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IMPLEMENTATION COMPLETION REPORT

INDIA

INDUSTRIAL POLLUTION CONTROL PROJECT
(Loan 3334-IN and Credit 2252 -IN)

November 30, 1999

Environment Sector Unit (SASEN)
South Asia Region

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CURRENCY EQUIVALENTS

Currency Unit = Rupee (Rs)
US\$1 = Rs 42 (as of April 1999)

FISCAL YEAR
April 1 – March 31

WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS AND LIST OF ACRONYMS

ASCI	Administrative Staff College of India
BOD	Biochemical Oxygen Demand
CETP	Common Effluent Treatment Plant
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
DEA	Department of Economic Affairs
DFI	Development Finance Institution
EIA	Environment Impact Assessment
GOI	Government of India
IC	Implementation Cell
ICICI	The Industrial Credit and Investment Corporation of India, Limited
IDBI	The Industrial Development Bank of India, Limited
IPP	Industrial Pollution Prevention
MoEF	Ministry of Environment and Forests
NEERI	National Environmental Engineering Research Institute
R&D	Research and Development
SDR	Special Drawing Right
SIDC	State Industrial Development Corporation
SPCB	State Pollution Control Board
SSI	Small-Scale Industry
TDS	Total Dissolved Solids
TSS	Total Suspended Solids

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Preface

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IMPLEMENTATION COMPLETION REPORT
INDIA
INDUSTRIAL POLLUTION CONTROL PROJECT
(Loan 3334-IN and Credit 2252-IN)

Preface

This is the Implementation Completion Report (ICR) for the Industrial Pollution Control Project in India, for which Loan 3334-IN, in the amount of US\$124 million equivalent, and Credit 2252-IN, in the amount of US\$31.6 million equivalent, were approved on May 30, 1991, and made effective on November 6, 1991.

Loan 3334-IN and Credit 2252-IN were closed on March 31, 1999, about eight years after approval and nine months after the original closing date. The project closing date was extended once. An aggregated amount of US\$7.5 million equivalent was canceled from the Loan and SDR (Special Drawing Right) 6.6 million was canceled from the Credit as of September 23, 1999.

The ICR was prepared by Charles Dahan and Dominique Babelon, consultants, under the supervision of Naimeh Hadjitarkhani, Task Manager,¹ from the Environment Sector Unit (SASEN) of the South Asia Region. The consultants had no earlier affiliation with the project

Richard Ackermann, Sector Director, SASEN reviewed the ICR prepared by the consultants and built into the ICR some of the recent findings of the Bank team, especially with reference to the lack of integration of the Project with the Policy Statement for Abatement of Pollution.² The Borrower provided their version of the ICR that is on file. Their comments on this ICR are included in Annexes B, C and D to the report. These comments were considered while finalizing the ICR.

Preparation of this ICR was begun in April 1999. It is based on ex-post evaluation reports prepared by the Borrower and the Development Finance Institutions; materials in the Bank project files; field visits to State Pollution Control Boards and project beneficiaries, beneficiaries' replies to questionnaires, and discussions with project management and Bank staff involved in the project.

¹ This project was prepared, managed and supervised by Walter Vergara, Principal Chemical Engineer, LCSES, until January 1998.

² INDIA Policy Statement for Abatement of Pollution, Government of India, 1992.

IMPLEMENTATION COMPLETION REPORT
INDUSTRIAL POLLUTION CONTROL PROJECT
(LOAN 3334-IN AND CREDIT 2252-IN)
Evaluation Summary

Project Objectives

1. The project's overall objective was to support the Government of India's efforts to prevent and alleviate environmental degradation caused by industrial operations and assist in the successful attainment of the proposed short and medium-targets of its environmental policy. The project was therefore designed to assist in identifying and implementing a cost-effective program for industrial pollution monitoring, control and abatement.
2. The project's specific goals were: (i) to promote effective and timely enforcement of existing legislation on environmental protection regarding industrial sources; (ii) to support efforts by industry to comply with existing environmental regulations, including a special effort designed to reach the small scale industry through the setting up of common treatment facilities and (iii) to support assessments, extension services and research in waste minimization, resource recovery and pollution abatement in industry.
3. The project comprised: (a) an institutional component designed to strengthen the Central and State Pollution Control Boards in four states (Maharashtra, Gujarat, Tamil Nadu and Uttar Pradesh); (b) an investment component, through two Development Financial Institutions (DFIs), designed to support efforts by industry to comply with regulations, including support for the set-up of common effluent treatment plants (CETPs); and (c) a technical assistance component for the assessment of environmental problems and the development of suitable responses. The investment component was to finance sub-loans and sub-grants for: (a) the establishment of CETPs, mainly for Small Scale Industries (SSIs) at sites with a heavy concentration of chemical industries³, (b) individual projects undertaken by polluting enterprises in the chemical and related sub-sectors for waste minimization, resource recovery and pollution abatement; and (c) demonstration projects.
4. The objectives were consistent with the Bank's country strategy at that time. Bank lending to industry, and IDA grants for CETPs – mainly for SSIs – were viewed as important in accelerating the resolution of critical pollution problems at a time when the regulatory system and institutional arrangements for effective enforcement and compliance were inadequate in India. In parallel, the institutional capacity of State Pollution Control Boards (SPCBs) would also be built-up under the project. In line with its objectives, the project supported the enforcement strategy of GOI and the state governments.

³ The concept of CETP was originally promulgated in 1984 by the MOEF via the Central Loan Scheme (CLS). The CETP of Jedimetala in Andhra Pradesh was one of the first CETPs to access the CLS in 1985. The IPC Project essentially continued the CLS scheme with a ceiling on the extent of subsidy and increasing the promoter's contribution.

Achievement of Objectives

5. *The project's focus was more on physical outputs rather than on outcomes and impacts.* Over the years the Bank has shifted its own emphasis in monitoring projects from *inputs and outputs*⁴ to *outcome and impacts*. In the present case however, the project design and much of its implementation and supervision focused more on *inputs and outputs* and less on *outcome*. The measurement of *impact* was not considered at any stage of the project. In fact, the project did not have any environmental performance indicators as well as supportive management information system developed as part of its design.

6. Hence, although the progress on achievement of objectives in terms of *physical outputs* has been satisfactory, the *project outcomes and impacts* that are critical for project sustainability, are difficult to assess. This has been one of the major impediments in assessing the achievement of project objectives.

7. *Progress of the policy objectives not solely attributable to the Project.* While the project did not include covenants related to policy changes, several important policy issues were discussed and recorded as GOI commitments at negotiations. They related to: (a) issuing of a Policy Statement for the Abatement of Pollution; (b) increases in the levels of water cess; and (c) initiation of a switch from concentration to load based pollution standards. These specific policy objectives were substantially achieved and some progress has been made in the implementation of the Policy Statement for Abatement of Pollution. It would be inappropriate however to attribute much of the above progress solely to this project. Many of the major policy decisions were taken in fact as a response to public pressure and court mandates and in some cases, implemented as a part of an independent updating exercise. Somehow the project design was not conducive for effective implementation of the proposed short and medium-targets of GOI's Policy Statement for Abatement of Pollution, although this was the principal objective of the project.

8. *The project's institutional strengthening objectives were only partially achieved.* The project aimed at strengthening four State Pollution Control Boards (SPCBs) through the provision of equipment, facilities and training. The project also called for GOI to undertake a study on the organization and staffing of the SPCBs by December, 1991. The study on the organization and management of the four State Boards was completed in April 1994 and was subsequently discussed in a workshop, but no specific action plan evolved from it, perhaps because of frequent management changes in MoEF and SPCBs. Nevertheless, indicators of changes in geographical coverage, staffing, regulatory activity, productivity and budget between 1990/91 and 1998/99 show that all four state boards increased their regulatory activity, expanded their geographical coverage, and increased productivity through a combination of regionalization, delegation of functions, simplification of consent procedures, and computerization of operations. It must be noted however that most of these changes were in response to court rulings/interventions and not directly attributable to this Project.⁵ Finally, total revenues of the Boards in real terms increased 3 to 7 times, without increases in budgetary appropriations, partly as a result of water cess

⁴The Input-Output-Outcome-Impact framework defines these terms as follows: **Input** (resources provided or actually used under the project); **Output** (the immediate goods or services provided by the project); **Outcome** (the immediate results of the project); **Impact** (the longer term results) (Ref: *Pollution Prevention and Abatement Handbook 1998, Toward Cleaner Production, The World Bank in collaboration with UNEP, UNIDO*)

⁵ For example, the Gujarat Board was forced to recruit a significant number of scientists because of the High Court orders.

increases promoted under the project. In fact, three out the four states have become financially self-sufficient (Part I, paras 20-26).

9. In several important areas, however, implementation of proposed changes has been limited: they include strengthening of the planning function, sub-contracting more routine monitoring activities, and technical assistance to small-scale industry. Furthermore, with the exception of Gujarat PCB, the other three SPCBs have made limited progress towards changing staff skills mix to a greater share of technical and scientific staff. None of the boards has increased compensation levels adequately to attract a cadre of competent environmental specialists. Finally, none have been transformed into autonomous agencies or other legal forms permitting increased administrative and budgetary autonomy.

10. With respect to the Institutional Strengthening Component, the training program and facility upgrades were implemented but procurement of the equipment was considerably delayed and most equipment was only received during the first quarter of CY1999. In line with the Appraisal estimates, 27 CETPs were actually appraised and implemented under the project, processing effluent from close to 4,000 mostly SSIs. IDA funds were also channeled to 26 additional CETPs, which did not use the line of credit through IDBI under the project. IDA funds for carrying out feasibility studies were extended to another 25 CETPs. Sixty-nine individual investment subprojects were implemented by enterprises, which borrowed project funds through the two DFIs, committing all the funds to medium and large-scale industries, mostly in the chemical and related sectors and in the four states, which were considered priority states in the Appraisal Report. Nine demonstration subprojects were implemented. Besides the state boards staffing and organization study, twelve other studies were financed under the project, including pre-investment studies, multi-client environmental and risk and hazard analysis studies, epidemiological studies, and one study to develop environmental performance indicators and to carry out an *ex-post* evaluation of the project. (Part I, paras 30-46).

Benefits and Outcome

11. Compliance rates by large industries in 17 categories of highly polluting industries have increased significantly in all of India, including in the four project states. With respect to small-scale industry, SPCBs, in response to pressures from Courts, have made major advances in the establishment of CETPs in industrial estates. When the project started, there were some CETPs being planned but none were under construction. By the project closing date, a total of 53 CETPs had been constructed or were under implementation in India, including 44 in the four targeted project states (Part I, paras 55-57). These are indicators of increased enforcement actions by project-supported SPCBs.

12. Except in a few cases, most CETPs are only in partial compliance with the SPCBs' standards, are not operating according to the design specifications, and may have a much shorter life than planned. They generally have been successful in addressing the issue of pH Chemical and Biochemical Oxygen Demand (COD and BOD), but have yet to address concerns related to Total Dissolved Solids (TDS), effluent sludge, heavy metals and organic chemical parameters. CETPs face a number of difficult issues associated with member compliance with pre-treatment requirements, design criteria, ownership model and institutional structure, and setting of equitable cost recovery systems. However, it is possible, in light of experiences gained thus far to develop appropriate models and correct these deficiencies. This aspect should be addressed by the ongoing IPP project. (Part I, paras 58-69).

13. With respect to individual investments, many individual subprojects appear to have generated their intended benefits, whether in respect of legal compliance, resources and/or energy savings,

waste minimization through recycling of wastes, or cleaner technology. There was a significant investment in the chemical-allied industrial sectors such as cement, caustic soda, distillery, manmade fibre and paper and pulp, across a wide range of installed capacities. It is questionable, however, whether these investments were made mainly due to the availability of subsidized funds (in terms of interest rate and repayment period) or due to rising regulatory pressures or due to both.⁶ The individual investments included a wide variety of projects focussing on conventional end of pipe pollution control, waste utilization and/or energy recovery and pollution prevention. Besides, there were more than 40% of individual investment projects where foreign technology was deployed. In this sense, the project was useful in introducing newer pollution abatement technologies in India. The *impact* of the project would have been far-reaching and sustainable if efforts had been made at outreaching these technologies. Fact sheets or some form of sector-specific simple guidance manuals may have been useful in documenting and disseminating the lessons learned.

14. The demonstration projects failed to address the needs of small and medium scale industries. Most of the beneficiaries of the grant assistance were large companies. Further, there were significant procedural delays. With respect to most demonstration projects, there are no reasonable prospects of replication. Moreover, five out of the nine sub-projects were already under advanced implementation when they were approved, casting doubt about the addition of benefits brought by including them under the project. In almost all cases, there are no clear plans for the dissemination of results (Part I, para 73).

Main Factors Affecting Project Implementation

15. Serious delays in implementation of the Institutional Strengthening Component led to a nine-month extension of the closing date. There were extraordinary delays in the procurement of equipment for the institutional strengthening component, and most of the monitoring and scientific equipment was still only being received by the closing date. A large number of these instruments have not yet been put to any use as these are still held up with Customs. The procurement process was deeply flawed throughout implementation, due to poor management by MoEF, Central Pollution Control Board (CPCB) and the procurement agents (Part I, paras 77-78).

