Direct Contracting.

2.5 **Procurement of non-consulting services**: Not much non consulting service is anticipated under this project. If any such services are required, the procurement will be carried out using the Bank’s SBD as agreed or acceptable to the Bank.

2.6 **Selection of Consultants**: Selection of Consultant would include hiring of International Consulting firms, national consultants and individual consultants for implementing all components. Short lists of consultant firms for services estimated to cost less than $500,000 or equivalent per contract may comprise entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. Some

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23 Equipment such as Thermal and Evolved Gas Analyzer (TEGA) is a combination of a high-temperature furnace with a mass spectrometer or similar equipment for the said purpose.
NGOs are also expected to be hired for Kadapa and Noor Mohammad Kunta dumpsites in AP and, Dhapa and Hooghly dump site in WB.

2.7 **Training:** Training will basically cover workshops, training for staff, hands on training for sampling for analytical techniques and Instruments, for risk assessment processing technologies and design of landfill facilities etc. These shall be carried out in accordance with Procurement plans prepared by the MOEF, APPCB and WBPCB and approved by the Bank.

2.8 **Operating Cost:** This will mainly include incremental and operating cost for hiring of vehicles, purchase of consumables, repairs of equipments, purchase of filter papers, etc.

2.9 The procurement procedures and Standard Bidding Documents to be used for each procurement method, as well as model contracts for works and goods procured, and its steps are presented in the POM.

**B. Assessment of the agency’s capacity to implement procurement**

3. Procurement activities will be carried out by three agencies: MOEF, APPCB and WBPCB. MOEF, APPCB and WBPCB will set up PIUs which will be specifically responsible for the procurement of state specific project components such as remediation of sites, overall environmental improvements in the area, and state based capacity building measures. Procurement Capacity Assessments have been carried out for APPCB, WBPCB and MOEF. The details on the assessments are given below implementing agencies wise.

3.1 **MINISRY OF ENVIRONMENT AND FORESTS**

3.1.1 **Assessment of MOEF Capacity to Implement Procurement:** An assessment of the capacity of MOEF to implement the procurement arrangements has been carried out by the Bank procurement staff and included (a) a review of the organizational structure for implementing the project, and (b) interaction with the concerned procurement staff of MOEF. The MOEF has earlier handled World Bank assisted projects and the PPF for the CBIPM and they have made procurement following the Bank’s Procurement Guidelines. A procurement consultant, working for the Project preparation Cell, has been identified in the MOEF and he has been trained in the Bank procurement procedures at ASCI, Hyderabad. MOEF will handle procurement of consulting services (e.g. supporting the preparation of the NPRPS, workshops, dissemination and training etc.) and minor equipment.

3.1.2 **Procurement Risks and Mitigation Measures:** Bulk of the procurement under the project falls and will be undertaken by the respective State Pollution Control Boards. As such the project does not carry a significant risk related to the equipment being procured by MOEF.

3.1.3 The MOEF will also publish information of contracts entered into by it and costing above INR 1,000,000 (US$25,000 approximately) on its website to bring about transparency in
decision making. MOEF will maintain all records relating to procurement for up to 2 years after the close of the project. MOEF will also maintain a separate record relating to complaints and their redressal.

**Andhra Pradesh PCB Procurement Assessment**

3.2 ANDHRA PRADESH POLLUTION CONTROL BOARD

3.2.1 Assessment of APPCB Capacity to Implement Procurement: An assessment of the capacity of APPCB to implement the procurement arrangements has been carried out by the Bank procurement staff and included (a) a review of the organizational structure for implementing the project, and (b) interaction with the concerned procurement staff of APPCB. It is noted that as a nodal agency it is entrusted with the Policy of controlling the pollution in the State and it is well versed with public procurement procedures and the World Bank procurement guidelines for purchase of goods, works and services. A procurement officer has been identified in the APPCB and has been trained at NIFM in the Bank procurement procedures.

3.2.2 Procurement Risks and Mitigation Measures: Bulk of the procurement under the project falls under the Components listed in Paras 2.1.1 and 2.1.2. Since a person trained in Bank procurement procedure will handle the procurement in APPCB, the risk is considered moderate. A close watch on the procurement will be kept through review of prior review contracts, and by arranging post review of all other contracts which fall below the prior review threshold.

3.2.3 APPCB will publish information of contracts entered costing above INR 1,000,000 (US$25,000 approximately) on its website to bring about transparency in decision making. APPCB will maintain all records relating to procurement up to 2 years after the close of the project. APPCB will also maintain a separate record relating to complaints and their redressal.

3.3 WEST BENGAL POLLUTION CONTROL BOARD PROCUREMENT ASSESSMENT

3.3.1 Assessment of WBPCB Capacity to Implement Procurement: An assessment of the capacity of WBPCB to implement the procurement arrangements has been carried out by the Bank procurement staff and included (a) a review of the organizational structure for implementing the project, and (b) interaction with the concerned procurement staff of WBPCB. It is noted that being a nodal agency in controlling the pollution of the Government of WB is well versed with public procurement procedures. A procurement officer has been identified in the WBPCB and shall be trained in the Bank procurement procedures shortly through NIFM, Faridabad.

3.3.2 Procurement Risks and Mitigation Measures: Bulk of the procurement under the project falls under the Component 1 & 2 and considering that a person familiar with the public procurement is being trained in the Bank procurement procedures, the risk is
considered high. However, after the person has been trained at ASCI/NIFM, the risk would stand revised to moderate.

3.3.3 WBPCB will publish information of contracts entered into by it and costing above INR 1,000,000 (US$25,000 approximately) on its website to bring about transparency in decision making. WBPCB will maintain all records relating to procurement up to 2 years after the close of the project. WBPCB will also maintain a separate record relating to complaints and their redressal.

4. Procurement Thresholds:

4.1 Goods and equipment - All contracts for goods and equipment above US$500,000 or equivalent will be procured following ICB procedures. Contracts between US$500,000 and US$30,000 will be procured following NCB procedures. Contracts below US$30,000 or equivalent may be procured following shopping procedures. Only a few ICB procurements are anticipated. Proprietary items and software may be procured following Direct Contracting Procedures after Bank’s prior approval.

4.2 Works - Works contracts up to US$ 30,000 may be procured following Shopping procedures. Procurement of works above US$ 30,000 and less than US$ 10 million will follow NCB Procedure. Contracts above $10 million would be procured through ICB. Force Account will be adopted, if required in emergent situations in terms of the provisions of paragraph 3.8 (e) of Procurement Guidelines with the prior approval of Bank.

4.3 Consultancy Services - Procurement of Consultants above US$200,000 or equivalent shall normally follow QCBS, unless otherwise agreed with Bank. Other methods of selection of consultants (QBS, FBS, LCS and CQS) shall follow the Bank guidelines for selection and employment of consultants and shall normally be limited to US$ 100,000 or equivalent in each case. Single source selection for consultancies identified and included in the Procurement Plan, such contracts shall be limited to US$50,000 or equivalent in each case.

5. Prior Review:

5.1 Goods and equipment – all contracts above US$300,000 or equivalent.
5.2 Works – works contracts shall be subject to prior review if the value of the contract is more than or equivalent to US$300,000.

5.3 Consultancy services – all contracts with firms above US$ 200,000 or equivalent and with individuals above US$50,000 or equivalent. All contracts following single source selections.

6. Post Review: All contracts not covered under prior review will be subject to post award review. For this review, a sample of the contracts awarded shall be selected annually on a random basis and post award review conducted by the Bank or its representatives. The
post review contracts to be reviewed will be 10% of the total post review contracts concluded during the given period of time. In addition, Bank will also conduct post award review of selected contracts during supervision missions.

7. **Others**: MOEF, APPCB and WBPCB shall ensure that the Project is carried out in accordance with the provisions of the World Bank Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits (revised October 2006).

C. **Procurement Plan**

8. At the time of Project appraisal, the Borrower developed an overall procurement plan for project implementation which includes the inputs provided by the two State IAs and MoEF. This plan has been agreed between the Borrower and the Project Team on April 28, 2010 and is available at the websites of APPCB, Hyderabad, WBPCB, Kolkata and Ministry of Environment and Forestry, New Delhi. It will also be available in the project’s database and in the Bank’s external website. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

D. **Frequency of Procurement Supervision**

9. In addition to the prior review to be carried out by Bank, general review of procurement will be undertaken during full fledged [bi-annual] supervision missions and at least one interim supervision mission for each State implementing Agency.

10. The overall project risk for procurement is **Moderate**

E. **Details of the Procurement Arrangements Involving higher value/International Competitive Bidding:**

1. **Procurement Plan for Goods, Works and Non-consulting Services**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Package Number</th>
<th>Description of Works and Goods</th>
<th>Estimated Costs (in thousand US$)</th>
<th>Method of Procurement</th>
<th>Prior / Post Review</th>
<th>Domestic Preference</th>
<th>No objection to bidding document (date)</th>
<th>Contract Award (date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MOEF-G1</td>
<td>Laboratory Equipments</td>
<td>643.2</td>
<td>ICB/NCB</td>
<td>Prior</td>
<td>Yes/No</td>
<td>10/19/11</td>
<td>1/10/12</td>
</tr>
<tr>
<td>2</td>
<td>AP-W1&amp;W2</td>
<td>Remediation works - NMK</td>
<td>27980.25</td>
<td>ICB / NCB</td>
<td>Prior</td>
<td>Yes/No</td>
<td>07/14/2011</td>
<td>01/20/2012</td>
</tr>
<tr>
<td>3</td>
<td>AP-W4</td>
<td>Remediation works - Kadapa MSW Site</td>
<td>3441.29</td>
<td>ICB / NCB</td>
<td>Prior</td>
<td>Yes/No</td>
<td>08/12/2011</td>
<td>02/22/2012</td>
</tr>
<tr>
<td>4</td>
<td>AP-G2</td>
<td>Laboratory Equipment</td>
<td>2552.4</td>
<td>ICB /</td>
<td>Prior</td>
<td>Yes/No</td>
<td>02/28/2011</td>
<td>08/16/2011</td>
</tr>
</tbody>
</table>
### Laboratory Equipment

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Package Number</th>
<th>Description of Services</th>
<th>Estimated Cost IncI ConL &amp; Taxes (in 000 US$)</th>
<th>Procure Method</th>
<th>Prior / Post Review</th>
<th>Proposals to be Received by the Project Authorities (Date)</th>
<th>Contract award (Date)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>WB-G5</td>
<td>Laboratory Equipment (WB PCS)</td>
<td>781.34 ICB / NCB</td>
<td>Prior Yes/No</td>
<td>12/19/2010 03/31/2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>WB-G8</td>
<td>Laboratory Equipment (WB PCB)</td>
<td>984.31 ICB / NCB</td>
<td>Prior Yes/No</td>
<td>12/19/2011 03/17/2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>WB-W1</td>
<td>Remediation works (Excavation and related Works) - Hooghly HW Sites</td>
<td>1203.64 NCB</td>
<td>Prior N.A</td>
<td>11/14/2011 01/27/2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>WB W-2</td>
<td>Remediation Works (transportation, treatment and disposal) Hooghly HW Sites</td>
<td>6390.62 NCB</td>
<td>Prior N.A</td>
<td>02/15/2012 04/10/2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>WB W-3</td>
<td>Remediation &amp; upgradation of Chakundi Site (design, engineering, remediation and transport work - Chakundi site)</td>
<td>1061.88 NCB</td>
<td>Prior N.A</td>
<td>03/15/2013 05/15/2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>WB-W4</td>
<td>Closure and Containment works - Dhapa MSW Site</td>
<td>7704.04 NCB</td>
<td>Prior N.A</td>
<td>12/12/2011 02/26/2012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Remediation packages are tentative and may change based on recommendation from the detailed assessment and engineering design.