16. CETPs were affected by a number of factors which slowed down their implementation and led to cost overruns: difficulties in getting groups of small companies to form companies and collecting equity, lengthy approval procedures, and, mainly, delays in obtaining the release of state and central subsidies. Implementation was further complicated by a requirement that all CETPs could be appraised technically only by NEERI, and financially by IDBI even though many industries chose to seek alternate sources of finance for obtaining loans due to copiousness of the procedural requirements being sought by IDBI. Considerable confusion was also created by MoEF's unilateral decision to allocate IDA funds to about 60 CETPs that were not appraised by IDBI. (Part I, paras 80-81). As a result, the financial appraisal of these additional CETPs was not done in accordance with Bank's requirements. This also led to incomplete information collection.

17. Commitment of the lines of credits through DFIs for individual investments was very fast: by mid-1994, or two and a half years after effectiveness, all IBRD funds were committed. The main

⁶ It must be clarified here that due to the fixed rate of interest, there were situations where a preference was shown by the individual industries to seeking loans under IPC, when the market rate of lending was higher than 15.5%. Conversely, when the market rate of lending was lower than 15.5%, industries effected cancellation of the loans with the DFIs. The interest rate on the sub-loan (15.5%) under IPC was originally conceived to be an attractive rate. However, the effective interest rates spiraled to 19-21% during certain periods. This was because there were delayed reimbursements by GOI / World Bank to the DFIs.

reason for such fast commitments was the interest rate differential which, developed between the project on-lending rates and commercial rates. This differential was not intended in project design. The on-lending rate of 15% (or 15.5%?) specified in the Loan Agreement was the commercial rate for domestic transactions at the time of Appraisal and was subject to revisions at the request of the Borrower. However, the project on-lending rate was not revised when commercial rates increased (Part I, paras 82-84). The DFIs appear to have extended loans mostly to their regular clients or blue-chip companies to ensure lower credit risks.

18. Approval of demonstration subprojects suffered considerable delays, and the first subprojects were approved over four years after effectiveness. This was due to cumbersome approval procedures and the inability of IDBI to identify eligible sponsors, since its client base consists of medium and large-scale enterprises with assets above the specified limit. After the limit on industrial size, measured by fixed assets was removed, 12 subprojects were finally approved between 1996 and 1998. Three were subsequently withdrawn; five were existing subprojects which were already well under implementation – for these, the project merely substituted grants for other existing sources of funds (Part I, para 85).

19. Except for the SPCBs Staffing and Organization Study, which was completed about two and a half years behind schedule, no progress was made to contract the other studies until the beginning of 1997. This component appears to have suffered from a general lack of attention by the Implementation Cell (IC) in MoEF, lack of coordination between MoEF and CPCB, and low priority given by IDBI and ICICI to utilize the project funds to strengthen their environmental capabilities (Part I, para 86).

Project Sustainability

20. Sustainability of the investment components would largely depend on the ability of SPCBs to maintain pressure for compliance through regular monitoring activities, agreed self-compliance programs and enforcement actions. Large and medium-scale industries have significantly improved compliance since 1991 mainly under pressure from Courts. Thus the improvement has come about more out of a reaction to judicial pressure, rather than as a result of, a strategy that is backed by appropriate policy instruments. Sustainability of CETPs is uncertain despite the emphasis which Courts and SPCBs are placing on their establishment and satisfactory operation as a solution to pollution created by small-scale industries. The CETPs' long-term environmental and financial sustainability is critically dependent on programs to resolve outstanding problems, including:

- sludge disposal⁷,
- deficiencies in management and institutional responsibilities,
- changes in cost recovery mechanisms to ensure that members are paying the full equitable cost of treatment based on their pollution load and to provide incentives to pollution prevention.

⁷ It may be noted here that (i) the project was designed to finance the design and implementation of CETPs for the treatment of wastewater and *solid materials* at industrial estates. (Refer SAR, 1991). Thus the issue of solid wastes was addressed in project design. (ii) the Hazardous Waste (Management) and Handling Rules of GOI that require sound disposal of effluent sludge as well was in place since 1989. The lack of consideration of sludge management in the design and financing of CETPs is therefore clearly an oversight in project implementation.

The large variety of experiences now available in India could permit resolution of the above problems. If the IPP project undertakes a consolidation of CETP experience and introduces a retrofitting activity to this effect, then in the long run, the CETPs could potentially become sustainable. The IPP project may also consider consolidating the experiences from the IPC and develop fact sheets / manuals so as to institutionalize CETPs. This will contribute greatly to ensuring the sustainability of CETPs. Finally, sustainability of achievements of most demonstration subprojects is unlikely, as many have not stabilized and have not organized dissemination efforts to ensure replicability (Part I, paras 87-88).

21. *Sustainability of the institutional strengthening component is also unlikely.* In general, not enough technically qualified and trained staff have been brought in, and critical enforcement and regulatory requirements remain unmet. Despite long delays, the equipment received should improve the monitoring and analytical capabilities of participating boards – though again, assuming that adequate staffing and budget for Operation & Maintenance are assured. The SPCBs made substantial progress towards financial self-sufficiency, but it will be imperative that these funds be used wisely. Specifically, effectiveness of the boards needs to be enhanced in the area of strategic planning and management. Their administrative autonomy needs to be increased. Changes in national policies allowing boards to impose heavy financial penalties on defaulters and a functioning system of effluent charges based on pollution load would considerably enhance their effectiveness (Part I, para 89).

22. For the institution building aspect of this project to be truly sustainable, the project would have had to not just strengthen the relevant authorities to design strategies to implement court orders. It should have gone beyond this by building the capacity to anticipate challenges and avoid the need for court orders by designing improved regulations and enforcing them. The capacity building would have been more effective had the guidelines provided under the section "Sector and Financial Intermediary Lending" in OD 4.01 been followed. It may be noted here that IDBI actually trained 400 of its staff with the assistance of IIT, Mumbai using the project funds. ICICI also trained some of its staff but on a lower scale. However the thrust of the training programs was not in line with the guidelines provided in OD 4.01. Even today the environmental and social appraisal process has not been institutionalized at both the DFIs.

Bank Performance

23. Overall, *Bank performance was not at its best.* During preparation, the Bank failed to anticipate implementation difficulties that could have been foreseen and avoided by suitable project redesign. The Appraisal report did not define specific performance indicators. and hence there was no program that ensured adequate generation and evaluation of data that could be used to assess the true project performance. The project was categorized as C that underplayed the level of environmental appraisal it deserved. During implementation, most major issues were identified in the course of supervision, but the Bank did not always pursue their speedy and complete resolution. These include problems associated with procurement of equipment for SPCBs. The Bank used financing intermediaries such as IDBI and ICICI as DFIs for the investment component. It did not however follow the guidelines provided under the section "Sector and Financial Intermediary Lending" in OD 4.01 to the fullest extent to ensure sustainable performance in environmental appraisal of investment projects.

24. With respect to the investment component there was an absence of a programmatic approach. The Bank spent considerable staff and consultant time in supervising and evaluating experience. For instance in the case of CETPs, Despite having identified lack of proper sludge disposal as one of the problems, the Bank did not press for the incorporation of sludge disposal investments in subproject designs. With respect to individual investments, Bank missions never reported that

subloan interest rates had become *de-facto* substantially subsidized (Part I, paras 82-84). The demonstration project sub-component suffered several design flaws (Part I, para 74). In addition, the decision to remove the cap on fixed asset value was not supported by adequate efforts to ensure replication.

25. Though a large number of training programs were organized at SPCBs, there was no comprehensive evaluation of the usefulness of training delivered so as to influence need based design of training programs during the course of project. (Part I, para 31). The technical assistance component suffered considerable delays and was greatly underutilized, although a number of prospective studies had been identified at appraisal (Part I, para 46).

Borrower Performance

26. *Performance of MoEF was inadequate.* Failure by MoEF to provide adequate project coordination and monitoring structures is largely responsible for the delays and poor reporting and communications. MoEF did not develop adequate project management system, including proper systems of approval, compilation and reporting. Also MoEF did not develop performance indicators until shortly before loan closing. MoEF did not comply with the Loan Agreement when it committed and in some cases disbursed IDA grants for CETPs that were not appraised by IDBI, and without requesting the Bank's formal approval. Inter-agency coordination mechanisms were cumbersome, and the disbursement process was slow. Performance of the two DFIs was satisfactory to the extent that they committed and disbursed funds within the specified time frame to subprojects complying with the established eligibility criteria, and met their obligations under the Loan and Project Agreements. While they promoted environmental training of their staff, sometimes out of their own resources, neither DFI substantially strengthened their environmental capabilities and they do not yet have dedicated environmental group. IDBI's performance on CETPs and demonstration subprojects was less than satisfactory. Finally, frequent shuffling among senior officials in MoEF as well as at the State-level did not provide the continuity in dialogue and action which was needed for more thorough implementation of recommendations of the SPCB Staffing and Organization Study (Part I, paras 92-94).

Assessment of Outcome and Impact

27. The picture that emerges from the project is mixed: overall, in terms of its original objectives, the outcome of the project is generally satisfactory with respect to *physical outputs* (Table 1) Because of the flaws in the project design, supervision and coordination, however, these *physical outputs* may not lead to intended *environmental gains or impacts* in the long run. There is a need for several retrofitting actions, which may perhaps be taken up in the ongoing IPP project. These actions would need to utilize the experience evolved out of the CETPs, address barriers identified in institutional strengthening and take up needed implementation of enabling policy measures. In their absence, the Project's sustainability is unlikely and much of the outputs will remain only as a learning experience to all project participants and stakeholders. Bank performance was marginal in light of a number of serious lapses: excessively broad investment eligibility criteria, poorly designed interest rate covenant, non-reporting of interest rate subsidies during implementation, and failure to press for incorporation of sludge disposal in subproject designs. In addition, Demonstration projects are not replicable and there has been no follow-up on technical assistance studies. The Borrower's (GOI) performance was satisfactory in terms of securing counterpart funds from the state governments, but deficient with respect to procurement and project coordination and management. Performance of the DFIs was satisfactory with respect to their commitments under the Project Agreement, but was unsatisfactory with respect to building-up their own environmental capabilities under the project. Performance of SPCBs was satisfactory, to the extent that they provided all the required counterpart funds for the Institutional

Strengthening component (not difficult in light of the increased funds available from the water cess) and showed institutional improvements during the project implementation period (Part I, para 97). Most of this was in response to court orders, however, and three out of four SPCBs did not, in fact, increase their technical capacity enough to significantly improve their policy making and enforcement capacity. As mentioned, the incremental benefits from demonstration subprojects are questionable, as well.

Future Operation

28. Unfortunately, the design of the follow-up project (the Industrial Pollution Prevention Project) followed the same pattern as this project, and it will be difficult to turn it around. In light of the many difficulties with this project, the follow-up project was approved prematurely. Without subsidies, the credit lines under the follow-up project are predictably not moving, confirming the observations made above with respect to this project.

29. To ensure the sustainability of the IPC project and consolidate its achievements, a number of actions are recommended, some of which have been included as part of the follow-up Industrial Pollution Prevention (IPP) Project:

- (a) GOI should consider the enactment of legislation to create emission charges based on pollution load and allow SPCBs to impose high financial penalties on defaulters;
- (b) Increased decentralization of priority setting, and planning and decision-making to the state level should be promoted;
- (c) Each of the state governments and SPCBs should prepare and carry out a specific action plan to further implement the recommendations of the State Board Staffing and Organization Study;
- (d) Guidelines for CETP design (including sludge management), operation and management (including cost recovery); should be developed. Standards for CETP (both influent and effluent) should be reviewed in terms of relevance and practicability. (e) CETPs that have design (e.g. sludge management) and operational deficiency (including cost recovery) should be examined for technical assistance.
- (f) For individual investments, emphasis should turn to medium and small-scale industry. whether or not they are part of CETPs. From this perspective, the choice of DFI may be re-visited. Under the IPP project, technical assistance funds are available for extension services and Waste Minimization Circles focusing on small-scale industries, but individual investments continue to focus on large-scale industry (Part I, para 98). For medium to large industries, efforts should be made towards promotion of voluntary initiatives rather than providing direct financial assistance. It may also be useful to review the eligibility criteria for the investment component to stress the need for a multimedia approach.
- (g) Operation of facilities is as important as investment if real environmental benefits are to be achieved as a result of installation of pollution abatement measures. It is recommended that efforts be made to establish training and certification of pollution abatement plant operators.
- (h) To facilitate effective dissemination of the experiences of the IPC Project particularly with respect to the investment component, fact - sheets or guidance manuals maybe developed for technologies introduced through individual industry projects, demonstration projects and CETPs.
- (i) One of the high priorities should be to build the environmental capacity in the financial intermediary institutions, especially at the two DFIs viz. IDBI and ICICI.
- (j) It is important that IPP project sets quantifiable environmental performance indicators and initiates collection and analyses of data to this effect. This will allow more effective evaluation

of IPP unlike IPC. The performance indicators developed towards the end of IPC project may be useful for such an exercise.

Key Lessons Learned

30. A number of lessons may be drawn from this project. The institutional strengthening and technical assistance components should be complementary to – or better, be built around – the investment component, and concrete implementation programs should be agreed with the borrower at the time of project preparation. In the design of institutional strengthening components, organizational studies should be followed by the preparation and implementation of specific action plans within a specified time frame; and procurement of equipment should be decentralized to beneficiaries (Part I, para 99).

31. With respect to CETPs, before new CETPs are established, a model should be developed addressing issues of design, scope, management, ownership and cost charging systems to ensure their sustainable and equitable operation in the particular circumstances. Project design should include all investments necessary to contain pollution, including for sludge management. CETP management should have sufficient powers to act against firms not complying with their pre-treatment obligations or in default on their payments. All CETPs should have a professional management team with responsibility for their establishment and operation, and private efforts to organize, own and manage CETPs for profit should be encouraged, as long as their clients are well represented in the company's board of directors to avoid risks of monopolistic behavior. Subsidies, if any, should be limited to investment and accrue only to SSIs. On the other hand, medium- and large-scale enterprises should not be forced to participate merely to get financial equity participation. The cost recovery system should be equitable, take into account pollution load, and provide incentives to members for water recycling and waste minimization. Technical and financial clearances to the extent possible should be delegated to more than one institution in order to reduce delays and facilitate access to funding through DFIs (Part I, para 100). A prerequisite to such a decentralization is however establishment of a clear process guidance framework and training.

32. Environmental lines of credit have been shown to rarely contribute to improved environmental outcomes in the long run unless, the policies responsible are modernized, well supported with regulatory, economic and market-based instruments, public awareness and education efforts and appropriately communicated. Large, well-run industries can afford to make the necessary investments, drawing on well-established lines of credit. Small industries typically do not avail themselves of environmental credit lines unless they are subsidized, in which case they often only take the money in order to comply with court orders. Poor operation and maintenance on the part of the small industry, combined with lax enforcement by the environmental authorities, often undermines the benefits of these subsidies. All of this points to the fact that it is the quality of management and other “intangible” factors that influence the environmental performance of industries, not the availability of ear-marked credit lines. This places all the more pressure on well-designed technical assistance and institution-building activities, which harness the ingenuity of industries to improve their management – and indirectly improve their environmental performance (Part I, para 101).

33. At a minimum, credit line eligibility criteria should specifically exclude pollution control facilities of new plants or capacity expansion units, and subprojects which have already secured financing from other sources and are under implementation should be excluded. Sub-project appraisal should ensure that investments are addressing the entire pollution issue and are not resolving a pollution problem just by shifting it to a different medium (*i.e.*, from liquid effluents to solid waste). Early during project implementation, financial intermediaries should be required

to develop an in-house environmental group capable of appraising the environmental soundness of projects, supervise implementation, and monitor the environmental performance of their clients. Access to World Bank financing – if at all – should be confined to financial intermediaries capable of reaching small- and medium-scale clients, as large scale industry has access to alternative sources of funds. With respect to overall management of the project physical and financial reporting systems should be agreed upon at appraisal, and financial criteria and monitoring indicators and the frequency of the reporting should be agreed before project implementation starts. During implementation, Bank missions should include a financial management specialist to review the adequacy of financial reporting systems (Part I, para 102).

34. For Demonstration Projects, agencies responsible for promoting demonstration projects should not be financial intermediaries, but agencies capable of administering a competitive grant program. Eligibility criteria for demonstration projects should include provisions for Intellectual Property Rights over results and should require a commercialization and dissemination program.

Conclusion

35. In many ways, the sum of these observations confirm the Bank's findings in other sectors: without an adequate policy environment and appropriate incentives, investment projects (with incidental technical assistance components) are not likely to achieve their intended objectives – certainly not in a sustainable manner. To the extent this was known in the early days of the project, a systematic restructuring effort (above all a downsizing of the project) would have been beneficial. As a pilot, this project would likely have been useful to experiment with, and identify, the most suitable environmental policy measures for the longer term. This approach appears not to have been chosen, in part because of a preoccupation – both inside the Bank and with the Borrower – with project size and the need for disbursements.

PROJECT IMPLEMENTATION REPORT
INDIA – INDUSTRIAL POLLUTION CONTROL PROJECT
(Loan 3334-IN and Credit 2252-IN)

PART I: PROJECT IMPLEMENTATION ASSESSMENT

A. Project Objectives

Original Objectives and Changes During Implementation

1. The project's overall objective was to support the Government of India's efforts to prevent and alleviate environmental degradation caused by industrial operations and assist in the successful attainment of the proposed short and medium-term targets of its environmental policy. The project was therefore designed to assist in identifying and implementing a cost-effective program for industrial pollution monitoring, control and abatement.
2. The project's specific goals were: (i) to promote effective and timely enforcement of existing legislation on environmental protection regarding industrial sources; (ii) to support efforts by industry to comply with existing environmental regulations, including a special effort designed to reach the small scale industry through the setting up of common treatment facilities and (iii) to support assessments, extension services and research in waste minimization, resource recovery and pollution abatement in industry.
3. The project comprised: (a) an institutional component designed to strengthen the Central and State Pollution Control Boards in four states (Maharashtra, Gujarat, Tamil Nadu and Uttar Pradesh); (b) an investment component, through two Development Financial Institutions (DFIs), designed to support efforts by industry to comply with regulations, including support for the set-up of common effluent treatment plants (CETPs); and (c) a technical assistance component for the assessment of environmental problems and the development of suitable responses. The investment component was to finance sub-loans and sub-grants for: (a) the establishment of CETPs, mainly for small scale industries (SSIs) at sites with a heavy concentration of chemical industries, (b) individual projects undertaken by polluting enterprises in the chemical and related sub-sectors for waste minimization, resource recovery and pollution abatement; and (c) demonstration projects.
4. The objectives were consistent with the Bank's country strategy at that time. Bank lending to industry, and IDA grants for CETPs – mainly for SSIs – were viewed as important in accelerating the resolution of critical pollution problems at a time when the regulatory system and institutional arrangements for effective enforcement and compliance were inadequate in India. In parallel, the institutional capacity of State Pollution Control Boards (SPCBs) would also be built-up under the project. In line with its objectives, the project supported the enforcement strategy of GOI and the state governments
5. Through extensive discussions during project preparation, the project also supported several policy objectives, which were recorded as Government commitments in the Minutes of Negotiations. These included: (a) issuing a Policy Statement for the Abatement of Pollution; (b) increases in the level of water cess; and (c) initiation of a switch from concentration-based to load-based pollution standards.

6. There was only one change in project objectives during implementation, which required amendment of the Development Credit Agreement (DCA): in November 1995, a component was added to strengthen external portfolio management by providing computer and communication systems to the Department of Economic Affairs (DEA) and an amount of US\$2 million of IDA funds was reallocated from the investment components to this activity.

Evaluation of Project Objectives

7. The objectives were clear and important in the Bank's country strategy at the time. Bank lending to industry and IDA grants for CETPs for the small-scale sector were viewed as important in accelerating the resolution of critical pollution problems, given the inadequacy of the regulatory system and of institutional arrangements for effective enforcement and promotion of compliance. The project's focus was on the chemical and related industries, identified as a group, as a major source of industrial pollution in the four project states. In parallel, the institutional capacity of these four State Pollution Control Boards (SPCBs) would be built up. In line with its objectives, the project supported the enforcement strategy of Government of India (GOI) and the state governments, and, after 1994/95, the execution of important Court decisions concerning the establishment of CETPs for small and medium industries. However, today, the policy and institutional objectives of the project appear to have been too modest, as, although the most important issues in the institutional and policy framework were identified, the project did not include instruments to ensure that they are addressed during implementation. Furthermore, Bank lending to large industries is not justified because when it is unsubsidized (as it should be), and requests for subloan funding are carefully scrutinized, Bank funds are not attractive to industry, which has access to other more flexible sources of funds. The impact of Bank lending under the project on accelerating compliance by large and medium-scale industry was clouded by the issue of subsidized interest rates which crept into the project during implementation, and is likely to have led to substitution of funds. In particular, the fact that: (i) a number of these sub-projects utilised the Bank line of credit to re-finance their commercial loans; and (ii) sub-loans were used to finance pollution control facilities of new investments and/or capacity expansions – activities which should have been included in the overall scope and financing plan of the project – raises doubts about the need for at least part of this lending operation.

B. Achievement of Objectives

8. Over the years the Bank has shifted its own emphasis in monitoring projects from *inputs and outputs*⁸ to *outcome and impacts*. In the present case however, the project design and much of its implementation and supervision focused more on *inputs and outputs* and less on *outcome*. The measurement of *impact* was not considered at any stage of the project. In fact, the project did not have any environmental performance indicators as well as supportive management information system developed as part of its design. Hence, although the progress on achievement of objectives in terms of *physical outputs* has been satisfactory, the *project outcomes and impacts* that ensure the project sustainability, are difficult to assess. This has been one of the major impediments in assessing the achievement of project objectives.

⁸ The Input-Output-Outcome-Impact framework defines these terms as follows: **Input** (resources provided or actually used under the project); **Output** (the immediate goods or services provided by the project); **Outcome** (the immediate results of the project); **Impact** (the longer term results) (Ref: *Pollution Prevention and Abatement Handbook 1998, Toward Cleaner Production, The World Bank in collaboration with UNEP, UNIDO*).

9. While the project did not include covenants related to policy changes, several important policy issues were discussed and recorded as GOI commitments at negotiations. They related to: (a) issuing of a Policy Statement for the Abatement of Pollution; (b) increases in the levels of water cess; and (c) initiation of a switch from concentration to load based pollution standards and were reflected in the draft Loan Agreement either as covenants or as conditions of Board presentation. However, they were dropped from the Legal Agreements at negotiations and were recorded in the minutes of negotiations as activities that the Government had the intention to implement. These policy objectives were substantially achieved and progress has been made in the implementation of the Policy Statement. It would be inappropriate however to attribute much of the above progress solely to this project. Many of the major policy decisions were taken in fact as a response to public pressure and court mandates and in some cases, implemented as a part of an independent updating exercise. Somehow the project design was not tuned for effective implementation of the proposed short and medium-targets of GOI's Policy Statement for Abatement of Pollution, although this was the principal objective of the project.

(a) Policy Statement for Abatement of Pollution.

10. The framework of incentives for compliance was reviewed by a mission in February 1990, which identified a number of gaps and weaknesses in it, in particular with respect to lack of financial incentives for compliance. The GOI prepared a draft Policy Statement which was discussed at a workshop in August/September 1990 in India, and at negotiations in Washington (April 1991). During negotiations, GOI informed the Bank of its intention to issue the policy Statement in that same year. However, a revised draft Policy Statement was given to the Bank prior to the Board presentation and was officially released in July 1992.

11. Besides clearly reaffirming the Polluter-Pays Principle, the Statement outlined a number of steps to prevent pollution; encourage the adoption of best available practical solutions, in particular by providing assistance to the small-scale industry; focus protection on heavily polluted areas and rivers; revise standards to introduce load-based standards and economic incentives for compliance (effluent charges); increase self regulation through environmental audits; promote public partnership; improve public awareness and information; and improve inter-agency coordination.

12. Annex 1, Table 1 presents the main policies in the Statement and progress made so far towards achieving them. There have been significant advances in identifying and developing programs in critical industries, areas and rivers; in assisting small-scale industry for adoption of clean technologies and pollution abatement; in developing load-based national standards and public liability regulation; in improving policies and regulation for siting of industry through a better EIA review process and the preparation of zoning Atlases; in increasing self-regulation by making environmental audits compulsory for 17 categories of industries; and in improving the release of information to the public.

13. However, there remain some important areas where progress has been slow. Two areas, especially, deserve priority attention: (a) integration of environmental concerns in development projects by local administrations, in particular municipalities, which is still weak, and much remains to be done to develop programs to curb growing pollution from domestic sewers and solid waste; and (b) economic incentives for better compliance have yet to be developed and applied. The lack of progress in the development and testing of economic incentives for better compliance, which were identified since 1990 as lacking in the policy framework and were an objective in the Policy Statement, continues to seriously undermine the effectiveness of environmental regulatory agencies actions.

14. Regarding the development of economic instruments, so far, there appears to have been no progress in developing a system of effluent or emission charges based on pollution load, high enough to encourage pollution prevention and abatement, starting in critically polluted and sensitive areas. Following a study which was carried out in the framework of preparation of the Industrial Pollution Prevention Project, a Government Task Force was formed in March 1995 to examine the feasibility of different types of economic instruments for industrial pollution abatement and to develop a plan of action for their selective introduction. Although the task force completed its work in March 1997, its report was only issued in March 1999. The Task Force recommended: (i) a substantial increase in the price of clean water to industry; (ii) detailed industry-specific studies to be carried out to set-up pollution charges; (iii) the introduction of tradable permits on a pilot basis; and (iv) changes to the legal framework to give power of enforcement to SPCBs. However, the report does not include a timetable for these actions.

15. Furthermore, the effectiveness of SPCBs continues to be hindered by the low levels of fines and penalties. Fines need to become high enough that the cost of non-compliance becomes higher than the cost of compliance. Currently, the only effective administrative sanction that SPCBs can impose is to order suspension of utility (power and water) supply to defaulters in industrial estates. Low levels of financial penalties is also resulting in heavy reliance being placed on criminal (as opposed to civil or administrative) law as the primary enforcement vehicle. This raises both the time and cost of enforcing the law and reaching negotiated settlements, due to associated lengthy court proceedings and exacting requirements. Raising fines and financial penalties would help "decriminalize" violations and rely more heavily on civil and administrative legal procedures for enforcement. This would also help expanding the role of NGOs in monitoring and enforcement and increasing delegation of monitoring functions to third parties.