### Consulting Services

2. **Consulting Services**

**[a] List of Consulting Assignments with Shortlist of International Firms/Higher Value Assignment**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Package Number</th>
<th>Description of Services</th>
<th>Estimated Cost IncI ConL &amp; Taxes (in 000 US$)</th>
<th>Procure Method</th>
<th>Prior / Post Review</th>
<th>Proposals to be Received by the Project Authorities (Date)</th>
<th>Contract award (Date)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MOEF-S1</td>
<td>Management consultants for managing and monitoring the CBIPMP for MOEF</td>
<td>766.99 QCBS</td>
<td>Pre</td>
<td>6/17/10 09/15/10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>MOEF-S2</td>
<td>Development of methodology, international best practice review, standards and guidelines and remediation of polluted sites</td>
<td>848.63 QBS</td>
<td>Pre</td>
<td>1/10/11 05/10/11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MOEF-S8</td>
<td>Legal and regulatory review and prepare NPRPS framework</td>
<td>299.57 QCBS</td>
<td>Prior</td>
<td>12/30/11 02/24/12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MOEF-S9</td>
<td>Inventory and mapping of polluted sites</td>
<td>746.60 QCBS</td>
<td>Prior</td>
<td>8/17/10 09/5/10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>AP-S1</td>
<td>Impact of MSW Dumpsites on Environment (15 corporations domestic)</td>
<td>263.00 QBS</td>
<td>Pre</td>
<td>11/21/2010 01/13/2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>AP-S2</td>
<td>Consultancies – Business strategy for ECAC</td>
<td>360.68 QCBS</td>
<td>Pre</td>
<td>01/29/2011 03/22/2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>AP-S3</td>
<td>Detailed reassessment/ engr. Study, bid document prep., and</td>
<td>774.78 QBS</td>
<td>Pre</td>
<td>01/28/2011 03/21/2011</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Description of Services

<table>
<thead>
<tr>
<th>Service Code</th>
<th>Description</th>
<th>Cost</th>
<th>Type</th>
<th>Pre/post</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP-S4 to S12 and S15, S19</td>
<td>Supervision for Final Management procurement, execution of works, monitoring etc.</td>
<td>1421.85</td>
<td>Ind</td>
<td>Pre/post</td>
<td>11/01/2010</td>
<td>12/22/2010</td>
</tr>
<tr>
<td>AP-S18</td>
<td>Post remediation groundwater investigation, and monitoring – NMK</td>
<td>1200.01</td>
<td>QBS</td>
<td>Pre</td>
<td>08/25/2011</td>
<td>10/15/2011</td>
</tr>
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<td>Pre</td>
<td>10/22/2012</td>
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<td>QBS</td>
<td>Prior</td>
<td>02/10/2011</td>
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<tr>
<td>WB-S4</td>
<td>Assessment and preparation of priority contaminated sites at Khardah, Durgapur, Belda and Dankuni</td>
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<td>Prior</td>
<td>03/10/2011</td>
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<td>Prior</td>
<td>02/01/2012</td>
<td>06/05/2012</td>
</tr>
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</table>

### (b) Consultancy services estimated to cost above US$ 200,000, per contract and single source selection of consultants (firms) will be subject to prior review by the Bank.

### (c) Short lists composed entirely of national consultants: Short lists of consultants for services estimated to cost less than US$ 500,000 or equivalent per contract may comprise entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

### 3. National Competitive Bidding

Procurement through the National Competitive Bidding (NCB) method shall be carried out in accordance with paragraph 3.3 and 3.4 of the Bank’s Procurement Guidelines and the following provisions shall additionally apply:

- Only the model bidding documents for NCB agreed with the Government of India’s Task Force (and as amended from time to time) shall be used for bidding;
- Invitations to bid shall be advertised in at least one widely circulated national daily newspaper, at least 30 days prior to the deadline for the submission of bids;
No special preference will be accorded to any bidder either for price or for other terms and conditions when competing with foreign bidders, state-owned enterprises, small-scale enterprises or enterprises from any given State;

Except with the Bank’s prior concurrence, there shall be no negotiation of price with the bidders, even with the lowest evaluated bidder;

Extension of bid validity shall not be allowed without the Bank’s prior concurrence: (a) for the first request for extension if it is longer than four weeks; and (b) for all subsequent requests for extension irrespective of the period;

Re-bidding shall not be carried out without the Bank’s prior concurrence. The system of rejecting bids outside a margin or “bracket” of prices shall not be used in the project;

Rate contracts entered into by Directorate General of Supplies & Disposals will not be acceptable as a substitute for NCB procedures. Such contracts will however be acceptable for any procurement under Shopping procedures; and

Two or three envelope system will not be used.
Annex 9: Economic and Financial Analysis
India - Capacity Building for Industrial Pollution Management

Assessing the benefits and costs of cleaning up Noor Mohammad Kunta Lake

Overview

1. This capacity building project includes both capacity building and investment components. The economic analysis here focuses on quantifying in monetary terms the benefits derived from the pilot investments. While caution should be used in the interpretation of the analysis, as it only provides an indication of the economic benefits generated by one component of the project, it nevertheless provides an important indication of the benefits that the project is expected to generate not only from its investment, but by enabling national and state authorities to undertake future such investments.

2. Noor Mohammad Kunta (NMK) also known as Kunta Lake is located in Katedan area of Rajendra Nagar Municipality in Hyderabad, Ranga Reddy District, AP. It is a small surface water body spreading over an area of about 13.6 ha with a catchment extending to an area of about 175 ha. There are industrial and residential developments in the catchment. The area is peri-urban with some urban and rural human settlements. Katedan Industrial Estate (KIE) is located within the catchment occupying a total area of 250 acres.

3. This lake is a good example to understand how unregulated anthropogenic activities can contribute to the complete degradation of a lake. The lake receives pollution loads from industries of KIE and the sewage from nearby household settlements. The KIE has 300-400 industrial units consisting mainly of food processing, oil refining, textiles, lead extraction and cement production. As per data from Andhra Pradesh Pollution Control Board (APPCB), the lake receives 39 m$^3$ of domestic and 178 m$^3$ of industrial effluent per day. The pollution of Kunta Lake has spill over effects on other small lakes and a larger Mir Alam lake in the area as they receive the polluted runoff from this lake. Therefore, the planned integrated pollution management approach of this lake has to take in to account this spill over effects in addition to other things.

4. A recent study shows that the lake water has strong pink colour (a field visit in October 2008 also confirmed this information) and high TDS, BOD, COD, oil, grease and heavy metals. Also, the observed low BOD to COD ratio indicates presence of significant quantities of non-biodegradable elements in the water body. Another study has found that the arsenic contamination near the lake exceeds 400 mg/kg. The chromium and lead levels at some spots are found to be as high as 877 mg/kg and 2,000 mg/kg respectively. Significant concentration of lead is also found in the surface and ground water. TDS in the ground water is found to be in the higher range of 2,924 – 3,280 mg/l, compared to the desirable and permissible limits of 500 and 2,000 mg/l. The hardness of the ground water is also observed to be significantly higher than the desirable and permissible limits of 300 and 500 mg/l. Similarly, chlorides and sulphates in the ground water are also in excess of the desired limit of 250 and 200 mg/l. Bacteriological analysis of lake shows that the total Coliform count (MPN) is much higher than the permissible limits of drinking water. A fresh assessment will be undertaken during the detailed engineering design.
Remedial Action Plan for Cleaning up Kunta Lake

5. Integrated area-based pollution management plan is proposed for the rehabilitation and conservation of Kunta Lake. This area-based plan first takes up a near-term remediation of known environmental risks and than a long-term impact assessment, remedial measure implementation and monitoring plan. The near term remediation include treatment of selected spots of soil, sediment and ground water contamination. The effect of some selective remedial measures for the surface water contamination will be examined. Two remedial measures, the closure of some industries of KIE and the commissioning of a new 4 ML/day sewage treatment plant which are already in place will be monitored to study their effects on the surface water quality of the lake. Studies to determine the long-term impact assessment of the lake area proceed in parallel with the near-term remediation plan. They include large-scale mapping of Lake Catchment, characterization of data gaps, ground water control, soil cover and soil removal, sediment removal and ongoing monitoring of surface and ground water and sediments. In addition, investments in sewage treatment by the local government and water pollution abatement by the industries (pollution abatement cost includes also cost of relocating the industries) are also part of the overall cost necessary to clean up Kunta Lake.

Beneficiaries of Kunta Lake Conservation

6. The conservation of Kunta Lake provides environmental services to a number of stake holders, who may also be required to contribute for its conservation. As it is the case with any water resource, the stakeholders are Households, Industries, Farmers, Fishermen, Employment Beneficiaries and Government.

7. **Households.** There are direct and indirect benefits to households in Hyderabad. The local inhabitants get the direct benefits in the form of reduced health damages from ground and surface water pollution, drinking water and employment in lake conservation activities. All the households of Hyderabad city get the recreational benefits. In addition, local people get secondary and indirect benefits from the ancillary activities like retailing, transport services etc related to the conserved lake. Local households can share the cost of the lake conservation in the form of effluent charges on household borne effluents.

8. **Industries.** A conserved lake could provide sustainable waste disposal services to the industry and households given its waste assimilative or carrying capacity. There could be improved water supply to industry from the ground and surface water sources. The industry could have savings in the cost of water; given the very high supply cost of water from conventional or government sources in Hyderabad. Industries can shares the cost of lake conservation in the form of water pollution abatement cost to comply with the pollution standards.

9. **Farmers and Fishermen.** Farmers gain from the increased land productivity due to reduced ground water and land pollution and increased water availability for irrigation. If fishing

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rights are given to the local fishermen, they can benefit from increased fish production and improved fish quality.