16. Enactment of regulations permitting effluent/emission charges based on pollution load and high administrative fines would also reduce dependence of SPCBs on resources such as fees charged for analysis, which create incentives for them to expand their own laboratory infrastructure rather than implementing a system of accreditation of private or other institutional laboratories.

(b) Water Cess

17. Water cess is a charge levied by SPCBs on water consumption from municipal water and sewerage companies and 16 categories of industry and other large users of water. Eighty percent of the proceeds of water cess collected is returned to SPCBs as a source of funds for their operation. The low levels of cess was identified during project preparation as a major obstacle to the Boards becoming financially more self-supporting. A substantial increase in water cess rates was proposed as a condition of Board presentation, but, at negotiations, this condition was eliminated as the Government informed the Bank that the increase could only take place after elections, as part of the 1991/92 Budget Statement, which had been deferred. Water cess rates were increased, effective February 1992. The increase was substantial: while the standard rate doubled, the effective increase was higher, up to six times for those not complying with the provisions of the Water Act and GOI's standards. Changes in cess rates are presented in **Annex E**, Table 2. Changes in amounts of water cess collected and returned to SPCBs in India and in the four project states are presented in **Annex E**, Tables 3 and 4.

18. The impact of this increase on SPCB's finances was significant: for the four beneficiary SPCBs -- which account for about half of total cess collected in India -- funding from cess reimbursement increased 4 times in real terms between the average of the three years preceding the increase (1988/89 to 1990/91) and 1997/98. This was the result of the rate increase but also

of stepped-up efforts at improving collection, which has doubled since 1992/93; increases in the share of cess transferred to SPCBs and reduction in delays in refunding the Boards for their share by the Central Government. Cess has become one of the major sources of funding for them, and has significantly contributed to their progress towards self-sufficiency and, for many, to the virtual elimination of direct budget allocation by the central and state governments. The GOI is currently considering a three-fold increase in cess rates to allow SPCBs to step up their activities significantly. However, cess remains considerably below the opportunity cost of water treatment and should be significantly increased and differentiated to provide effective incentives to reduce water consumption (through recycling) and liquid effluents.

(c) Load-based Standards

19. Reliance on concentration-based standards was identified during preparation as insufficient to ensure a decline of pollution in a fast growing economy and a gradual shift to load-based standards was advocated. The draft Loan Agreement at the time of negotiations included a covenant calling for the commissioning of a study to review discharge standards and eventually shift them to a load basis, when adequate. At negotiations, GOI informed the Bank that MoEF had decided to shift towards load-based standards and had issued the first set of such standards (for the pulp and paper industry). Since that time, national pollutant-specific load-based standards have been issued for eleven categories of industries, and wastewater maximum volume discharge standards have been issued for 12 categories of industries. A list of these industries is provided in Annex E, Table 5.

Institutional Objectives

Strengthening of State Pollution Control Boards

20. As commented later in this report, due to delays in procuring most of the needed equipment, the project has not so far fully achieved its objective of strengthening SPCB's analytical and monitoring capabilities. The project also aimed at contributing to their overall strengthening through a comprehensive training program as well as carrying out an organization and staffing study, which were implemented.

21. During preparation, a number of deficiencies were identified in the organization, staffing and funding mechanism of the four SPCBs. Important functions, such as planning, research, and environmental education, were either inadequately represented or were completely absent. The overall staffing was insufficient; staff were unevenly distributed between states and regional offices and they did not have adequate skills mix and training. The remuneration for staff was low which resulted in lack of incentives to perform well and there were limited career opportunities. Furthermore, SPCBs, as bureaus within the civil service, had low status and lacked autonomy. Finally, it was viewed that SPCBs need to become financially more independent and also increase their efforts at collecting revenues and charges.

22. A study of the organization and management of the four State Boards according to the terms of reference agreed upon at negotiations was to be completed by December 1991. GOI formed a committee to carry out the study, which was completed in November 1992. However, the Bank judged that the report did not adequately fulfil the terms of reference, hence a second study was contracted to the Administration Staff College of India (ASCI), which submitted its report in April 1994. A workshop was organized in Hyderabad in February 1995, and representatives of MoEF, the Central Pollution Control Board (CPCB), and the four SPCBs, ASCI and the Bank (as observer) participated to discuss the recommendations of the study and prepare an action plan. While the workshop generally endorsed the recommendations of the study and produced

recommendations for endorsement of senior officials of state governments and MoEF/CPCB, it was not followed up by the development of concrete plans specific to each board. MoEF had agreed to follow-up on implementation of the workshop recommendations, but did not report any further on it. It is thus difficult to assess the extent to which the study itself motivated the changes in SPCBs which took place subsequently. It is likely to have been one of the contributing factors, however, because chairmen of SPCBs met every quarter either regionally or nationally to discuss policies, standards and experiences. **Annex F** lists the main recommendations of the study and presents the corresponding implementation status for each one of the four boards.

23. Indicators of changes in geographical coverage, staffing, regulatory activity, productivity and budget, from 1990/91 to 1998/99, are presented in Table 6A. All four boards have significantly increased their regulatory activity and expanded their geographical coverage. While total staff as well as technical and scientific staff have increased moderately (10% to 36% for total staff, and 17% to 35% for technical and scientific staff, except Gujarat where the increase was 97%), productivity seems to have increased substantially. Samples per staff have increased by 75% to 230% and inspections per staff by 48% to 242%. Increased productivity is attributed to a combination of regionalization (all boards have increased the number of regional offices and laboratories), delegation of functions to the regional and sub-regional levels, simplification of consent procedures, and computerization of operations. Total revenues in real terms has increased by 2.9 times (Maharashtra), 3.2 times (Gujarat), 4.7 times (Uttar Pradesh), and 6.4 times (Tamil Nadu) between 1989/90 and 1997/99. At the same time, dependence on state and central governments budget appropriations has been reduced, since state boards have maintained (Gujarat, at about 55%), or increased (Maharashtra, from 59% to 92%, Uttar Pradesh, from 77% to 100%, and Tamil Nadu from 48% to 100%) their share of resources raised from water cess, analysis charges, consent fees and interest on financial investments.

24. Increased delegation of functions to regional and subregional levels, simplification of consent procedures, and increased financial self-sufficiency, were all part of recommendations of the study. Other recommendations which all boards to some extents implemented are: (a) increased emphasis on self-regulation through time-bound agreements for compliance with industries (associated with provision of Bank guarantees); (b) establishment of environmental and public awareness and research and development units; (c) computerization of functions; and (d) promotion of CETPs in industrial estates. Moreover, some boards have also created planning units and established better procedures for EIAs.

25. However, in a number of important areas, implementation of proposed changes has been limited: (a) generally, boards did not substantially strengthen their planning function, and their priorities continue to be dictated by national programs or by the Courts (for example, the Gujarat Board was forced to recruit a significant number of scientists because of court orders). They have yet to develop a strong capacity to establish their own priorities and design and carry out corresponding programs in heavily polluted and sensitive areas; (b) boards did not significantly improve their productivity by outsourcing more of the routine monitoring activities (at least for good performers) and require more self-reporting, while focusing their own monitoring activities more on defaulters by supplementing their staff with consultants --none of the boards has established a system of laboratory accreditation except Maharashtra, which abolished it in 1997--; (c) besides promoting CETPs, board have not built up capabilities to provide technical assistance to small scale industries within or outside CETPs to inform them about options available to them and guide them on technological choices for cleaner technologies or pollution abatement; and (d) reporting on environmental quality also remains limited to mostly monitoring results produced under national programs.

26. With respect to staffing and organization, only one state (Gujarat) has substantially increased the number of technical and scientific staff (ref. para 25). The three other boards have made limited progress towards changing their staff skill mix to increase the shares of technical and scientific staff--at Appraisal, boards had estimated that they would require between 100 and 150 additional technical and scientific staff each to perform their functions. Only Gujarat has met this target (110), because of the Court order, while the other boards increased their staff only by 34, 62 and 87, respectively in Uttar Pradesh, Maharashtra and Tamil Nadu. Furthermore, none of the boards carried out the comprehensive manpower studies which should have followed the staffing and organization study, nor have they increased compensation levels to build a cadre of competent environmental specialists. Finally, none of the boards adopted corporate structure or other legal forms which could permit increased administrative and budgetary autonomy.

Strengthening of Environmental Capabilities of DFIs

27. ICICI and IDBI had expertise in finance and engineering through their normal operations in India, but very little environmental expertise, despite the fact that all new investments are required to have Environmental Impact Assessments to receive financing from these institutions. The project sought to complement the DFIs' capabilities by funding a training program for ICICI and IDBI officers on all aspects of environmental assessment of industrial projects, which they did not use partly due to poor coordination with MoEF. However, IDBI managed to organize one training program and used US\$50,000 of IDA funding.

28. In both IDBI and ICICI, technical appraisal is decentralized to branch offices. Overall project coordination at headquarters is the responsibility of departments which do not deal with technical matters. Project follow up is done by regional loan officers, but they have no expertise to assess environmental performance. Essentially, IDBI and ICICI rely on clearances by SPCBs to assess whether the investments they finance are environmentally justified, and, de-facto, all supervision in terms of pollution control is left to SPCBs. Both institutions have informed that they have carried out environmental training programs for their lending officers out of their own resources, and ICICI has stated that it is in the process of formulating an environmental and social policy. However, neither DFI has yet a specialized environmental group capable of outlining the institution's policies with respect to environmental requirements of lending, and of analyzing and monitoring the environmental justification of their projects and the environmental performance of their borrowers. The project failed to build up such capacity.

Physical Objectives

29. Physical achievements of the project are summarized in Table 5A and further detailed in Tables 5B through 5D. The Project's physical objectives were substantially achieved.

(a) Institutional Component

30. The project was to finance a program of improvements at the CPCB and the four SPCB's through a training program, acquisition of equipment, and laboratory facilities. The objectives of this component were partially met.

31. *Training.* Training was to be provided to staff of CPCB and SPCBs to upgrade their skills in four major areas: laboratory quality assurance and control; instruments use and maintenance; environmental science, and management training (in particular project management, laboratory management, reporting and planning). Most of the training was to take place in India. Overall, the training programs were substantially completed. Although funding allocation for training was not fully used, a total of 145 training programs were organized through 30 reputed training

institutions in India, between 1992/93 and 1998/99, for about 2,000 participants from CPCB and all India's SPCBs. In addition, MoEF organized three training programs abroad. The distribution of programs offered by topics is shown in Table 5B. The actual program was rather broader in scope than originally planned, but covered all the subjects in the original program and other subjects relevant to SPCBs activities. There were, however, a large number of computer applications courses (close to 30% of all courses offered) which might have been better offered locally by each board, while MoEF/CPCB should have concentrated on organizing more specialized and managerial training. There is no evaluation of the usefulness of training delivered, but SPCB officials interviewed during the completion mission generally expressed their overall satisfaction with the range and content of training programs.

32. *Equipment.* The project was to assist the Boards with a program of improvements in analytical and monitoring equipment at the central and regional laboratories of the four SPCBs. The program included analytical and monitoring instruments, air conditioning and humidity control equipment for laboratories, some office equipment as well as vehicles. Equipment totalling about US\$9.5 million, or about 110% of Appraisal estimates, were purchased under the project (the list of equipment is provided in Table 5B). However, for reasons further explained in Section C, procurement of the bulk of equipment was considerably delayed. Most equipment were received during the first quarter of 1998/99, including most of the sophisticated analytical equipment. By the closing date, this sub-component had substantially reached its physical objectives, but had made marginal impact on the strengthening capability of SPCBs.

33. *Facilities.* The project supported the provision or refurbishing of laboratory facilities in the four states. This sub-component has generally met its objectives. 22 central and regional laboratories were improved or expanded and fitted with equipment (ref para 32) to provide adequate environmental control. In Maharashtra and Uttar Pradesh, the project was also to provide adequate office space for SPCB headquarters. Such space was provided in Uttar Pradesh; however, in Maharashtra, SPCB continues to operate in its original facility which is totally unsuitable. Total spending on this activity amounted to US\$0.9 million, or about 56% of the Appraisal estimates (appraisal estimates, however, included environmental control and office equipment which are included in equipment costs).

34. A summary of costs of the Institutional Strengthening Component, by categories, is provided in Table 8B.

(b) Investment Component

35. This component was to finance sub-loans and sub-grants for: (a) set-up of CETPs at industrial estates and other sites with a heavy concentration of chemical industries mainly of small size; (b) individual projects undertaken by enterprises in the target sectors dealing with waste minimization, resource recovery and pollution abatement; and (c) demonstration projects to be selected on the basis of established eligibility criteria. The investment component targeted sectors comprising the chemical and related industries, including fertilizers, leather tanning, dyes, pesticides and insecticides, pharmaceuticals, petrochemicals, pulp and paper, and sugar and distilleries, which as a group had been identified as a major source of industrial pollution. For individual investments, these sub-sectors were not explicitly listed in the eligibility criteria, however, at negotiations, it was recorded in the minutes that the project would target the chemical and related industries as priority but other industries would not be excluded. Large and medium-scale industries were to be targeted under the individual projects (implicit in the choice of two financial intermediaries dealing only with these types of projects) while small-scale industry would be targeted in setting up CETPs.