Estimates of Benefits and Costs of Cleaning up Kunta Lake

10. Estimating the benefits and cost flows of Kunta Lake clean up requires data mainly from primary surveys and to some extent from secondary sources. Given the time and resource constraints for preparing this economic analysis, benefit transfer methods and some data from secondary sources are used to obtain the estimates.

11. **Recreational Benefits.** The city of Hyderabad and its surroundings have a few lakes similar to Kunta Lake. There are some lakes which have been fully rehabilitated and conserved providing all kind of recreational benefits (such as boating, picnic areas, walking and site seeing). A benefit transfer method is used to estimate the recreational benefits of Kunta lake by using as a proxy the recreational benefits generated by Durgam lake located in a prosperous urban settlement of Hyderabad. Durgam Lake is larger than Kunta Lake; it covers an area of 65 acres. There are recreational visitors numbering 0.371 and 0.458 million in 2006-2007 and 2007-2008 respectively. Durgam Lake offers recreational services of scenic beauty, boating and angling. The lake authorities charge an entry fees of Rs. 30 per adult and Rs. 15 per child while for boating the respective charges are Rs. 40 and Rs 20. It also earns income from the fees charged for social functions (weddings, receptions, etc.) and shooting of commercial films25. The lake authorities have earned on average Rs. 0.15 million per month during 2007-2008 amounting to an annual income of Rs. 1.8 million. Using this information, an estimate of user charges of Rs 40 per visitor is obtained.

12. The most widely used travel cost method estimates the cost per trip as the sum of: (i) entry fees and (ii) travel expenses and considers it as visitors’ willingness to pay26. A rapid pilot survey of 25 visitors to Durgam Lake shows that on average a visitor to the lake spends about Rs. 75 per trip. Therefore, the visitor willingness to pay for Durgam Lake is estimated as Rs 115 per trip. Assuming that the number of visitors is proportional to the lake area27 and using the Durgam lake data, the number of visitors to Kunta Lake can be estimated as 0.1384 million in a year. Based on the above, the potential future recreational benefits of Kunta lake are estimated at Rs. 16 million (US$ 0.35 million) per year.

13. **Health Benefits.** By reducing ground water pollution, the cleanup of Kunta Lake could provide health benefits to local households. Examination of water from 119 registered wells in the lake command area shows that arsenic in ground water is 14 ppb exceeding ISI standard of 10 ppb for drinking water28. The arsenic level in the surface water of the lake is 32 ppb. As mentioned above, the TDS in the ground water is found to be in the higher range of 2924 - 3280 mg/l, compared to the desirable and permissible limits of 500 and 2000 mg/l. The ground water pollution also causes other water borne deceases like diarrhea, jaundice etc. to households. There

25 Source: Department of Tourism, Government of Andhra Pradesh, India.
26 See Freeman (1993) and Guha and Ghosh (2008) for a recent using the case study of travel cost method in India.
27 This assumption is recognized to be very rough, time and budget limitation did not allow for a more in-depth analysis
28 Technical Report NO: NGRI-EG-526
are 4,850 households in the lake area which are prone to ground water pollution. There are two useful recent studies in India providing estimates of household willingness to pay for supplying good quality water. A study by Purnamita Dasgupta (2004) provides an estimate of Rs. 1,649 per year at 2000 prices for the willingness to pay for good quality water of households in Delhi slums. Similarly, a study by Joyashree Roy (2005) provides an estimate of Rs. 3,731 per year at 2005 prices for the damages to a representative household from arsenic pollution of ground water in WB. These two studies used the household health production function models to make these estimates. Another study by Gunathilake et. al (2006) using contingent valuation method provides an estimate of SL Rs 3,360 per year for a household willingness to pay for improved water quality in South West Sri Lanka. Using information from these studies and making adjustments for price changes, an estimate of Rs. 4,000 is taken as the health benefits per year for a representative household in the Kunta lake area. Therefore, the health benefits from the lake rehabilitation and conservation for all households are estimated at Rs. 19.4 million at 2008 prices (or US$ 0.43 million) per year.

14. **Employment generation to unskilled labor.** The remediation of the lake is labor intensive and the engineering estimates show that almost 67% of such expenditures could be paid as wages to unskilled labor. Also, the construction of sewage treatment plant on the lake site to treat household borne effluents provides employment to unskilled labor and again engineering estimates show that 15% of investment expenditures in this case could be payments to unskilled labor. A recent study provides estimates of shadow prices of unskilled labor in different states of India and shows that the opportunity cost or shadow price of unskilled labor employment on developmental projects forms 39% of project wage rate in AP. Therefore, 61% of wages paid to unskilled labor for the lake remediation and the construction of sewage treatment plant could be considered as benefits to the local households supplying unskilled labor. The annual flows of these benefits are estimated during the period of investments for the lake rehabilitation and shown in the Table below.

15. **Reduced ground water supply costs.** The reduced pollution of Kunta lake and its surrounding ground water can generate water supply saving costs. The APPCB (2006) report shows that water use by industries and households in the lake area is 4,523 Kl/d and 48.49 kl/d respectively. An earlier study provides estimates of water supply cost for household and industrial uses at 1997 prices. The cost of supplying a Kl of water from a well was estimated at Rs. 0.55 for a flat and Rs. 6.61 for individual houses and industries. In contrast, the municipality charges Rs. 1.53/Kl of water for flats while the industries and individual houses pay on average Rs. 35/Kl for tankers. If ground water could be usable there will be savings of Rs. 0.98 for flats and Rs. 28.39 for industries per Kl of water used. Adjusting for price changes during 1997-2008, these estimates are Rs. 1.5 and Rs. 44 at 2008 prices for flats and industries respectively. Therefore, the potential benefit of reduced cost of water supply to industries and households due to the rehabilitation and conservation of Kunta lake are estimated as Rs. 8.564 million (US$ 0.19 million) per year.

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29 APPCB (2006)
31 KL kiloliter of water = 1000 liter
16. **Improved agricultural productivity.** Kunta lake was originally created to provide irrigation to neighboring farm lands and drinking water needs of the region. However, for the past several years the lake and ground water became unusable due to industrial and household borne water pollution. The Andhra Pradesh Agricultural University and its experimental farms located in the lake command area are particularly affected by the water pollution. The experimental farm of 16 acres belonging to the university became uncultivable. This land could again become productive after the cleanup of the Lake. Recent estimates of incomes from the cultivation of wheat and paddy in India show that on the average an acre of farm land provides a net income of Rs. 3,891 per year. Therefore the annual income from 16 acre of this experimental farm land are relatively minor and estimate at Rs. 0.623 million (US$ 0.014) million per year.

17. **Fishery benefits.** The conservation of Kunta lake will provide fisheries benefits to fishermen. In the absence of information about the potential fisheries benefits from the conserved Kunta lake, a benefit transfer method, using the case of Durgam Lake, is used. Durgam lake has a 65 acres pond area, the local government gets a revenue of about Rs. 0.3 million annually from providing fishing rights to local fishermen. Studies on fishery development show that fish yields varying amounts in open ponds and lakes. Conservative estimates suggest that the annual fish yield could be in the range of 250-500 kg per acre pond area. Assuming that the potential fish yield from the conserved Kunta lake could be 350 kg per acre pond area, there could be fish production of 6,882 kg every year. At the market price of around Rs. 30 per kg of fish, fisheries benefits from the lake could be around Rs. 0.2 million per year.

18. **Remediation Cost of Kunta Lake.** Through an IBRD loan and an IDA credit, the Government of India is financing the cleaning and rehabilitation of Kunta Lake. The investment costs include a technical assistance part estimated at US$ 2 million (financed at 85% through an IDA credit and 15% through GOI) and an investment part estimated at US$ 30.93 million (financed at 50% through an IDA credit, 35% through an IBRD loan and 15% through GOI).

19. **Cost of sewage treatment plan.** The recent construction of a sewage treatment plant in the Kunta lake area, will also contribute substantially to the cleaning of the lake. Therefore both the investment and operation and maintenance (O&M) costs need to be included in the cost benefit analysis. The sewage treatment plant is expected to treat household borne effluents. The investment cost and O&M cost of are respectively Rs 65 and 1.8 million. The Table below shows the time flows of investment and O&M costs.

20. **Pollution abatement costs.** In order to reduce the lake pollution load, industries will need to incur (some have already done so) water pollution abatement costs. Industries can either invest in pollution abatement technologies (these technologies comprise of a change in production process, a change in inputs use, product changes and end of pipe technologies) or relocate to a more suitable industrial area. The government of AP is considering the option of relocation of industries. However, given the high cost of relocation to the water pollution abatement, this analysis will use the cost of pollution abatement for the purpose of the CBA.

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33 See Murty and Goldar (2007)
34 Indian government comprises governments of Centre and the state of Andhra Pradesh in India.
21. APPCB (2006) estimates that effluents from industry and households in the lake command area are respectively 178.347 and 38.63 KL per day. Out of 178.347 KL of effluents generated by the industry, textiles and vegetable oil processing industries contribute respectively 139.50 and 21.45 KL per day. The effluents form these two industries have normally very high concentrations of Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). The effluents from textiles industry could at least have BOD and COD levels of 700 mg/l and 1400 mg/l while the corresponding levels for vegetable oil processing industry could be 20000 mg/l and 30000 mg/l. Given the influent volume and pollution concentration described above, pollution loads of main water polluting industries in the lake command area could be estimated. The annual loads of BOD and COD generated by textiles are estimated at 34.2 and 68.3 tons respectively while the corresponding loads for oil industry are 150.1 and 225.2 tones. Recent studies in India about industrial water pollution abatement provide estimates of shadow prices or cost per ton of reducing BOD and COD for the Indian industry as Rs. 13,290 and Rs. 50,623 respectively\(^35\). Based on this information, the annual cost of water pollution abatement to industries located in the lake command area is estimated as Rs. 17.3 million (US$ 0.38 million) per year. This cost has to be incurred by the industry to comply with the environmental regulation of command and controls and standards.

22. **Overall costs and benefits.** The stream of benefits and costs is provided in the Table below. These flows are considered for a period of 35 years starting from the year 2009. If the remediation is completed during five years time, the benefits are assumed to start flowing from the 6\(^{th}\) year onwards. A recent study commissioned by the Planning Commission, Government of India\(^36\) has recommended the use of a social rate of discount of 10 % for the economic evaluation of public investment projects in India. The estimates show that the rehabilitation and conservation of Kunta lake provides a positive net present social benefits worth Rs. 186.7 million (US$4.1 million) and has a benefit cost ratio of 1.282.

23. In this analysis, with limited scope, only part of benefits of the rehabilitation of the Kunta Lake could be measured and estimated. Therefore even estimates of partial benefits using mostly benefit transfer methods show that there is a significant overall social benefits from investing in the remediation and conservation of Kunta Lake. A more detailed analysis using data from primary surveys of households, industries and other stake holders of the lake could certainly provide a more accurate and probably much higher estimates of the potential benefits.

\(^{35}\) Murty and Kumar (2004): make these estimates by estimating an output distance function for Indian water polluting industry. This methodology captures comprehensively the cost of all pollution abatement technologies used by the industry to reduce water pollution. *Ref: Environmental and Economic Accounting for Industry*, New Delhi, Oxford University Press,

\(^{36}\) See Murty and Goldar (2007)
### Estimates of Present Value Benefits and Costs Flows of Cleaning up Kunta Lake

<table>
<thead>
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<th>Rs. (million) at 2008 prices</th>
<th>US$ at 2008 prices</th>
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<td>4,064,000</td>
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<td>Benefit cost ratio</td>
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*Figures may not add up due to rounding.*

**Conclusion**

24. The rehabilitation of Kunta Lake in Hyderabad provides both public good and private good type of benefits justifying the proposed investment. The public good type of services provided by the lake include recreation and aesthetic values to nearby residents, disposal of pollution, and improved land productivity while the private good services consist of health benefits, irrigation, water for industrial and household uses, fisheries and employment. Detailed environmental valuation methods like Contingent Valuation Method, travel cost and household health production function methods have to be used to estimate public good type of benefits. Given the time and budget constraints, benefit transfer methods and secondary data sources have been used in this analysis. Nevertheless, estimates show that the rehabilitation and conservation of the lake provides positive net present social benefits worth US$.4.1 million at 10 % rate of discount and has a benefit cost ratio of 1.28. The benefit estimates could be much higher with a comprehensive accounting of all benefits and costs using reliable data.

### Assessing the benefits and costs of rehabilitating Kadapa Dumpsite, Andhra Pradesh

**Overview**

25. Kadapa is a town in the Rayalseema region of AP and is one of the oldest municipalities in India. It has an area of about 65 km² with a population of 35 million. The town generates an estimate 206 metric tons (MT) of solid waste per day amounting to 75,190 MTs per year. A recent feasibility study (TERI, 2008) estimates that solid waste generation can reach up to 111,000 MTs per year. This waste has been dumped in an open dumping area of 10.85 acres.
known as Ukkayya Palli or Kadapa landfill. The dumpsite is located 3 km from the city, but human habitation is found within 0.5 km of the dumpsite.

26. This landfill has been operating since 1988. Under compressed conditions, the total matter at the dump site is estimated at 0.16 million cubic meters. This accumulated waste has created pollution of ground and surface water, soil and air (through open burning of waste) in the neighborhood the dumpsite. Part of the waste collected from the town was burnt regularly at the site to make place for more waste. Surface water runoff and the percolation of the leachates from the land fill could result in the pollution of ground water and nearby surface water bodies with arsenic, mercury, lead, phosphorous and other pollutants.

Estimates of Benefits and Costs of Rehabilitating Kadapa dumpsite

27. The rehabilitation of Kadapa dumpsite, as proposed under the CBIPM project, would provide benefits to local residents (by improving their overall living conditions, decreasing pollution levels, providing employment opportunities) as well as generate global benefits (by reducing CO\textsubscript{2} emissions). The analysis below provides an overview of the costs and benefits generated by the rehabilitation of Kadapa dumpsite. These estimates are based on secondary data or on information collected during a field visit conducted by the project team. The analysis uses the most appropriate economic valuation techniques based on the type of information available.

28. **Cost of Rehabilitating Kadapa dumpsite.** There are various rehabilitation options for municipal solid waste disposal sites. Among the various options, TERI report (2008) suggests capping the disposal site and venting or flaring the gas. The rehabilitation of the site would also include providing the drainage and leachate collection systems all around the periphery of the disposal site as well as the onsite treatment of the leachate. The total estimate cost is around US$ 2.8 million or US$ 3.4 by adding physical and price contingencies.

29. **Employment generation to unskilled labor.** The rehabilitation of Kadapa dumpsite requires employment of unskilled labor for earth moving activities (which represents about 86 % of total rehabilitation costs). Engineering estimates suggest that almost 67 % of such costs could be paid to unskilled labor. A recent study\textsuperscript{38} provides estimates of shadow prices of unskilled labor in different states of India and shows that the opportunity cost or shadow price of unskilled labor employment on developmental projects forms 39 % of project wage rate in AP. Therefore, 61 % of wages paid to unskilled labor for the dumpsite remediation could be considered as benefits to local households supplying unskilled labor. Therefore, this project provides significant employment benefits to local unskilled laborers especially during its construction period. The present value of these benefits is estimated at Rs 40 million (or US$ 0.9 million).

30. **Reduction in Greenhouse gases.** Landfill gas is produced in landfills by the decomposition of organic materials. The primary components of landfill gas are methane (50%) and carbon dioxide (48%). Landfill gas is a threat to human health and global warming. Flaring of landfill gas converts methane to carbon dioxide and water vapor. Given that methane's global warming potential is 21 times that of carbon dioxide by weight, this conversion results in a significant positive benefit to the global atmosphere. With 206 MT of municipal solid waste per

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\textsuperscript{38} Murty and Goldar (2007).
day, and various assumptions on waste composition, the avoided tons of CO$_2$ emissions were estimated (see graph below). At a value of $15/ ton of CO$_2$ the net present value is estimated at Rs 40.8 million (or $0.7 million).

![Methane emissions avoided from Landfill gas Capture and Flaring Activity](image)

31. **Health, aesthetic and recreational benefits using the hedonic price method.** Air and water pollution around the dumpsite can cause health and amenity losses to households living nearby the site. One method available to estimate these damages is the hedonic property prices method. This method consists at analyzing the house location choices made by households and captures their willingness to pay for houses located in a less polluted environment. An attempt has been made under this economic analysis to capture households’ willingness to pay for a two bedroom apartment (with more or less similar characteristics) located at different distance from Kadapa dump site. The table below summarizes the information found. One can notice an increase in monthly rent as the distance form Kadapa sites increases. At the exception of the village of Kondayyapalli, this is not on the wind direction from Kadapa and is safely separated from the landfill by a well built road.

32. During the course of the survey it was observed that a two bedroom apartment in a locality free of pollution in Kadapa town could be worth Rs 3,000 in monthly rent. Therefore it was conservatively assumed that the rehabilitation of the Kadapa dumpsite can lead to an increase in rent of an average apartment to RS. 2,000. The gain in annual rental value due to the rehabilitation of Kadapa site in the four affected villages is estimated at a present value of Rs 26.5 million (or US$ 0.6 million).

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Price variation of two-bedroom apartments located at different distance from Kadapa dumpsite

<table>
<thead>
<tr>
<th>Municipality Ward</th>
<th>Distance From Landfill (Km)</th>
<th>Number Of households</th>
<th>Average monthly rent (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ukkayyapalli</td>
<td>0.5</td>
<td>250</td>
<td>750</td>
</tr>
<tr>
<td>Masapet</td>
<td>1.5</td>
<td>1113</td>
<td>1,500</td>
</tr>
<tr>
<td>Sankarapuram</td>
<td>1.0</td>
<td>1175</td>
<td>1,000</td>
</tr>
<tr>
<td>Kondayyapalli</td>
<td>0.5</td>
<td>1770</td>
<td>1,500</td>
</tr>
</tbody>
</table>

Source: Survey conducted during the preparation of this economic analysis

33. **Agricultural benefits.** During the field visit, interviews were conducted with local farmers. It was observed that about 100 acres of agricultural land remained uncultivated due to the landfill. However land located at the tail end of Kadapa-Karnool irrigation canal and not affected by the dumpsite, was receiving water and producing one crop a year. It was therefore assumed that the rehabilitation of the dumpsite could lead to the cultivation of the surrounding 100 acres of at least one paddy crop in a year after. Recent estimates of incomes resulting from the cultivation of one crop of paddy in India show that on the average an acre of farm land provides a net income of Rs 3,891 per year\(^{40}\). The net present value of stream of benefit was estimated at Rs 3.5 million (or <US$ 0.1 million).

**Conclusion**

34. **Estimate of benefit cost ratio and net present value.** The rehabilitation of Kadapa dumpsite provides both local and global type of benefits justifying the proposed investment. Local benefits include improvement in public health, overall quality of life as well generation of employment and agricultural revenues. Global benefits include the reduction in CO\(_2\) emission. As the table below indicates, the net present value, using a 10 % rate of discount\(^{41}\), was estimated at Rs 28 million (or US$ 0.8 million) and the benefit cost ratio at 1.65. Even with conservative assumptions using only immediately quantifiable benefits, the resulting benefit cost ratio is high and justifies the investment in the rehabilitation of the dumpsite.

**Estimates of Present Value of Benefit and Cost Flows of Kadapa Landfill**

<table>
<thead>
<tr>
<th></th>
<th>Rs (million) at 2008 prices</th>
<th>US$ at 2008 prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits to local households (PV)</td>
<td>26.6</td>
<td>$591,000</td>
</tr>
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<td>Employment benefits (PV)</td>
<td>40.3</td>
<td>$896,000</td>
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<td>Agricultural benefits (PV)</td>
<td>3.5</td>
<td>$78,000</td>
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<td>Reduction in GHG (PV)</td>
<td>40.8</td>
<td>$738,000</td>
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<tr>
<td>Cost of rehabilitation (PV)</td>
<td>67.3</td>
<td>$1,496,000</td>
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<tr>
<td>Net present value</td>
<td>28</td>
<td>$807,000</td>
</tr>
<tr>
<td>Benefit cost ratio</td>
<td>1.65</td>
<td></td>
</tr>
</tbody>
</table>

Figures may not add up due to rounding

\(^{40}\) See Murty and Goldar (2007)

\(^{41}\) A recent study commissioned by the Planning Commission, Government of India has recommended 10 % rate of discount for the economic evaluation of public investment projects in India (Murty and Goldar, 2007)
Annex 10: Safeguard Policy Issues

India - Capacity Building for Industrial Pollution Management

1. The project is expected to produce significant environmental improvements; however, because of its complex nature and remediation works associated with project sites (legacy pollution), the overall project has been classified as Category ‘A’. An Environment and Social Management Framework was prepared and public disclosure and consultations have been carried out in accordance with OP 4.12.

2. The Environment and Social Assessment (ESA) process included a baseline survey of the four sites, focus group discussions and a series of site-specific consultations with key stakeholders and formal public disclosure. The ESMF, completed in December 2008, includes comprehensive Environmental Management Plans (EMPs) and Social Management Plans (SMPs) which were prepared following detailed environment and social impact assessments of the pilot sites in AP and WB. The EMPs and SMPs pay particularly close attention to mitigating the potential consequences of management of hazardous materials. The EMPs include site specific impact mitigation measures by environmental component: air and noise, soil, ground and surface water, noise, flora and fauna, wildlife, wildlife, traffic and infrastructure, livelihood, shelters, agriculture activities and employment. The initial site remediation plans will be further detailed through detailed profiling of the site pollution and completion of the detailed engineering design. The design will include location specific mitigation measures with recommendations to contractors during site remediation/rehabilitation works.