(i) *Common Effluent Treatment Facilities (CETPs)*

36. The concept of CETP was originally promulgated in 1984 by the MOEF via the Central Loan Scheme (CLS). The CETP of Jedimetala in Andhra Pradesh was one of the first CETPs to access the CLS in 1985. The IPC Project essentially continued the CLS scheme with a ceiling on the extent of subsidy and increasing the promoter's contribution. The objective of the sub-component was to support a special effort to reach mostly the small - scale industries in the chemical sector through the setting up of CETPs to help them comply with environmental regulations. At Appraisal, it was estimated that about 20 CETPs for a total of 4,700 small - scale enterprises, processing a total of about 163,700 m³/day of effluent would be implemented under the project. Twenty-seven CETPs were actually appraised by IDBI and implemented under the project, processing about 143,000 m³/day of effluent from 3,926 enterprises. The project had allocated a total of US\$12 million equivalent of IDA funds and US\$24 million of IBRD funds to respectively finance grants (up to 20%) and subloans (up to 40%) towards the costs of these plants.⁹ Total IBRD and IDA funds disbursed for CETPs appraised by IDBI amount to about US\$13.8 million and US\$4.9 million respectively. The list of subprojects together with their costs and financing is provided in Table 8C. These 27 CETPs account for about 50% of all CETPs (53) funded under the project countrywide.

37. Beginning in early 1997, MoEF started to commit IDA funds to a large number of CETPs that were not accessing the IBRD loan component through IDBI and were therefore not appraised by IDBI. This was done without consultation with the Bank, and was apparently in response to a Supreme Court order which obligated MoEF to extend the central government subsidy to polluting industries nation-wide. The subsequent developments were as follows:

(a) the Bank appears to have been informed about these CETPs in 1997, as the Aide Memoire of the supervision mission of February 1997 includes the following observation: *“The MoEF informed that it has allocated resources of about Rs.225 million for financing of 15 CETPs in the Delhi area as a direct result of instruction from the Supreme Court. However, specific proposals for these projects have yet to be received by IDBI and the Bank. Proposals meeting agreed eligibility criteria will have to be prepared by a sponsor and appraised financially and technically by IDBI before the Bank issues its approval”*,¹⁰

(b) during the supervision mission of September/October 1998 the issue of additional 60 CETPs, for which MoEF had already committed funds, including 15 CETPs in New Delhi, was raised. However, it was not clear whether the Bank in 1997 had already agreed to take a flexible position on these CETPs. In order to help MoEF resolve this issue (which MoEF had indicated was imposed on them by the Supreme Court order), the project team requested MoEF to inform the Bank about the status of these CETPs by November 1998, with the understanding that the Bank would favorably review the situation on case by case basis for CETPs that have been completed;

⁹ IBRD allocation was reduced to US\$16 million through an amendment to the Development Credit Agreement on July 9, 1993.

¹⁰ Based on discussions with MoEF, the proponents of setting up CETPs for small-scale industries found the established procedures for approval of CETPs and eligibility criteria specified by IDBI to access the IDA and IBRD funds too cumbersome and impossible to fully comply with. Some of the constraints were: (i) long delays in inspection and approvals by IDBI, (ii) requirements for personal guarantees, (iii) high interest rates on IBRD loan, and (iv) requirement for projected financial statements and balance sheets, which many of them could not produce. Therefore, they requested MoEF to allow them to by pass IDBI, which MoEF apparently agreed to. In the meantime State governments under pressure from the Courts, contributed their share of subsidy for setting up CETPs for small-scale industries, which in turn obligated MoEF to release the central subsidy under IDA funds. MoEF has indicated that somewhere around this time they informed the Task Manager about the actions they were taking, and there was no objection from the Bank. However, MoEF did not produce any correspondence to this effect.

(c) Early in 1999, just before the closing date of the project, MoEF requested the Bank to reallocate savings under the Technical Assistance Component to be utilized for (i) granting supplementary funds to the CETPs that had received central grants at the time that the ceiling of Rs. 5 million was in effect, and (ii) enabling MoEF to fulfill its commitment to release the central subsidy – funded through the IDA component — to these 60 CETPs. The Bank informed MoEF that formal reallocation of funds right before project closing date was not warranted, but in order to free MoEF from the substantial financial liability they had created for themselves under the project, the Bank agreed to accord post-facto approval to those CETPs. However, this approval was subject to CETPs having substantially met the agreed eligibility criteria that was stipulated in the *Project Agreement*. During the wrap-up meeting of the final supervision mission and preparation for the ICR in April 1999, the Bank agreed on a timetable for review and post-facto approval of these CETPs to be completed before end June 1999;

(d) subsequently, the Bank engaged a local consultant to: (i) review compliance with the eligibility criteria and (ii) visit a sample of the CETPs to verify status of their completion and also to determine the order of magnitude of the eligible expenses that had been incurred. In the end, the Bank agreed to reimburse a total of about Rs. 184 million (equivalent to about US\$4.3 million). This covered a total of 52 out of these 60 CETPs, of which 26 were reported to have been commissioned or were about to be commissioned and 25 (including 15 in New Delhi, where cost of compound wall were also covered) were funded for carrying out feasibility studies.¹¹ A list of these CETPs and IDA allocation is provided in table 8D.

38. Table 5C provides breakdowns of the 27 CETPs, which were appraised by IDBI by size of investment, categories of industries, states, effluent treatment capacity, and member industries. An analysis of this data shows the following:

- A comparison of average CETP capacity in each sub-sector (2,400, 3,800, and 14,000 m³/day respectively) and the average number of members (53, 114 and 355, respectively) shows that the mixed chemical industry is much more concentrated in large industrial estates and thus require larger CETPs with a larger numbers of participants. However, the volume of effluent per participant in the mixed chemical sub-sector is about 39 m³/day, in line with those of the two other two sub-sectors.
- All 27 CETPs are located in the four states targeted under the project, with about 60% in Tamil Nadu (accounting respectively for 38% and 30% of credit and loan funds and 40% of subproject total costs). In comparison, only 15% of the subprojects were implemented in Gujarat, but they accounted for 42% and 58% of credit and loan funds and 47% of subproject total costs. This reflects the concentration of chemical industries in Gujarat. Also, out of the additional 26 CETPs approved by MoEF which were implemented or under implementation in the country, 15 are located in Tamil Nadu. The high concentration of CETPs in Tamil Nadu is the result of the high number of judicial verdicts by the Madras High Court in 1997, adaptation of the CETP concept, and the high concentration of small dyeing and leather/tannery industries in the state.
- Allocation of funds was relatively concentrated in the larger CETPs: about 59% of the CETPs appraised by IDBI had a total cost of less than US\$1million each, and accounted for only 38% of IDA and 8% of IBRD funds. In contrast, 7.5% (two subprojects) had a cost higher

¹¹ It should be mentioned that MoEF had already advanced about Rs. 225 million to New Delhi government for construction of 15 CETPs, and had already claimed the amount from the IDA under SOE procedures. Although, MoEF had advanced the funds in 1997, the Bank became aware of this transaction only in December 1998.

than US\$5 million and accounted for 32% of IDA and 50% of IBRD funds. In the first category, the average treatment capacity per participant was 35.4 m³/day (with a total treatment capacity of about 30,000 m³/day effluent from 848 participants), while in the second category, the average treatment capacity per participant was 63.1 m³/day (with a total treatment capacity of 71,000 m³/day from more than 1,125 participants).

- Most CETPs are relatively small: out of the 27 CETPs approved by IDBI, 19 have less than 100 participants and their average capacity is less than 2,200 m³/day of effluent. There has been a general increase in CETP membership over time. Total number of participants in all 27 CETPs as of April 1999 was 3,926, about 20% higher than in IDBI estimates at the time of subproject appraisal. Over 85% of members are small and medium-scale industries, identified as priority targets for CETPs at Appraisal (out of 3,926 participants, at least 3,350 are small to medium scale industries, the balance of 576 are mainly medium to large scale industries).
- There are substantial economies of scale: 26% of CETPs have a treatment capacity of less than 1,000 m³/day and were implemented at a very high average cost of about US\$1,000 per m³/day of effluent treated. Comparatively, CETPs with more than 10,000 m³/day capacity were implemented at a much lower average cost of about US\$210 per m³/day of effluent treated. The economy of scale is less for treatment capacities between 1,000 and 10,000 m³/day, for which the average cost was in the range US\$325 to US\$460 per m³.

39. The objective of reaching the small - scale industry through the setting up of CETPs to comply with existing environmental regulations has therefore been partially met in the four targeted project states and in 17 priority industries, but there are a number of important issues yet to be resolved which are further discussed in Paras 58 through 69.

(ii) Individual Investments

40. The project had allocated a total of US\$100 million of IBRD funds to be on-lent to individual enterprises by IDBI (US\$60 million) and ICICI (US\$40 million), to finance 80% of subloans to be approved under the project (there was a cap of US\$10 million on each subloan). IBRD funds was increased to US\$108 million in July 1993 through a US\$8 million reallocation of funds from the Demonstration and CETP subcomponents. Both IDBI and ICICI actually approved a total of 76 subloans, 69 of which were implemented and fully disbursed (as of May 1999, seven were either canceled or still pending disbursements). Total IBRD funds actually disbursed for subloans amounted to US\$102.7 million. IDBI on-lent US\$57.6 million (96% of the Appraisal estimates) and ICICI US\$45.1 million (113% of the Appraisal estimates). The list of subprojects together with their costs and financing plans is provided in **Table 8E**.

41. Table 5D provides breakdowns of subprojects by size, categories of industries, states, types of project and types of pollution. A review of these data shows that the objective of this sub-component of reaching large and medium-scale industries in the chemical and related sectors of the four most industrialized states of India has been met:

- About 74% of subprojects approved, accounting for 75% of IBRD funds disbursed, were in enterprises in the chemical and related sectors identified as priority targets at Appraisal-- all sub-projects belonged to the 17 categories of highly polluting industries targeted by GOI as priority. Among these, 11 subprojects, accounting for one third of IBRD funds, were for the replacement of mercury cells with cleaner membrane cells in the caustic soda industry;

- 62% of projects approved, accounting for 69% of IBRD loan disbursed, were located in the four project states;
- 58% of subprojects (accounting for 42% of IBRD funds), were investments for pollution abatement and resource recovery; 22% of subprojects (accounting for 36% of IBRD funds) were investments in cleaner technologies; 12% of subprojects (accounting for 13% of IBRD funds) were investments in pollution control facilities for new plants or the expansion of existing plants; and 8% of subprojects (accounting for 9% of IBRD funds) were new plants to recycle wastes;
- 43% of subprojects addressed problems related with liquid effluents, 25% with dust and gaseous emissions, 5% with solid waste, and 26% (accounting for 40% of IBRD funds disbursed) with a combination of at least two of the three (subprojects for replacement of mercury cells are included under this category). The small share of subprojects dealing with solid waste reflects SPCBs' lack of emphasis on proper solid waste handling and disposal at the time;
- 44 sub-loans implemented pollution abatement technologies with foreign collaborations. Foreign collaborations in the Chlor-Alkali industry sector were the highest.¹²
- The average subloan amount was about US\$1.7 million. However, the distribution of subloans by size was highly skewed: almost half of subloans were less than US\$1 million, but they accounted for only 13% of total amounts approved. On the other hand, 22% of subloans were over US\$3 million and accounted for close to 60% of amounts approved.

42. There is, however, an unexpected number of subprojects (10), accounting for 17% of sub-loan amounts approved, which financed the pollution control facilities of larger projects for new plants or capacity expansion units in existing plants. Although funding for large subloans (new or expansion of capacity) was not excluded from the eligibility criteria¹³ one may question the rationale for including this type of investments under the project for the following reasons. First, because they are not contributing to reducing total pollution, and second because pollution control facilities should be an integral part of new plants or expansion units and its funding should be part of the project financing package, for which commercial sources of funding are available. These subprojects have merely financed industrial capacity expansions (subprojects aiming at improving existing pollution control facilities together with expansions are not included in this category).

43. There are also indications that at least 17 subprojects, totalling about US\$24 million of IBRD funds, were re-financed, or IBRD funds were substituted for other financing, as they were completed or were nearing completion (all within four months of approval) when sub-loans were approved.

(iii) Demonstration Projects

44. The project provided direct grants for projects demonstrating new approaches or techniques potentially widely replicable in India, as prototype innovative units in the field of waste minimization, resource recovery, or pollution abatement. Grants would be justified on the following grounds: (i) risk due to technological novelty and lack of commercial scale experience

¹² Lessons Learnt from the Bank-assisted Industrial Pollution Control and Industrial Pollution Prevention Projects in India- Environmental Management Center- April 1998.

¹³ Minutes of negotiations recorded that "both new plants and modifications to existing plants are considered eligible under the new investment component".

in India, (ii) large environmental impact in surrounding areas (treatment and disposal of hazardous or toxic material), and (iii) comparatively large investments requirement from otherwise economic and efficient sponsors. The maximum grant amount was US\$500,000. However, to be eligible, sponsors' fixed assets had to be equivalent to US\$5 million or less.