3. The SMPs, including income Restoration/Rehabilitation Plans (RAPs) have incorporated the feedback from Project Affected Persons (PAPs), gathered during consultations. Public consultations at the four project sites have been completed prior to negotiations and recorded. At each of the four project sites, list of names of PAPs were collected as part of the ESA process. As a follow-up measure, at least one month prior to commencement of site remediation/rehabilitation works, the state PIUs will ensure completion of a rapid verification survey at each of the four project sites to ensure that resources for mitigation of social impacts and other SMP activities are properly allocated and directed to the correct PAPs. Care has been taken to ensure that implementation arrangements will meet mitigation and monitoring requirements for the expected investment activities. APPCB and WBPCB will be responsible for implementation of the safeguards measures in the respective EMP and SMP.

4. The complexity of social issues at the sites has required a multi-phased, iterative approach to ultimately develop SMPs. Social issues have been addressed in four stages: (1) Social due diligence has been carried out during rapid screening, as part of the ESA and in order to account for site-specific social, economic, political, and environmental issues to meet Category ‘A’ requirements. Screening identified the following: any Safeguards Policies to be triggered by project activities and, through informal consultations with local stakeholders; any perceptions of community members regarding the political, social, and environmental (including health) effects of hazardous/solid waste pollution in the area of influence; and potential community-level participants in the multi-stakeholder monitoring mechanism. (2) As part of the ESA, a SMP has been prepared for each site, as well as disclosed to/discussed with PAPs at the...
sites. All sites involve some restoration of income (as per requirements of OP/BP 4.12) to compensate those whose earning activities are interrupted either temporarily or permanently due to implementation activities. RAPs/rehabilitation plans have been developed for the MSW sites to improve PAPs’ socio-economic situations and ensure that youths among PAPs are attending school rather than working full-time. The ESMF has a communication strategy to set realistic expectations among community members regarding project objectives and limits; and provides for a grievance mechanism for communities surrounding each project site. Stage 2 also involved collection of baseline data on community socio-economics (with special attention to vulnerable groups) and quality of the ambient environment quality. (3) Implementation at sites will include launch of the multi-stakeholder enforcement mechanism, in which community organizations participate. Any concerns that community members have about the project itself during this phase can be addressed to the grievance mechanism. (4) During and after remediation of pilot sites, the social issues will continue to be addressed through: monitoring the implementation of EMP and SMP measures and any inputs to the grievance redress mechanism; monitoring of related key indicators identified for the baseline (including quantitative socio-economic data and qualitative perceptions about environmental health and quality of ambient environment); and monitoring of the efficacy and social inclusiveness of the multi-stakeholder local environmental enforcement mechanism. The ESA investigated whether there is any religious or other cultural symbolic significance to the crematorium, and explored the area for any nearby sites to see if OP/BP 4.11 is triggered. The ESA report includes a matrix of site specific Physical Cultural Property mitigation measures to ensure that any impacts of temporary nature will be fully addressed during implementation.

5. More specifically, the four sites selected for remediation in the pilot states of AP and WB involve the following Safeguard Policy Issues:

**Management of Hazardous Waste in Noor Mohammed Kunta, AP:**

6. There is a small religious site next to the lake and a nearby cemetery. The ESA includes an assessment of possible impacts on Physical and Cultural Resources and mitigation measures to ensure that possible impacts are addressed and protected according to World Bank policies on Physical Cultural Property (OP/BP 4.11). The Masjiid-O-Darga of NMK lake and the graveyard are the only religious places likely to receive direct and temporary impact from project activities due to the site proximity. The recommendations are taken into consideration not only in terms of diminishing disruption of religious rituals but also in terms of safety and health hazards. There also is evidence of a small number of rag-pickers (approximately 10) who collect metal and other saleable waste from around some of the smaller lakes. These individuals have been identified and their circumstances are addressed by the SMP, in accordance with the requirements of GOI and World Bank Safeguards Policies related to rehabilitation and income restoration.

**Remediation of the dumpsite in Kadapa, AP**

7. Though project activities would not require relocation of people, they would shut down income sources for rag-pickers and others whose livelihoods are derived from dump materials. The ESA has identified these individuals, determined whether they belong to SCs/STs/OBCs, and has prepared an SMP to properly protect and compensate them as required by GoI, GOAP,
and World Bank Safeguard policy requirements (notably OP/BP 4.12 and OP/BP 4.10). In addition, the SMP provides for job skills training, livelihood support and incentives to ensure that the children who were formerly working as ragpickers attend school, as well as health and rights awareness-raising activities, in order to help improve the life opportunities of PAPs. A RAP has been prepared for several families of rag-pickers who were identified during the social assessment as living in make-shift shelters on the site and the same will be verified during project implementation, and the RAP will be updated accordingly.

**Remediation of Old Hazardous Waste Sites in Hooghly District, WB**

8. Although the population living at the sites is very small (approximately 6 people at the Sarkar Weighbridge site and 15 people at the Minu Bridge site—all living in dhabas at each site), they would need to be relocated, at least temporarily, during remediation activities at the sites and compensated for lost income during the period remediation. At the Sarkar site, the people living there also are doing business for the truck drivers who come through for the weighbridge and each adult person earns an average of 2500 Rs. Per month. There also are 2 children earning money there (washing utensils), about 1,000 Rs. Per month. At the Minu bridge site, there is a 4-member family that owns the dhaba, plus about 11 people who stay in the dhaba and also work, earning about 5,000 Rs per month (the earnings are higher at this site because there is more land available for parking).

9. The Durga Temple is the only Physical Cultural venue likely to receive direct impact from project activities due to its proximity to the Ashalata Brickfield Hazardous waste Site. In order to mitigate the potential risk associated with accessing the temple particular attention has been given to secure access, lighting of the temple during works and road safety, preventing noise and dust to worshipers and waste spillage from transportation.

**Remediation of the dumpsite in Dhapa**

10. The following safeguards and other social issues have been observed at the site:

- The KMC is constructing a brick wall around the whole area in order to demarcate the area (not to keep out rag-pickers). The fencing-off of the area is a policy decision made and implemented by local government well before the site is being considered for inclusion as one the project demonstration sites. The Environmental and Social Assessment (ESA) has developed an SMP that makes recommendations on how to help the state to develop a plan for restoring income of the approximately 600 rag-pickers who will no longer have access to the 8.21-ha plot (closed around end of Year 2) and the 13.8-ha plot (closing around end year 5).

- Rehabilitation and Restoration of Income for rag-pickers: Up to 600 rag-pickers are active on the total 21 acres for their livelihoods. About half are children under age 18. The majority of rag-pickers are female, although there is a sizeable representation of males as well. These are people who reside in the villages surrounding the site. They are mostly Mondal people, who are SCs (so in this case World Bank OP/BP 4.10 on Indigenous Peoples would not be triggered). This is a full-time job for many, and for some households in the nearby village, rag-picking is the sole source of income. Each
A full-time rag-picker gathers 50-100 kg of waste per day, sale income from which yields an average of 150 Rs per day. The children who are rag-picking (some attend school part time) earn an average income of 25 Rs per day. According to stipulations of World Bank Safeguards Policy OP/BP 4.12, the rag-pickers’ income will be compensated when the dumpsites shut down, before which time they will receive job training for alternative employment opportunities. When the 8.21-ha area is shut down by end of Year 2, it is predicted that most, if not all, of the rag-pickers there will move to the larger dump site and continue rag-picking until that dumpsite is closed by end of Year 5. The SMP has proposed a phased process of rehabilitation and income stream restoration, as well as means of encouraging families to keep their children in school and not let them near the dumpsite, as children are more vulnerable to the disease associated with the waste.

- Three small vendors set up around the dump-site to sell food, tea, betel leaf, chewing tobacco. The estimated revenue from total food sales per day is 50-100 Rs. per person per day. The SMP also proposes means of compensation for lost potential income to these parties.

- Surrounding the two dumpsite ‘hills’ is about 700 ha of land that is actively farmed by local community members. The farming produce consists of vegetables (e.g., cauliflower). Toxic waste from the dumpsite leaches into the water and soil and evidently contaminates the produce. This leachate is visible, gathering even outside of the brick wall being built around the 8.21-ha area. The land is all owned by KMC, and none of the local people farming it have leases; they are all encroaching. The farming issues are addressed as part of the SMP.

- People living near the dumpsites (about 300 households, approx. 3000 population) report myriad problems that they associate with the nearby pollution. These include:
  - Water that is so polluted (red-brownish color in the wells) that people no longer drink it; they use the contaminated water for farming and washing still. The water that KMC is supplying is not adequate and barely meets the needs of cooking and drinking.
  - Asthma, TB, malaria, and diarrhea are prevalent in all villages. Eye irritation and nose burning because of methane gas released by the dumpsite was reported by residents of Kannapaedia. This is closest village to the dumpsites and is directly down-wind of it. Only this village expressed feeling eye irritation and nose burning as a direct result of the nearby site.
  - In all the villages (Kannaepedia, Durgapur, Anthomatal, Voicethala, Makalthala, Choinabae and Ucchipota), people complained about the bone recycling industry and cremation of people (separate place from the bone recycling) on the site. People identify the pollution as the cause of their diseases and complain about the burning smell. Those farming the surround fields complain about the burning of bodies.
  - The major occupations in these villages are farming, fishing, rag-picking and working as laborers in the Dhapa farm lands and in Kolkata. Farming occurs right outside the boundary wall, although KMC has cleared the nearest farming area. Fish ponds also lie outside the wall, and only men are involved in the fishing. The whole area is wetlands; in the villages many of the houses are surrounded by water. During monsoon season, the approach road also is filled with water. The groundwater is not of good quality for farming and fishing.
Annex 11: Project Preparation and Supervision

India - Capacity Building for Industrial Pollution Management

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<th>Actual</th>
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<td>Initial PID to PIC</td>
<td>May 17, 2006</td>
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<tr>
<td>Initial ISDS to PIC</td>
<td>July 7, 2006</td>
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<td>Appraisal</td>
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<td>November 10, 2008</td>
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<tr>
<td>Negotiations</td>
<td>December 2, 2008</td>
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<tr>
<td>April 26 – 30, 2010</td>
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<tr>
<td>Board/RVP approval</td>
<td>June 3, 2010</td>
</tr>
<tr>
<td>Planned date of effectiveness</td>
<td>September 2010</td>
</tr>
<tr>
<td>Planned date of mid-term review</td>
<td>June 2013</td>
</tr>
<tr>
<td>Planned closing date</td>
<td>September 30, 2015</td>
</tr>
</tbody>
</table>

Key institutions responsible for preparation of the project:
1. Ministry of Environment and Forest, Government of India
2. Andhra Pradesh Pollution Control Board
3. West Bengal Pollution Control Board

Bank staff and consultants who worked on project preparation included:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles J. Cormier</td>
<td>Lead Environmental Specialist (TTL)</td>
<td>SASDI</td>
</tr>
<tr>
<td>Ruma Tavorath</td>
<td>Sr. Environmental Specialist (co-TTL)</td>
<td>SASDI</td>
</tr>
<tr>
<td>Arun Manuja</td>
<td>Sr. Financial Management Specialist</td>
<td>SARFM</td>
</tr>
<tr>
<td>A. S. Harinath</td>
<td>Environmental Specialist</td>
<td>SASDI</td>
</tr>
<tr>
<td>Bela Varma</td>
<td>Program Assistant</td>
<td>SASDI</td>
</tr>
<tr>
<td>Cecilia Belita</td>
<td>Sr. Program Assistant</td>
<td>SASDI</td>
</tr>
<tr>
<td>Jennifer Solotaroff</td>
<td>Social Development Specialist</td>
<td>SASDI</td>
</tr>
<tr>
<td>K. Sankaran Vaideeswaran</td>
<td>Procurement Specialist</td>
<td>SARPS</td>
</tr>
<tr>
<td>Santhanam Krishnan</td>
<td>Consultant/Procurement</td>
<td>SASDI</td>
</tr>
<tr>
<td>Vikram Raghavan</td>
<td>Sr. Counsel</td>
<td>LEGES</td>
</tr>
<tr>
<td>Adriana Damianova</td>
<td>Lead Environmental Specialist</td>
<td>SASDI</td>
</tr>
<tr>
<td>Craig Meisner</td>
<td>Consultant</td>
<td>DEC</td>
</tr>
<tr>
<td>C. M. Vasudev</td>
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</tr>
<tr>
<td>John Prakash Badda</td>
<td>Program Assistant</td>
<td>SASDI</td>
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<tr>
<td>Kumudni Choudhary</td>
<td>Program Assistant</td>
<td>SASDO</td>
</tr>
<tr>
<td>Maria Sarraf</td>
<td>Sr. Environmental Economist</td>
<td>SASDI</td>
</tr>
<tr>
<td>Marina Djabbarzade</td>
<td>Consultant/ Community Development and Cultural Heritage Management</td>
<td>ECSSD</td>
</tr>
<tr>
<td>M. N. Murty</td>
<td>Consultant /Environmental Economist</td>
<td>SASDI</td>
</tr>
<tr>
<td>Prasad Modak</td>
<td>Consultant / Environmental Institutions</td>
<td>SASDI</td>
</tr>
<tr>
<td>Priti Kumar</td>
<td>Sr. Environmental Specialist</td>
<td>SASDI</td>
</tr>
<tr>
<td>Sanjay Srivastava</td>
<td>Regional Safeguards Coordinator</td>
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</tr>
<tr>
<td>Tapas Paul</td>
<td>Sr. Environmental Specialist</td>
<td>SASDI</td>
</tr>
</tbody>
</table>
Funds expended on project preparation:
1. Bank resources: US$1,186,632
2. Trust funds: US$90,809
3. Total: US$1,277,442

Estimated Supervision cost per annum: US$102,000

**Project Supervision Plan**

The following strategy will be applied during project supervision:

(i) **Implementation capacity of Borrower’s agencies:** Staff/consultants with an experience with Bank project implementation will be hired, particularly for financial management and procurement; training capacity will be provided and is budgeted in the project management cost. Support from higher level Government officials to be ensured through their participation in the POC and State PSC. Technical quality of technical documentation will be ensured by reviews by experts of TEP, a structure included in the institutional implementation arrangements. The cost of operation of the TEP is included in the project management budget.

(ii) **Social and environmental safeguards issues:** During project implementation continuous engagement and consensus building with key stakeholders especially at local level as part of the community awareness and monitoring arrangements will be a central effort. A project communication plan will be developed and included in the Project Operation Manual with inputs for activities implemented by the states and prepared by WB and AP PCBs. Staff with adequate skills in WBPCB and APPCB PIUs will be assigned to monitor the implementation of EMP and SMP. Project progress reports will include regular updates on the status of implementation of the EMP and SMP.

(iii) **Governance and accountability risks:** The Bank team will monitor risks identified in the GAAP as per the plan (See for details Annex 15). During supervision the team will check progress against early warning indicators of the GAAP. The implementing agencies will report regularly on the FM and procurement indicators. A test check on the quality of procurement documents and records of PIUs will be undertaken to detect fraud and corruption, and validations of works by field checks. Annual financial audits would be conducted by an independent firm of chartered accountants during implementation.

(iv) **Financial management:** FM arrangements will be supervised in the following two ways: (a) a review of project interim un-audited financial reports for each semester during supervisor missions, as well as an end-of-year audited financial statement and auditor’s management letter; (b) perform on-site supervision review of FM and disbursement arrangements to ensure compliance with FM requirements as outlined in the FM manual.

This will include random checks of selected transactions and internal controls. The supervision will be performed by a Bank accredited FM Specialist. He/she will participate in supervision missions and will review project documentation made available by PIUs aiming to identify fraud and corruption risk or non-compliance with project
controls. He/she will work with the implementing agencies to establish a register of late payments to be queried during supervision for possible red flags of facilitation payments etc. He will report to the TTL on any FM issues and will agree on actions to follow up.

(v) **Procurement:** In addition to prior reviews, supervision will be carried out from the Bank NDO office. The PIU procurement staff capacity will be assessed during each supervision mission, issues identified and corrective measures will be recommended. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity and included in the supervision report. During the supervision missions (at least twice a year) a post review of procurement actions will be undertaken. The supervision of procurement related issues will be carried out by a Procurement Accredited Staff. He/she will participate in filed supervision missions and will report to the TTL on any issue of concern. During the post review the PAS will review contract awards just below the prior review threshold and will obtain market intelligence information as needed regarding the performance and reputation of key companies likely to bid on the major procurement packages.

(vi) **Communication with Borrower’s agencies:** A dedicated SASDI staff with adequate operational skills will be assigned in NDO to work with the Borrower’s agencies and advice on the general implementation issues. He/she will allocate at least 10 staff weeks during year one and two to make sure an interim supervisions is carried out as often as necessary. Informal sharing and discussion of project ISR ratings will be applied as appropriate. PIU project Directors will be invited during the CPPR meeting to discuss project implementation issues. A project implementation launch workshop will be organized prior to project effectiveness which will discuss key FM, procurement, organizational, reporting issues and timelines. A MTR workshop will be organized by the Bank to take stock of the issues and if restructuring will be necessary discuss issues with all implementing agencies prior to finalizing the proposal to the Bank management. Prior to launching the preparation of the ICR beneficiary surveys in the two participating states will be undertaken.

The following table presents the staffing and skills requirement on annual basis during supervision are proposed:

<table>
<thead>
<tr>
<th>Staff skills</th>
<th>No.</th>
<th>Staff weeks</th>
<th>Key responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTL</td>
<td>1</td>
<td>8</td>
<td>Project start-up; project launch, MTR overall project management, communication with GOI; monitor disbursements; preparation of ISR</td>
</tr>
<tr>
<td>Social Development Specialist</td>
<td>1</td>
<td>6</td>
<td>On site supervision; review of PIUs capacity in social safeguards, Supervise the implementation of SMP; interaction with project beneficiaries, organize beneficiary surveys</td>
</tr>
<tr>
<td>Environmental/ Safeguards Specialist</td>
<td>1</td>
<td>6</td>
<td>Operational support, on-site supervision; day to day communication with Borrower’s agencies at national and state level; review implementation of EMP; assess safeguards capacity of PIUs in the two pilot states</td>
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<tr>
<td>Environmental engineer/ HW Management</td>
<td>2</td>
<td>8</td>
<td>Technical review of remediation plans and implementation, supervise the closure of old dumps; site visits and verification</td>
</tr>
</tbody>
</table>
of monitoring data; review technical specs for procurement of lab equipment

| Institutional Development Specialist | 1 | 6 | Supervise implementation of Component 1; Assist the borrower to review capacity building plans and their implementation; filed visit for verification of progress of ECAC |
| FM specialist | 1 | 5 | Review FM reports, Oversight of PIU FM systems; review FM audits communicate with Borrower on FM matters |
| Procurement Specialist | 1 | 4 | Prior review and clearance of procurement documents; supervise implementation of procurement plans, assist the Borrower to update procurement plans; undertake filed supervision. |
| Program/Operations Assistant | 1 | 7 | Administrative support to project implementation; liaise with PIUs; assist the TTL with overall project management and organization of supervision missions |
| Research Analyst | 1 | 6 | Tracking project implementation and disbursements; participate in filed supervision |

Timing of formal and informal supervision missions and cost are proposed as follows:

<table>
<thead>
<tr>
<th>Theme</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Y5</th>
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<tr>
<td>Project Launch Mission</td>
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<td>-</td>
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<td>-</td>
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<td>4</td>
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Annex 12: Documents in the Project File

India - Capacity Building for Industrial Pollution Management

8. Improved Implementation of Municipal Solid Waste Management (Project Reports II & III): TERI. September 2008
**Annex 13: Statement of Loans and Credits**

**India - Capacity Building for Industrial Pollution Management**

<table>
<thead>
<tr>
<th>Project ID</th>
<th>FY</th>
<th>Purpose</th>
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<th>IDA</th>
<th>SF</th>
<th>GEF</th>
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Total portfolio: 956.52 249.41 42.30 536.35 604.74 175.91 38.60 236.35

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Total pending commitment: 0.04 0.01 0.00 0.00
### Annex 14: Country at a Glance

#### India - Capacity Building for Industrial Pollution Management

**India at a glance**

- **Lower-middle income**

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**Average annual growth, 2002-08**

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**Poverty**

- **% of population below national poverty line**
- **Urban population (% of total population)**
- **Life expectancy at birth (years)**
- **Infant mortality (per 1,000 live births)**
- **Child malnutrition (% of children under 5)**
- **Access to an improved water source (% of population)**
- **Gross primary enrollment (% of school-age population)**
- **Male**
- **Female**

**KEY ECONOMIC RATIOS and LONG-TERM TRENDS**

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**Structure of the Economy**

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**Growth of capital and GDP (%)**

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</table>

**Note:** 2008 data are preliminary estimates.

*The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.*
### PRICES and GOVERNMENT FINANCE

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer prices (% change)</td>
<td>11.2</td>
<td>13.1</td>
<td>6.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Implicit GDP deflator</td>
<td>8.2</td>
<td>8.0</td>
<td>4.9</td>
<td>6.2</td>
</tr>
</tbody>
</table>