45. After experiencing long delays in implementation of this subcomponent, which was associated with the fixed asset limit and IDBI's difficulties in identifying suitable candidates (Section C), the limit of US\$5 million in fixed assets was waived in 1994. However, waiver of this limit was recorded informally through the Aide Memoire and follow-up letter of the supervision mission that took place in August/September 1994. 12 subprojects were eventually approved between 1996 and 1998, of which nine were implemented and three were subsequently cancelled. Grants totalling US\$2.8 million were provided to the nine subprojects which were implemented, or 70% of the Appraisal allocation. There are clear indications however, that five out of the nine implemented subprojects were re-financed, in the sense that the sponsors had already secured the necessary funding from other sources (including loans from IDBI's own sources) and in some cases had started implementing their project when IDBI directed them to apply for grant under this project. A list of the subprojects and their cost is presented in **Table 8F**. A description of the subprojects and an assessment of their results are presented in **Table 6E**.

(c) Technical Assistance Component

46. As commented later in para 86, this component suffered from considerable delays and was greatly under utilized, although a number of prospective studies had been identified at appraisal (Annex 4.3 of the Staff Appraisal Report). Most of these studies were not carried out, at least not under the project. A list of studies carried out under the TA component and their cost is provided in **Table 8G**. A summary of their content and outcome is provided in **Table 7**. The project financed the following studies and technical assistance:

- *Preinvestment, Treatability, and Pilot plant studies and Manuals.* The project financed three pre-investment and three pilot plant studies, focused on central incineration and hazardous waste treatment and disposal, municipal solid waste processing, sewage treatment and treatment of polluted waters.
- *Organizational Study of the State Boards.* This study was prepared by the Administrative Staff College of India. The impact of this study is covered in earlier sections.
- *Training Program on Environmental Issues at the DFIs.* IDBI conducted more than 10 training programs for its staff in technologies for pollution abatement and environmental assessment. Around 400 staff were trained. ICICI trained some of their staff, albeit at a much lower scale at existing training institutions. Neither DFIs contracted technical assistance to assist in the organization of an environmental cell for promotion of environmental projects and institutionalized environmental and social appraisal in the assessment of loans.
- *Other Studies.* A study was carried out to develop environmental performance indicators for the project and to carry out an ex-post evaluation of the project (this study was completed in March 1999). Two studies were carried out to address pollution control problems and environmental assessments of groups of industries (cement industry); two area/epidemiological studies addressed area-specific environmental problems; and one study sought to develop a software for hazardous analysis.

(d) External Portfolio Management

47. In November 1995, at the request of the GOI, the Bank agreed to strengthen the Ministry of Finance's capacity for management of external assistance by making provision for purchase of equipment for Department of Economic Affairs (DEA) --including the office of the Controller of Aid Accounts and Audit (CAA&A)-- and the Project Management unit. The Development Credit Agreement was amended on November 8, 1995 to incorporate an allocation of about US\$2 million for this purpose. In March 1999, the Bank also agreed to additional allocation of about US\$108,000 out of IDA funds to finance works in the office of the CAA&A related to site preparation, such as minor civil works and electrical wiring, required for optimum functioning of the purchased hardware, which was left out from the original package.

Costs and Financing

48. Total project costs and financing plan, actual compared to the Appraisal estimates, by components and sub-components, are presented in Tables 8A and 8B. Actual costs are estimated at US\$685 million, compared to US\$260 million at Appraisal. Of these costs, IBRD financed US\$116.5million (versus US\$124 million expected at Appraisal), IDA contributed US\$23.3 million (versus US\$31.6 million at Appraisal), DFIs US\$57.3 million (versus US\$25 million at appraisal), State Governments US\$5.9 million (versus nothing at Appraisal), and sponsors US\$481 million (versus US\$62 million). The Government of India, which was expected to contribute US\$17.4 million to CETPs and SPCBs operations, did not actually contribute funds from its own resources, except for about US\$0.9 million for facilities.

49. The very large increase in total costs is attributed entirely to the inclusion in individual investments of the total cost of a number of very large projects, of which the project only financed a small fraction. These consist of three subprojects which financed the pollution control facilities of new plants or of capacity expansions (IDBI-B004, IDBI-B045 and ICICI-B026, totalling US\$148.7 million), and of investments in cleaner technology by the caustic soda industry, one of which also with capacity expansion, which totalled US\$244.9 million. Together, these investments totaled US\$417.1 million, or 70% of total costs of individual investments. Since sponsors financed most of these costs from their own resources or borrowing from sources other than those provided under the project, this resulted in total sponsor contributions much above the Appraisal estimates for individual investments (73% of total costs, compared with 25% at Appraisal).

50. Costs of the institutional development component in USDollars are comparable to appraisal estimates, when excluding costs of SPCB operations, which were to be paid by GOI but were actually paid by SPCBs. These costs were not provided and are not part of revised cost estimates. Other costs were financed from IDA, as planned. Costs of the Technical Assistance component are substantially below estimated costs in Rupees as well as in US Dollars, due to the low average cost of the studies which were financed. As planned, they were financed on a grant basis under IDA.

51. Total costs of CETPs appraised by IDBI are comparable in Rupees to the Appraisal estimates, but, due to the devaluation of the currency which took place over the period (the exchange rate depreciated from Rs. 20 in 1990/91 to Rs. 40 per US\$ at the end of 1998), actual costs in USDollars are only two thirds of the Appraisal estimates (US\$40 million, compared to US\$60 million at Appraisal). At Appraisal, CETPs funding formula was: grants up to 40% of total costs (20% from IDA, through GOI, and 20% matching grant from GOI), IBRD loans up to 40% of total costs, and sponsors' contribution was a minimum of 20%. Subsequently, the matching grant of 20% became the responsibility of the state government and the percentages of both the IDA

and state grants were raised to 25%. Furthermore, the original ceiling of Rs. 5 million in grants from both central and state governments was lifted in 1996. Nevertheless, the actual financing plan shows that on average, sponsors financed a much larger share of total costs than originally envisaged, 44% instead of 20%. IBRD (through IDBI subloans) financed 29% of total costs (versus 40% at Appraisal) and IDA grants 12% (versus 20% at Appraisal). State governments, financed the remaining 15% through grants. The total grant element of these CETPs thus amounted to only 27%, compared to 40% at Appraisal and in the subloan applications. The difference between the actual and originally envisaged formula is due to cost overruns, which were covered by the sponsors, the absolute ceiling on subsidies until 1996; and delays in the receipt of grants (some were still pending by the closing date). Furthermore, as of the closing date, six out of 27 CETPs appraised by IDBI had not used their approved sub-loans.

52. In addition, the Bank accorded post-facto approval to eligible expenditures for 51 CETPs which were not appraised by IDBI (ref para 37), for a total of about Rs.184 million, which were financed out of IDA funds.

53. Total cost of demonstration projects were, in US Dollars, 70% higher than estimated at Appraisal. This reflects higher average subproject costs, in turn due to sponsors being larger clients than originally planned. Since the grant amount was limited to US\$500,000 per subproject, sponsors have also contributed significantly more than expected, 84% versus 60% estimated at Appraisal.

Benefits and Impact

54. No Performance Indicators were defined in the Staff Appraisal Report by which to judge the success of the project, and no such indicators were developed during implementation. In 1998, the Bank commissioned a study to conduct a brief review of this project as well as the follow-up Industrial Pollution Prevention Project and draw on the lessons learnt.¹⁴ Another study was commissioned by MoEF to propose environmental performance indicators for the project and carry out an ex-post evaluation **Table 7**, but it was completed only in March 1999. Various studies were carried out to evaluate the results of CETPs¹⁵. The following paragraphs build upon these studies and beneficiaries' responses to questionnaires sent out by the DFIs at the request of the Bank.

(a) Institutional Strengthening

55. The results and impact of the Institutional Strengthening component need to be assessed in conjunction with the impacts of the SPCBs reorganization study and other policy and institutional changes which occurred within the boards since 1990. These aspects were covered in preceding paragraphs. Quantitative indicators of SPCBs performance are presented in **Table 6A**.

56. CPCB has compiled data since 1992/93 on compliance by 17 categories of highly polluting industries (Table 6B), which were the target of the project. Compliance rates have increased significantly, in all of India as well as in the four states. In Gujarat, Maharashtra and Tamil Nadu, compliance has improved from 60-70% in 1991/92 to 88%-96% in 1997/98. In Uttar Pradesh,

¹⁴ Lessons Learnt from the Bank-assisted Industrial Pollution Control and Industrial Pollution Prevention Projects in India- Environmental Management Center- April 1998.

¹⁵They are: (a) Performance of CETPs: A Review of Twelve CETPs in India-EPTRI, Hyderabad, March 1996; (b) CETPs and Pollution Abatement in SSIs-National Institute of Public Finance and Policy-New Delhi, March 1999; (c) CETP Evaluation; Deepak Kantawala; (d) Common Effluent Treatment Plants Evaluation; Kirsten Oleson; World Bank, August 1997.

compliance has improved from 20% in 1991/92 to 84% in 1997/98. When excluding closed plants (these may have closed permanently), compliance rates improves even further. Interviews of project beneficiaries by the completion mission during field visits have confirmed that boards have substantially increased their pressure and controls, although sometimes they fail to provide feedback on analysis results. The project may have contributed in part to these achievements by supporting the strengthening of the Boards and providing financing to large and medium-scale enterprises in the 17 categories of highly polluting industries, but the main reason for the improvements are pressures from Courts. SPCBs have focused their action principally on liquid effluent and, to a much lesser degree, air emissions, and only recently have they started to address issues of hazardous waste management. Furthermore, little consolidated information exists with long enough time series to draw conclusions on the effectiveness of the Board's actions on the environmental status of their states. Under CPCB national programs, SPCBs have been monitoring the quality of water and, more recently, ambient air in a number of critical areas. However, although monitoring results are published in SPCBs' annual reports, no analysis of trends over time and main factors for changes are presented in these reports.

57. With respect to small-scale industry, SPCBs, in response to pressures from Courts, have made major advances in the establishment of CETPs in industrial estates. When the project started, there were some CETPs under planning, but none were under construction. By the project closing date, a total of 53 CETPs had been constructed or were under implementation in India, including 44 in the four project states.

(b) Investment Component

(i) Common Effluent Treatment Facilities (CETPs)

58. Based on information obtained from Bank files, IDBI, MoEF, plant visits during the ICR mission, information obtained from a sample of beneficiaries contacted with questionnaires through IDBI, the study on "Environmental Performance Indicators" and studies carried out by consultants on evaluation of CETPs,¹⁶ it was possible to assess the main characteristics of the 27 CETPs appraised by IDBI and the preliminary results obtained by a sample of 13 CETPs. A description of all subprojects together with their main characteristics, and results obtained by the above 13 subprojects, are provided in Table 6C. A review of this data shows that some of subprojects appear to have partially generated their intended benefit of reducing pollution from small-scale industries. The effluent of more than 3,900 small- to medium- scale industries are now being treated, furthermore, these CETPs have enabled them to resume and/or continue operations. The limited environmental impact of CETPs is illustrated on Page 6 of Table 6C, which shows the result of 8 CETPs in operation in Gujarat on the quality of receiving water bodies, in terms of reductions of Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) levels and increased levels of Dissolved Oxygen (DO). CETPs, if working well are cost effective mechanisms to contain pollution generated by SSIs as well as to reduce SPCB's surveillance effort on them. However, a number of important technical, management and financial issues need to be addressed to ensure the environmental and financial sustainability of the CETP scheme and make it more effective. These issues are thoroughly commented in the above mentioned studies and are summarized hereafter:

59. *Environmental Compliance* - Except for a few, most CETPs are only in partial compliance with SPCB's standards -- they have generally been successful in addressing the issue of acidity,

¹⁶ Including by the Environment Protection Training and Research Institute (EPTRI) in 1996 and by the National Institute of Public Finance and Policy in March 1999.

COD and BOD, but have yet to address concerns related to Total Dissolved Solids (TDS), sludge management, and effluent color, heavy metals and organic chemical parameters. Deficiencies in compliance are often the result of deficiencies in design and/or large fluctuations in quality and quantity of raw effluent.

60. *Pre-treatment facilities* - Except for Enviro Technology Ltd., which does not require preliminary treatment from its members and has treatment charges based on effluent acidity and COD values, most agreements between CETPs and their member units provide pre-treatment of effluent to specific standards prior to primary treatment. In addition to screening out grit and other gross suspended material on site, pre-treatment may include de-toxication and precipitation of metals such as chromium when necessary¹⁷. In a few cases, such as GIDC's CETP of Vapi (Gujarat), a very large CETP (designed for more than 1,000 members from mixed chemical industries), primary treatment is also required from members. Compliance by individual units with the pretreatment standards is critical to the efficiency of CETP operations and should be carefully monitored to ensure proper operation of the CETP. Yet, it has been difficult for CETPs to monitor member units and take action against those in default with pre-treatment standards. Currently, CETPs rely on SPCBs for enforcement of pre-treatment standards on its members, through State Industrial Development Corporations (SIDCs). Therefore, CETPs must be given sufficient powers and means to inspect and test effluents of any of its member at the firm's outlet and to take quick action against those that are not complying with their pretreatment obligations.

61. *Sludge Disposal* - Sludge, particularly from the mixed chemical sector, tanneries and dyeing units may be hazardous and require safe and secured landfill facilities. However, with the exception of two CETPs¹⁸ that have implemented and are operating a secure hazardous waste deposit, and three that are temporarily disposing of their sludge in small secured deposits built within their premises but also have plans to establish secured hazardous waste deposits, all other CETPs are or will be temporarily storing their sludge without special care, or dumping it in nearby areas until their State Board can notify a suitable site for secure deposit. This reveals a deficiency in design of CETPs and in the technical review carried out by NEERI.¹⁹ Early, during project implementation, the Bank identified this issue, but did not impose the incorporation of sludge disposal investments in CETPs' design. The rules framed under the Hazardous Waste Act lay the onus of identification, accusation, environmental impact assessment and the final notification of secured sites on the SPCBs. CETPs thus have to wait for a site to be notified by SPCBs for disposal of sludge and there have been considerable delays in these notifications, leading to temporary storage by CETPs. Nevertheless, since SPCBs were involved in the promotion and clearance of CETPs, they should have addressed this issue in time and the Bank and MoEF could have at least imposed the site notification as condition for approval of CETP after this issue was raised.

62. *Effluent Transport to CETPs*- Except for two CETPs that are using lined tankers for the transport of effluents from the member units to the CETP, all other CETPs appraised by IDBI and

¹⁷ The requirement of pre-treatment by tanneries is to remove chrome from effluent before it is discharged to the CETP. Many medium-large units have their own chrome recovery unit. Other individual units segregate chrome bearing effluent and transport by tankers to neighboring existing chrome recovery plant. It is estimated that recovered chromium can amount to as much as 40% of the chromium needed in tanning and that the pay back period of the recovery plant is approximately 2 years. However, no CETP is equipped with such facility and no individual subproject for such facility has been financed under the project

¹⁸ Perfect Enviro Control Systems Pvt. in Gujarat for 6 tons per month of sludge and gypsum waste per unit members and Enviro Technology Ltd. Ankleswar which, through a sister company has developed and operates a central secured hazardous waste landfill, the design of which was financed under the technical assistance component of the project.

¹⁹ It may be noted here that the project was designed to finance the design and implementation of CETPs for the treatment of wastewater and *solid materials* at industrial estates. (Refer SAR, 1991).

approved by the Bank use fixed collection and conveyance systems. Many of these systems were implemented under the project as part of the CETPs and represent up to 60% of the total cost. A few were implemented by the SIDCs. Tanker transport has the advantage of allowing easy measurement of the volume and quality of effluent received from each member unit, thus permitting an equitable sharing of costs based on pollutant loads. In addition, it makes it easy for the CETP to refuse effluent from non-complying units. For large CETPs, however, operating costs of fixed collection and transport system are lower. Ideally, they should be designed with accurate metering and sampling devices and with the option of not accepting effluent from non-complying units.

63. *Recycling of Treated Effluents and Waste Minimization.* CETPs are not yet recycling water, however, a few of them have already started R&D programs to that effect. The treated effluent is generally sent to the SIDC effluent transport system, in few cases to the municipal sewerage system, and in 6 cases the effluent is used for gardening, plantations or released in agricultural lands. In designing the cost sharing method, it is important to provide incentives to member units for water recycling and waste minimization so that, by upgrading their production technology and improving their effluent quality, they may save in their share of abatement costs. It was reported that some CETPs are already taking initiatives of process optimization, recovery of toxic substances and cleaner technology to minimize waste and reduce their effluent treatment costs.

64. *Ownership and Management of CETPs.* The predominant ownership model for the CETPs appraised by IDBI, has been the association or cooperative of the member firms. A number of CETPs were promoted, implemented and operated by SIDCs, as was the case of the CETP in Vapi (C IDBI 07) which was initially controlled and operated by GIDC, and has now been transferred to the VAPI Waste and Effluent Management Company Ltd., an association of its members. Only one CETP was established for profit by an independent company.

65. CETPs promoted, implemented and operated by SIDCs turned out to be not successful in either implementation or operation. Members firms often default on payments of their share of treatment costs and tend to perceive that pollution control is the government's responsibility. Also, public management of CETPs creates a conflict of interest within the government, as SPCBs can find it difficult to take actions against another government body. The role of public agencies like SIDCs is important in setting up CETPs in estates, but it should be limited to disseminating information, motivating and organizing the SSI's, guidance in technical and financial proposals. Experience in a number of CETPs also have shown that the assistance of SIDCs in the collection of monthly effluent treatment charges together with water bills is efficient and cost effective.

66. Adequate representation of member firms in the promoter company is essential to ensuring that the design is based on accurate information, and results in a lower payment default rate by members and better achievement of environmental goals than in CETPs owned and operated by government bodies. However, many CETPs promoted, managed and operated by members associations or cooperatives have technical and financial problems. This has already resulted in IDBI experiencing difficulties in collecting interest charges from several CETPs. In most cases this is due to lack of an experienced management team in charge of CETPs, who can professionally manage the CETP as a business for profit for its members. Such a management team should have the responsibility for the establishment and successful operation of the CETP and include experts having experience in the establishment and running of CETPs.

67. Involvement of the private sector beyond the simple participation of members in industry associations should contribute to sustainability. Private efforts to organize, own and manage CETP's facilities as profit organizations should be encouraged and supported. However, this

could conceivably lead to a monopolistic situation with possible arbitrary increases in effluent treatment charges, particularly when the CETP relies on a fixed conveyance system. Securing the strong participation of members on the Board of the company can reduce this risk. The Enviro Technology Ltd. CETP implemented in Ankaleshwar (Gujarat under the project) is a good example of ownership arrangements: United Phosphorus Ltd. (UPL) is the main promoter and controls 51% of the shares; but 36 members are also equity partners and are represented on the board of the company—in fact, the major promoters are large-scale industries which do not use the CETP facilities for their own needs, the CETP being strictly for the treatment of SSI effluent; this CETP has been operating in a sound technical and financial manner; and in 1998 the company paid 10% dividends to all the equity shareholders.

68. *Cost Recovery.* All CETPs financed under the project have required contribution to the initial equity from their members and in a few cases also an interest-free deposit. For operating costs, there is a significant variation in the methods of charging effluent treatment costs by the CETPs appraised by IDBI. Except for a few, most of them suffer from two limitations: (i) effluent treatment costs are not equitable; and (ii) they do not provide incentives to member units for preventing and controlling pollution. Different methods include those in which: (a) fixed costs are shared according to water consumption but variable costs are divided equally; (b) fixed and variable costs are divided equally between members; (c) there is a flat charge per m³ based on the member's unit water consumption; (d) charges are based on water consumption, but a penalty is added if COD is higher than an established limit; (e) charges are uniform per kg of skin or hide treated by tanneries members; (f) charges are based on the effluent volume and a pollution factor is calculated for each member from the estimated BOD and COD of its effluents; (g) fixed charges are based on the booked volume of effluent and variable charges on the COD load of effluent; and (h) as in the Ankaleshwar CETP, fixed costs are based on volumes treated and variable costs on the pollution load of acidity and COD of effluent received in tankers. Many of the CETPs have introduced a cross subsidy through differentiated charges for small and medium/large scale industries.

69. The method of effluent treatment charge should be equitable and provide incentives to members for pollution prevention. Since operation and maintenance costs of effluent treatment depend on the volume and characteristics of effluent, the share of each firm in the total cost should be based on the volume and characteristics of its effluent. Therefore, charges should be based on volume and analysis of effluent and should differentiate between pollutants by the cost associated with their treatment. These charges should recover costs of operation and maintenance, financial costs and a return on investment. Finally, if subsidies are needed for the establishment of a CETP, they must be limited to installation costs and be directed only to the small-scale industries. The equitable sharing of all fixed and variable costs is crucial for efficient functioning of the CETP. Large and medium-scale enterprises should not be obliged to participate, but if the effluent channel is common to them and the CETP, they should be charged equitably for their volume and effluent content.

(ii) *Individual Investments*

70. It is difficult to determine the global impact of the project on the environment. However, sixty one subprojects for pollution abatement or cleaner technology financed under the project aimed at complying with standards and may have contributed to the reduction in the number of industries in non-compliance in the 17 categories of highly polluting industries in India between 1992/93 and 1998/99. In 1992, 1551 industries in these 17 categories were identified in India, of which 540 were in non-compliance in 1992/93, declining to 147 in 1998/99 (Table 6B). It is questionable, however, that these investments would not have been made without funding from the project, since alternative sources of funds were available, albeit at unsubsidized rates. Based

on information obtained from Bank files, IDBI and ICICI, plant visits during the ICR mission, and information obtained from a sample of beneficiaries contacted with questionnaires, it was possible to assess the main characteristics of the individual subprojects. It was also possible to assess the preliminary results obtained by about 40 beneficiaries who responded to questionnaires (a sample of 58% of all sub-borrowers). A description of all subprojects together with their main characteristics is provided in Table 6D, which also includes results obtained from the above 40 subprojects. A review of this data shows that, except in a few cases, most individual subprojects appear to have generated their intended benefits, whether legal compliance, resources and/or energy savings, waste minimization through recycling of wastes, or cleaner technology. Often, environmental benefits are a combination of above benefits plus financial benefits. The following paragraphs outline some of the most important benefits:

- Out of 76 subprojects approved under the project, about 30 financed the installation or modernization of liquid effluent treatment plants to help beneficiaries comply with SPCBs standards. Most completed facilities reported that they were now in compliance and had their consents renewed. About 10 of these subprojects, mainly in the pharmaceutical and the sugar/ethanol sub-sectors, also installed biogas generation facilities for methane recovery and use as fuel in plant operation, resulting in large energy savings. Additional resource recovery was also achieved in black liquor treatment subprojects in the pulp and paper industry, in which alkali and lignin are being recovered from the treatment.
- About 12 subprojects helped resolve problems of dust and emission control in the cement, steel and ferrous-alloys, and aluminum industries, through the installation of electrostatic precipitators, bag filters, wet and dry scrubbers. In addition to meeting environmental standards and improving ambient air, some of these subprojects permitted large resource recoveries. This was the case for the installation of a dry scrubber in an aluminum smelter, which, in addition to reducing fluorine and dust emissions to well within SPCB limits, allowed savings of about Rs. 500,000 per day by recovering alumina and aluminum fluoride.
- Five plants were constructed to recycle wastes because of their financial returns. These include: (i) a plant to use fly ash recovered in plant boilers or power plants in the manufacturing of construction bricks and slabs; (ii) a plant to use slag, iron ore and coke fines for the production of slag cement; (iii) a plastic waste recycling plant; (iv) a plant using by-product fluosilicic acid, recovered from gas effluent treatment in the fertilizer industry, for the production of aluminum fluoride for sale to aluminum smelters; and (v) a plant to produce maleic anhydride from effluents of a phthalic anhydride plant. These are interesting examples of for-profit resource recovery resulting in waste minimization.
- Substantial benefits were achieved from the adoption of cleaner technologies, in particular through: (i) the replacement of mercury cells by membrane electrolyzers for the production of caustic soda in about 11 plants, to eliminate mercury contamination and permit substantial (25%) energy savings; (ii) the replacement of a single absorption sulfuric acid plant with a double absorption plant to reduce SO₂ emissions to levels within the standards, also resulting in lower sulfur and energy consumption; (iii) the production of bio pesticides from seeds; and (iv) upgrading of processes in existing plants, such as in an ammonium chloride plant, to minimize waste and recover resources. These projects are good examples of cleaner industry with large potential replicability.

71. These achievements, however, must be tempered in several respects:

- Most subloans for individual subproject were made to DFIs existing customers, and were not necessarily directed to the ones most in need for this type of financial assistance. This would

have required more specific marketing strategies designed to reach new clients beyond the DFI's traditional customer base and better defined eligibility criteria.

- Two issues remain to be addressed with respect to the mercury cell replacement sub-projects: (a) in many of the subprojects, mercury cells were replaced only partially and therefore beneficiaries did not completely eliminate mercury contamination; and (b) the destination of the old mercury cells is not clear. The subloan contracts should have incorporated strong conditions to address these issues.
- While investments include many liquid effluent treatment sub-projects and, to a lesser extent, dust and emissions control subprojects, except for an incineration unit and the waste recycling plants, the project did not finance investments to address problems of adequate disposal of hazardous waste, a pervasive problem in India.
- As mentioned earlier, there are strong doubts about the incrementality of project environmental benefits, at least with respect to 25 projects (one third of the number of total projects and 30% of total funding): (a) 10 subprojects have financed pollution control facilities of new plants or capacity expansion units; while these facilities have a pollution prevention objective, they should be considered a normal part of any new project, and, in any case cannot claim to reduce pollution overall; and (b) 17 sub-projects, (including two in the former category) were completed or were nearing completion when subloans were approved, indicating that the project merely substituted for existing funds.

(iii) Demonstration Projects

72. Table 6E provides a description of each of the nine subprojects, their status, an assessment of their environmental and other benefits, and of their replicability. Two sub-projects were sponsored by sugar/distillery industries, two by pulp and paper industries, and one each by synthetic fiber, pharmaceuticals, pesticides, and mechanical engineering industries. Three subprojects intended to improve treatment methods to reduce pollution from liquid effluents to levels compatible with standards (associated in two cases with energy recovery); three aimed at recycling and resource recovery (in two cases associated with energy recovery as well); two were test cases for the application of Clean Technology programs; and one aimed at developing environmentally-friendly pesticides.