#### Government finance (% of GDP, includes current grants)

- **Current revenue**: 19.0, 21.9, 20.9
- **Current budget balance**: -2.8, -3.2, -7.6
- **Overall surplus/deficit**: -6.0, -9.6

### TRADE

#### (US$ millions)

- **Total exports (fob)**: 14,257, 33,219, 159,007, 190,000
- **Tea**: 435, 1,038, 1,703
- **Iron**: 825, 893, 9,005
- **Manufactures**: 10,064, 58,393, 71,237
- **Export price index (2000=100)**: 152, 161
- **Import price index (2000=100)**: 162, 182
- **Terms of trade (2000=100)**: 93, 89

### BALANCE of PAYMENTS

#### (US$ millions)

- **Exports of goods and services**: 14,210, 47,484, 256,240, 276,408
- **Imports of goods and services**: 26,842, 58,565, 310,301, 345,993
- **Net income**: -2.5, -3.5, -4.1, -4.51
- **Net current transfers**: -8,632, -11,081, -54,061, -69,585
- **Current account balance**: -8,499, -4,345, -17,273, -30,049
- **Changes in net reserves**: 1,004, -3,829, -92,164, 20,080

#### Memo:
- **Reserves including gold (US$ millions)**: 4,802, 32,490, 309,287, 351,259
- **Conversion rate (DEC, local/US$)**: 14.5, 42.1, 40.1, 45.9

### EXTERNAL DEBT and RESOURCE FLOWS

#### (US$ millions)

- **Total debt outstanding and disbursed**: 61,659, 98,774, 204,992, 230,611
- **IBRD**: 5,590, 7,991, 6,680, 7,429
- **IDA**: 12,186, 18,562, 25,378, 25,419
- **Total debt service**: 6,055, 10,039, 39,036, 31,076
- **IBRD**: 777, 1377, 702, 703
- **IDA**: 99, 423, 894, 970

#### Memo:
- **Composition of net resource flows**
  - **Official grants**: 700, 490, 1,145, 1,189
  - **Official creditors**: 2,661, 948, 2,565, 3,539
  - **Private creditors**: 5,679, 3,977, 25,798, 17,802
  - **Foreign direct investment (net inflows)**: 91, 2,635, 25,27, 41,189
  - **Portfolio equity (net inflows)**: 0, -601, 34,986, -15,030
  - **World Bank program**
    - **Commitments**: 2,648, 1,755, 3,309, 1200
    - **Disbursements**: 2,478, 1,399, 1,005, 2,083
    - **Principal repayments**: 383, 1,159, 1,050, 1,189
    - **Net flows**: 2,095, 270, 754, 924
    - **Interest payments**: 573, 671, 546, 54
    - **Net transfers**: 1,522, -401, 208, 41

#### Note:
This table was produced from the Development Economics LDB database. 2/9/09
A. Approach to project design and governance and accountability issues

1. The project aims to strengthen the institutional capacity of the key agencies at national and state level responsible to reduce the risk from unattended hazardous waste and effectively enforce the HWM Rules. In the face of lack of prior experience in the area, institutional difficulties and appropriate incentives to implement remediation of legacy pollution in an economically, socially and environmentally sustainable manner, the project offers an opportunity to address a long standing pollution problem by enhancing the analytical and technical skills of responsible staff in key agencies through project based experience in remediation, while at the same time helping the institutions to undertake a large scale remediation based on the project experience. The approach to project design is therefore reflective of the technical nature of the project, but also it recognizes the complexities associated with a lack of prior experience in the area, weak environmental governance and knowledge base to address, in a comprehensive manner, the unattended public health risks. The following is a summary of the salient features of the project approach:

i. The process of identification of risks stared as early as project preparation. Risk based assessment methodology is used to determine the feasibility of project investments in demonstration pilots for cleanup of legacy pollution. This is an explicit requirement in the terms of reference of the preparation consultants.

ii. Detailed review of the institutional capacity gaps have been undertaken to determine areas where capacity building needs justify the project support. The project design recognizes that capacity building efforts must be focused and be linked with demonstrating results on the ground.

iii. Project preparation was done in inclusive and participatory manner where at all stages consultations with project stakeholder have been an evolving process. Communication with states at all times during project preparation was a central effort to assess their commitment to project objective, inputs and intended outcomes. At the same time, certain flexibility was exercised while designing state implementation arrangements to make sure that respective agency mandates are duly considered and other agencies are engaged when necessary to complete the implementation structure.

iv. Project implementation and institutional arrangements are designed using the lessons learned and operational experience from projects implemented elsewhere in the Bank and specific country and regional experience from other sectors.

v. The project design takes stock of the prior experience in the environment sector projects for capacity building where significant delays and unnecessary implementation difficulties in the decision making process of the executing agencies where mainly due to excessive project
complexity for a single implementing agency, and lack of attention to actual contributions to environmental improvements.

vi. The project design makes provisions for clear decision making and monitoring framework. This includes specific provisions for a third party supervision of remediation works to ensure quality of engineering design and technical specifications, clarity and completeness of bidding documents, proper recording of site works and prudent invoicing. Similarly, it includes provisions for addressing likely contractual aspects of unforeseen site works and handling such issues during implementation and supervision.

vii. The project has strong focus on enhancing environmental assets in the project areas by addressing ‘the public bad’ and investing in ‘public good’ where benefits spill over the population, businesses, and public at large. Assessment of project environmental social aspects is being carried out which includes local level consultations prior to completion of environmental management plans for four pilot sites where remediation works will be undertaken.

viii. The project approach to monitoring is inclusive and designed to be carried out in two levels. Human resource capacity of PCBs is the center of the capacity building efforts supported by the project. Its focus is to support implementation, and specifically to monitor the impact of project investments in remediation. Technically, the monitoring of the effects of pilot remediation will start as early as the site works commence and will continue through the after-care monitoring program for each site. Not only it will be a technical requirement to state PCBs, but it will help sustain the skills acquired through the technical training activities of staff of PCBs supported by the project.

ix. Community level monitoring will be undertaken by engaging the local society formations which are already active in the project area and expressing concerns of the quality of environmental conditions. In AP the local Agricultural Academy, a stakeholder and a beneficiary, will be engaged in the monitoring of remediation results. In WB, the project will engage local society groups and project beneficiaries, which are already active in the area, to monitor that secondary contamination and indiscriminate disposal of hazardous waste do not occur in the project area.

2. Many of the perceived risks are already recognized by the team and are in the purview of the project effort. Steps to mitigate risks were incorporated as seen from the above during preparation. Furthermore, risk mitigation measures identified in the GAAP would be continuously taken up with counterpart agencies for their implementation. There is no doubt that the team must continue to make a focused effort throughout project supervision to ensure that client’s attention stays on target and these issues are taken up for proper implementation. This is specifically important with MOEF given its limited experience with Bank projects.

Stakeholder Involvement, Public Participation and India RTI.

3. International experience has shown that meaningful public participation in environmental decision making from the early start (as opposed to ‘after the fact’ endorsement of decisions already made) can make a significant difference in the long term sustainability of environmental
initiatives, policies and regulations. Public buy-in in major decisions is important to environmental governance particularly when dealing with HW and MSW. Central to this are the activities which the project is proposing i.e. addressing capacity gaps, understanding the issues and addressing them through a capacity building support and demonstrating and practicing risk based pollution remediation. The first effort to pioneer public access to environmental information was made by the international community in 1998, when the Aarhus Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters made possible public involvement in environmental decision making. This project builds on the spirit of Aarhus Convention and the India Right to Information Act and its key concepts which are:

- Transparency & Accountability in the working of every public authority;
- The right of any citizen of India to request access to information and the corresponding duty of Government to meet the request, except the exempted information (Sec. 8/24)
- The duty of Government to pro-actively make available key information to all (Sec 4).
- A responsibility on all: citizenry, NGOs, media.

4. The legal provisions of the RTI translate in the project design and implementation arrangements in following ways:

- Inspect works, documents, records;
- Take notes, extracts or certified copies of documents or records;
- Take certified samples of material.
- Obtain information in any form and other electronic mode [Sec.2(j)]

5. The RTI provides for both on-demand disclosure and proactive or *suo moto* disclosure of information making the maximum use of project activities for public outreach, knowledge sharing and other project sponsored activities. The project implementing agencies will use their websites for effective disclosure of information to citizens to facilitate public oversight and achieve greater transparency and quality of project implementation. Table 3 provides a plan for disclosure of project related information.

6. Project implementation at project sites will include the launching of the multi-stakeholder enforcement mechanism, in which community organizations participate. Any concerns that community members have about the project itself during this phase can be addressed to the grievance mechanism.

**GAAP objective and issues:**

7. The objective of the GAAP is to identify the critical areas and measures to enhance the transparency, accountability and performance of the project, and thus achieving project results and higher development impact. Broadly, the key governance and accountability issues in the project are two-fold:

i. Issues that arise from the innovative/pilot nature and technical aspects of the project and lack of prior experience in comprehensive clean up, which is carried out with due consideration of economic, environmental, social considerations. It will result in some difficulties to *a priori*
assess of the exact technical scope of remediation works and accurately define the technical specification and cost of site works before detailed area profiling is done.

ii. Issues that arise from the weak institutional capacity of environmental agencies, internal decision making framework and random communication between the central level and states that may result in delays and more processing time of project milestones and the implementation of internal controls and financial management and procurement requirements.

8. These and other implementation issues are outlined in the table below:

<table>
<thead>
<tr>
<th>Project cycle</th>
<th>Issues/ Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remediation Pilots</td>
<td>Demonstration effect diminished due to lengthy implementation</td>
</tr>
<tr>
<td></td>
<td>Poor oversight by state implementing agencies</td>
</tr>
<tr>
<td></td>
<td>Failure to sustain the remediation results</td>
</tr>
<tr>
<td></td>
<td>Lack of appropriate communication to public and communities on results</td>
</tr>
<tr>
<td></td>
<td>SEMF and site specific mitigation measures not properly integrated in the pilots</td>
</tr>
<tr>
<td>Procurement</td>
<td>Incomplete technical specifications</td>
</tr>
<tr>
<td></td>
<td>Procurement delays and higher cost</td>
</tr>
<tr>
<td></td>
<td>Poor supervision of contracts</td>
</tr>
<tr>
<td></td>
<td>Collusion among contractors</td>
</tr>
<tr>
<td></td>
<td>Delays in bid evaluation</td>
</tr>
<tr>
<td></td>
<td>Submission of forged documents to win contracts</td>
</tr>
<tr>
<td>Project Execution and Contract Management</td>
<td>Implementation delays</td>
</tr>
<tr>
<td></td>
<td>Inaccurate invoicing</td>
</tr>
<tr>
<td></td>
<td>Payments made without prior verification of quantities and quality of site works</td>
</tr>
<tr>
<td></td>
<td>Non-compliance of contractor with site specific safeguards and site mitigation measures</td>
</tr>
<tr>
<td>Financial Management System and Internal Controls</td>
<td>Inadequate and unreliable FM information and incomplete reports</td>
</tr>
<tr>
<td></td>
<td>Lack of compliance with established internal financial controls</td>
</tr>
<tr>
<td></td>
<td>Delays in hiring auditors</td>
</tr>
<tr>
<td></td>
<td>Inability of auditors to provide quality and independent opinion</td>
</tr>
<tr>
<td></td>
<td>Diversion of funds for non project purposes</td>
</tr>
<tr>
<td></td>
<td>Inadequate staff capacity</td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>Achievement of PDO adversely affected by the lack of project information</td>
</tr>
<tr>
<td></td>
<td>Achievement of PDO affected by inability to apply checks and balances and implement mid-term corrections</td>
</tr>
<tr>
<td></td>
<td>Achievement of PDO affected by the lack of engagement of citizens in oversight of project pilots</td>
</tr>
<tr>
<td>After-care and Monitoring</td>
<td>Resources for aftercare not planned adequately</td>
</tr>
<tr>
<td></td>
<td>Transfer of responsibility for aftercare monitoring to other agency</td>
</tr>
<tr>
<td></td>
<td>Environmental improvements in the area affected by neglect</td>
</tr>
</tbody>
</table>
Table 2: Governance and Accountability Action Plan

<table>
<thead>
<tr>
<th>Item</th>
<th>Issues/Risk/ Rating</th>
<th>Mitigating Actions</th>
<th>Responsibility</th>
<th>Timeline</th>
<th>Early warning indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of remediation pilots</td>
<td></td>
<td>-Agree on roles of project oversight structure and progress reporting</td>
<td>MOEF and State PCB</td>
<td></td>
<td>-Delayed progress reports -Delayed contracting of independent supervision -Delays in detailed engineering design</td>
</tr>
<tr>
<td>(M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor performance by state implementing agencies</td>
<td>-Demonstration of effect diminished due to lengthy implementation</td>
<td>-Use project resources to strengthen and rationalize the technical capacity of State PCB -Nominate staff of PIU according to agreed TORs -Prepare timelines for implementation</td>
<td>State PCBs</td>
<td>Y1</td>
<td>-Failure to nominate technical staff for training -Substantial deficiency in staffing of PIU -Failure to submit progress reports</td>
</tr>
<tr>
<td>(M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure to sustain remediation results</td>
<td></td>
<td>-Expand community outreach to change behaviors and prevent secondary pollution -Agree on a plan for regular monitoring of industries in the area by PCB</td>
<td>State PCB</td>
<td>Y1 and onwards</td>
<td>-PCB fails to inventory and monitor units generating HW in the project area</td>
</tr>
<tr>
<td>(M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of appropriate communication to public and communities on remediation results</td>
<td></td>
<td>-Expand community outreach activities using project resources</td>
<td>State PCBs</td>
<td>Y1 and onwards</td>
<td>-Complaints from communities continue -Social and Environmental issues inadequately addressed in progress reports</td>
</tr>
<tr>
<td>(M)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEMF and site specific mitigation measures not properly integrated in the pilots</td>
<td></td>
<td>-Technical documentation and Bidding documents for site remediation includes safeguards provisions</td>
<td>State PCBs</td>
<td>Y1 and onwards</td>
<td>-Social and Environmental issues inadequately addressed as witnessed during site visits</td>
</tr>
<tr>
<td>(L)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Project execution and contract management | Poor quality of technical documents causing delays (M) | - Early involvement of independent supervision in review of technical specs  
- Periodic review of bidding process and post review of contract awards just below the prior review threshold | State PIU | Y1 and Y2 | - Poor quality of bidding documents |
|-------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------|----------|-------|----------------------------------|
| Inaccurate invoicing of works (M) | - Strengthen technical supervision and introduce mandatory field checks  
- Ensure adequate capacity of PIU FM  
- Establish a register of late payments | State PIU | Y2 and onwards | - Costs either too low or too high and/or do not match with progress of contract milestones  
- No compliance of completed and certified works |
| Payments made without prior verification of quantities and quality of site works (M) | - Mandatory site visits and reporting by independent supervision consultant  
- Combined Procurement and FM audits  
- Intensify site visits of completed works suspend payments if at fault | State PIU | Y2 and onwards | - Slow progress of site works |
| Non-compliance of contractors with site specific safeguards and site mitigation measures (L) | - Contractors workshops periodic review of quality of contractors documents | State PIU | Y2 and onwards | - Poor quality of bidding documents  
- Obvious omissions of safeguards requirements in the contractors documents |
| Procurement | Incomplete technical specifications (M) | - Pre-bid briefings and quality written clarifications to bidders in a timely manner | MOEF and State PIU | Prior to effectivenes Y1 and onwards | - Procurement delays  
- Lack of response from bidders |
| Procurement delays and higher cost (L) | - Mandatory uploading on bidding documents at PCB website  
- Avoid ‘slice and | MOEF and State PIU | Y1 and onwards | - Winning bids too high compared to similar works |
<table>
<thead>
<tr>
<th>Problem Description</th>
<th>Recommended Action</th>
<th>Responsible Agency</th>
<th>Timelines</th>
<th>Other Actions and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor supervision of contracts (M)</td>
<td>- Maintain procurement staff of adequate quality</td>
<td>State PIUs</td>
<td>Y1 onwards</td>
<td>- Lack of proper reporting</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>- Frequent changes in the procurement timeline</td>
</tr>
<tr>
<td>Collusion among contractors (M)</td>
<td>- Records of public openings of bids kept on the public domain and disseminated within 15 days of contract award</td>
<td>State PIU</td>
<td>Y1 onwards</td>
<td>- Bidders use same bank for security deposit and bank guarantees</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Bids far too low</td>
</tr>
<tr>
<td>Delays in bid evaluation (M)</td>
<td>- Create procurement database for each pilot site with procurement plan</td>
<td>State PIU</td>
<td>Y1 and onwards</td>
<td>- Lengthy time between bid submission and award</td>
</tr>
<tr>
<td></td>
<td>- Keep accurate records of all documents with data of EIO, and bids</td>
<td>MOEF</td>
<td></td>
<td>- Number of extensions of bid validity exceeds the acceptable standards</td>
</tr>
<tr>
<td></td>
<td>- Undertake internal audits</td>
<td></td>
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</tr>
<tr>
<td>Submission of forged documents to win contracts (M)</td>
<td>- Random verification of references of firms</td>
<td>POI and State PIUs</td>
<td>Y1 and onwards</td>
<td>- Incomplete of missing bank guarantee documents</td>
</tr>
<tr>
<td>Financial Management System and Internal controls</td>
<td>Inadequate and unreliable FM information and incomplete FMR (M)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Ensure FM training before effectiveness</td>
<td>PCB PIUs</td>
<td>Prior to effectiveness and Y1 onwards</td>
<td>- Inordinate delays in submission of quarterly FM reports</td>
</tr>
<tr>
<td></td>
<td>- Obtain TA to improve the quality of record keeping (electronic and manually)</td>
<td></td>
<td></td>
<td>- Pending receipts and unaudited reports</td>
</tr>
<tr>
<td>Lack of compliance with established internal financial controls (M)</td>
<td>- Strengthen financial management oversight through line ministry and State Governments</td>
<td>MOEF and States</td>
<td>Y1 onwards</td>
<td>- Significant variation of expenditure and budgets</td>
</tr>
<tr>
<td>Delays in hiring auditors and overdue</td>
<td>- Hire auditor for three years with an agreed schedule</td>
<td>MOEF and state PCB</td>
<td>Y1 By December 2010</td>
<td>No evidence of hiring audit firm during supervision</td>
</tr>
</tbody>
</table>
| Monitoring and evaluation | Achievement of PDO adversely affected by the lack of project information (M) | - Same as above  
- Prepare clear TOR and agree with the Bank | PCB After negotiations | - Inability of the auditors to pick up information on FM issues noted during supervision |
|---------------------------|--------------------------------------------------------------------------------|------------------------|-----------------|-------------------------------------------------|
| Monitoring and evaluation | Achievement of PDO adversely affected by the lack of project information (M) | - Disclosure policy agreed with pilot states  
- Abide to the provisions of RTI | MOEF State PCB After effectiveness onwards | - Large number of request for information  
- Lack of evidence on timely responses |
| Monitoring and evaluation | Achievement of PDO affected by inability to apply checks and balances and implement mid-term corrections (M) | - Carry out beneficiaries survey at midterm review to assess public perception | PCB PIUs Y1 onwards | - Continuous delays  
- Absence of information from monitoring and evaluation of progress/results |
| Monitoring and evaluation | Achievement of PDO affected by the lack of engagement of citizens in oversight of project pilots (M) | - Agree on the design and implementation arrangements of social accountability mechanism and public engagement | MOEF and PCBs Y1 Mechanism to be in place by end of Y1 | - Non-compliance with procedures and arrangements related to community involvement and beneficiaries surveys |
| After-care and monitoring | Resources for after-care not planned adequately (H) | - Include first year after care in the remediation contract  
- Assign responsibility to PCB for regular monitoring of environmental parameter of the site and plan budget resources | PCB State Government Y3-4 onwards Prior to Project completion | Complains for violation or improper management of the site reported (media or elsewhere)  
Site/Beneficiary survey during Y5 reports concerns from citizens |
<p>| After-care and monitoring | Transfer of responsibility for aftercare monitoring to other agency | - Agree and ensure implementation of after care plans prior to completion of site | States and MOEF Y4-5 dependng on completion | Delays in agreeing on site management and monitoring arrangements |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Documents to be disclosed</th>
<th>Frequency</th>
<th>Mode</th>
</tr>
</thead>
</table>
| **Procurement** | Project procurement Plan (PPP)  
Procurement Plan (timeline) regular updates  
List of contractors who purchased bids  
Name of contractors awarded contracts  
Minutes of bid opening | As and when the latest revisions are made | PCB Website  
Local and national newspapers  
UNDP Business Development Info-shop Website |
| **Financial Management** | GOI /MOEF sanctioned amount for the project  
Expenditure Statement  
Audited Financial statements | Yearly  
Quarterly | MOEF Website  
SPCB websites |
| **Safeguards** | E&SA for public consultation  
Executive Summary of ESMF  
Social accountability feedback information  
Advance information for consultations and surveys | MOEF and PCBs websites once in the project cycle / and in accordance with bank safeguards requirements  
When information is available  
When planned | PCB Websites  
Info -Shop |
| **Area/Remediation Pilots** | Yearly progress reports  
Monitoring of water quality  
Environmental violations | Annually  
Bi-annually | PCB websites  
Project Publication |