73. A number of subprojects have not yet stabilized, and their potential environmental benefits are not certain. However, for some, financial benefits from resource recovery or by-product sale could offer short pay-back periods. So far, there is evidence of replication for only one subproject (IDBI 07), via the sale of technology. There are little prospects of replication of other subprojects even if outstanding technical and cost problems are resolved (IDBI-02, 03, 04, 05 and 12). In one case, however (IDBI-09), there is no chance of replication, as this was essentially product development for a single firm, which has patented the product and stated that it did not intend to sell the process to potential Indian or foreign competitors. As mentioned earlier, five out of the nine subprojects (IDBI-03, 04, 05, 06 and 07) were re-financed, casting doubt about the additionality of benefits brought about by including them under the project. Generally, there are no clear plans for dissemination of results in these subprojects.

74. In retrospect, this component has suffered from several design flaws. First, it relied on a financial intermediary (IDBI) to promote the sub-component and identify subprojects. Financial intermediaries are ill-equipped for this task. Furthermore, IDBI has a mandate to provide financing only for medium and large projects (small and medium-scale industry being attended by the Small Industry Development Bank of India, an IDBI subsidiary). Therefore, IDBI sought to

promote the scheme principally among its clientele, in this case large- and medium- scale industry which is also normally able to generate the funds internally or borrow from other sources for relatively small projects of this type (less than US\$1.2 million at Appraisal). This explains why IDBI had difficulties identifying sponsors until the fixed asset limit of US\$5 million was lifted and why more than half of the implemented subprojects were re-financed. The kind of investments that the project sought to promote would have been better handled through a competitive grant scheme managed by research and technology institutions with a wide range of smaller clients.

75. Second, sponsors were not required to submit a plan for the dissemination of research results together with their proposals. Third, there was no clear approach to the intellectual property over the results of research. While it is certainly justified that sponsors should patent and licence their technology for a fee (after all, they financed all the development and over 80% of plant costs), they should not be allowed to otherwise restrict access to these results; the justification for financing subprojects aimed at product development for the benefit of a single firm is weak as they have little demonstration effect despite potential environmental benefits.

(c) Technical Assistance

76. A description of the purpose, status and impact of the technical assistance studies is provided in Table 7. The impact of the most important study, that of staffing and organization of SPCBs, has already been extensively commented upon. The study for the development of environmental performance indicators for the project provided a useful basis for the Borrower's completion report and some contributions to this report. Four other studies had concrete results: (i) impact assessments and pre-investment technical studies for a centralized hazardous waste incinerator at Chennai have resulted in a project and site proposals which is now at the review stage for environmental clearances; (ii) the EIA and feasibility study for the Ankleshwar landfill has resulted in a project which has been completed and started operations, the first of its kind in India to be managed and implemented by a private sponsor; (iii) the study for technology development for sewage treatment using specialty bio-products; and (iv) the studies for technological development for treatment of polluted water bodies using specialty bio-products, are both associated with the successful IDBI-07 demonstration project; one of the study helped in the laboratory scale and testing studies, and the second study helped adapt the technology developed by the sponsor to the depollution of a lake. Among the remaining studies, one of them (Air Pollution Control in the Cement Industry in India) seems to have had limited benefits because it focused on the specific needs of 8 large privately owned cement plants already with a good environmental performance. For the remaining five studies, there is no information on their results and impact.

C. Main Factors Affecting the Project

77. There were no significant delays during preparation of the project, as less than two years elapsed between identification and signing. Serious delays in the implementation of the Institutional Strengthening Component, however, led to one nine-month extension of the closing date, from June 30, 1998 to March 31, 1999.

(a) Institutional Strengthening Component

78. There were extraordinary delays in the procurement of equipment for the institutional strengthening component, since most of the monitoring and scientific equipment was only being

received by the closing date, i.e. seven years after effectiveness. The procurement process was deeply flawed throughout implementation. The main difficulties were as follows:

- CPCB was to prepare the technical specifications, in consultation with an expert committee with representatives of state boards. One year after effectiveness CPCB came up with a set of specifications;
- The Implementation Cell (IC) of MoEF was originally in charge of carrying out procurement activities. However, in March 1993, it became clear that IC did not have the required capabilities and it was agreed that a procurement agent would be appointed. It took until the end of 1993 for MoEF to appoint the Directorate General of Supplies and Disposal (DGS&D) as procurement agent, thus losing another year in this process.
- After nine months (September 1994), the first lots of equipment (jeeps and equipment such as air conditioners and voltage stabilizers required for office and laboratory facilities) were awarded. However, by the end of 1994, a year after the appointment of DGS&D, no monitoring and scientific equipment had yet been procured (bids had not even been invited). In agreement with the Bank, in February 1995, MoEF decided to pass on the responsibility of procurement to CPCB, including the contracting of a new procurement agent.
- It took yet another year for CPCB to sign a contract with a new procurement agent, the National Thermal Power Corporation (NTPC), in February 1996.
- By then, technological changes had occurred (since 1992) which made changes to technical specifications necessary. A first package was floated in June 1996. However, after bids were invited, changes were made to the specifications and items were added, so that bids were eventually received only in June 1997, a full year after bids had been invited. However, the award of contract were to be approved by CPCB, which did not agree with NTPC's recommendation. The Bank arbitrated in favor of NTPC. Orders were placed only in March 1998, almost two years after bids had been invited.
- The second package was awarded in November 1998, also almost two years after bid invitation in March 1997. This time, the problem was that specifications had been too narrowly defined and that most bidders were unable to meet all the specifications and requested changes so they would be able to present proposals. Again, there was disagreement between CPCB and NTPC.
- The third and fourth packages were invited only in July 1998 and the contracts awarded in January 1999, two months before the project closing date. This resulted in delivery of a number of items – worth US\$1.8 million – well beyond project closing date which made them ineligible for reimbursement under IDA Credit.

79. In retrospect, poor performance can be attributed to the non-viability of centralized procurement for most items which were to be procured in a large quantities -- a large variety of specialized items should not have been packaged in a few large packages, and the responsibility for procurement of at least the less complex items should have been decentralized to SPCBs--. Even for sophisticated items, the possibility should have been explored to: (a) let SPCBs themselves procure their equipment or contract the procurement agent directly; (b) split responsibilities for procurement between CPCB and the procurement agent in all steps of the procurement process --CPCB's role should have been limited to agreeing with SPCBs on technical specifications, and the rest of the process should have been left to the procurement

agent; and (c) sophisticated equipment should have been procured through a two-step bidding process to avoid later changes to narrowly defined specifications.

(b) Investment Component

(i) Common Effluent Treatment Facilities

80. By March 1993, only two CETPs had been approved. Approvals subsequently increased to 13 by August 1994, 18 by February 1995 and 27 by March 1997. However, in March 1999, only half of the 27 CETPs financed by IDBI had been commissioned. CETPs were affected by a number of factors, which slowed down their implementation, and led to cost over runs:

- lengthy approval procedures: CETPs had to be approved by the National Environmental Engineering Institute (NEERI) (technical appraisal), which was the only institution designated for that purpose; MoEF, the Steering Committee, IDBI (financial appraisal); and the Bank procedures initially involved 16 steps in three stages. They were somewhat simplified in 1993 (elimination of approval by the Steering Committee);
- difficulties in getting groups of small enterprises to formalize their association into an eligible entity and gather the required equity, particularly at the beginning of project implementation when regulatory and court pressure was not yet very strong; and delays in completing detailed engineering and issuing tenders (up to 6-9 months);
- delays in obtaining clearances from state governments for the sites and in obtaining consents to establish;
- most of all, delays in obtaining the release of state subsidies: since the release of state subsidies triggered the release of the central (IDA) subsidy and of the IDBI subloan, these delays created very serious problems for CETPs. In October 1996, 19 CETPs were experiencing delays of up to two years in releasing the grants. This led to the suspension of construction and cost over-runs. These delays continued to be pervasive until the closing date;
- there were also delays in the release of IDBI funds, when IDBI started requiring personal guarantees; finally, costs also increased due to late submission to the Bank of disbursement applications. In the meantime, IDBI advanced the funds from its own resources, but at interests rates (19%-20%) significantly above the 15% project rate.

81. After 1995, judicial activism leading to several Supreme Court orders--in particular in Delhi, Tamil Nadu and Gujarat--led to substantial acceleration in the establishment of CETPs. However, many CETPs did not wish to borrow from IDBI, with which they did not have client relationships or whose procedures they viewed as cumbersome. Yet, in order to be eligible for IDA subsidies, all CETPs had to be appraised financially by IDBI. Without consulting the Bank, MoEF committed IDA funds to 60 of these CETPs (ref. para. 37). As a result, the financial appraisal of these additional CETPs was not done in accordance with Bank's requirements. This also led to incomplete information collection.

(ii) Individual Investments

82. Commitment of funds under the line of credit for individual investments by both IDBI and ICICI was very fast: by October 1992, about a year after effectiveness, 50% of total IBRD funds were already committed and, by mid-1994, or two and a half years after effectiveness, IBRD

funds were fully committed. In fact, as it became apparent that demand would exceed availability of funds, on July 9, 1993, the Bank reallocated US\$8 million, from CETPs and Demonstration subprojects, which were moving slowly to this component.

83. The main reason for such fast commitments was the interest rate differential which had developed between the project on-lending rates and commercial rates on alternative sources of financing. Throughout the commitment period, this differential was about 1.5 to 3 percentage points. Page 6 of Table 5D shows the interest rate band of IDBI lending since 1991, and ICICI reported similar or even higher rates. This differential was not intended in project design. Throughout preparation it was clear that on-lending rates were to be similar to prevailing domestic currency lending rates of DFIs for investment projects. However, during negotiations this covenant was changed and Bank requirement was compromised to "*The Banks will onlend their loan proceeds to sub-borrowers on terms consistent with the non-concessional rate structure in effect at the time for term lending in domestic currency*". The on-lending rate of 15% specified in the Project Agreement was the commercial rate for domestic transactions at the time of Appraisal. However, while commercial rates increased subsequently, the project on-lending rate was not revised (Schedule 1 of the Project Agreement stipulated that "onlending rate to investment enterprises shall, unless revised by the Borrower, in consultation with the Bank, be 15%").

84. While IBRD loan disbursements (which were essentially for individual investments at that time) were substantially faster than expected until the end of 1994 (Table 4), they subsequently stagnated until mid-1997. This is because sub-borrowers were reluctant to compile the documentation required to support their expenditures, which had to be channelled through DEA and submitted to the Bank for reimbursement. When interest rates fell in line or below the project rate, the incentive to do so was even less. Some sub-borrowers even requested the cancellation of their loans or of its outstanding balance. Also, DEA was slow in submitting ICICI and IDBI claim applications to the Bank (6-9 months in 1992).

(iii) Demonstration Projects

85. Approval of demonstration projects suffered considerable delays, as the first subproject was approved only in 1996 (over four years after effectiveness). This was due to: (a) a one year delay in MoEF establishing procedures for approval, which subsequently turned out to be too cumbersome and had to be simplified (by-passing the Steering Committee); and (b) inability of IDBI to identify sponsors who could meet all eligibility criteria, despite promotional work carried out by a consultant hired specifically for this purpose. After the limit on fixed assets was waived seven subprojects were finally approved in 1996 and another five in 1997 and 1998. As mentioned elsewhere, three were subsequently withdrawn and five were existing subprojects which were re-financed.

(c) Technical Assistance

86. Except for the SPCB Staffing and Organization Study, which was completed in April 1994, almost two and a half years behind schedule, no progress was made to contract studies until the beginning of 1997, despite repeated attempts to identify eligible studies and agree on work programs. Eventually, 12 other studies were financed, but commitments remained far from original estimates. This component appears to have suffered from a general lack of attention and frequency of changes in senior officials in MoEF, and from lack of close coordination with CPCB. Also, part of this component was to finance pre-investment studies for subprojects to be funded under the investment component. Since most of the individual investment subprojects were already designed and many were under implementation at the time of subloan approval, and

sub-borrowers were principally large enterprises capable of financing their own pre-investment needs, these studies were not required. Finally, as already commented, IDBI and ICICI also did not make much use of the funds available to them to strengthen their environmental capabilities.

D. Project Sustainability

87. Overall, from the available information, the extent of incremental environmental benefits achieved by the project is not clear. Given the remaining implementation problems with most CETPs and the apparent dependence on subsidies, the need for continued pressures from the courts to compensate for the weak action on the part of the regulatory authorities, and the modest interest of industry to use the credit lines for reasons other than to access the subsidy, *the project benefits are not judged to be sustainable*. Sustainability of the investment components would largely depend on the ability of SPCBs to maintain pressure for compliance through regular monitoring activities, agreed self-compliance programs and enforcement actions. Large and medium-scale industries have significantly improved compliance since 1991 under pressure from Courts, and legal requirements for periodic environmental audits should reinforce this trend further. Sustainability of CETPs is uncertain despite the emphasis which Courts and SPCBs are placing on their establishment and satisfactory operation as a solution to pollution created by small-scale industries. This is because of the continued poor enforcement, and the sometimes poor construction, maintenance and operation of the facilities. The CETPs' long-term environmental and financial sustainability is critically dependent on programs to resolve outstanding problems, including:

- sludge disposal,
- deficiencies in management and institutional responsibilities,
- changes in cost recovery mechanisms to ensure that members are paying the full equitable cost of treatment based on their pollution load and to provide incentives to pollution prevention.

88. The large variety of experiences now available in India could permit improvement in the operation of CETPs. Finally, sustainability of achievements of most demonstration subprojects is unlikely, as many have not stabilized and have not organized dissemination efforts to ensure replicability (ref para 87). If the IPP project undertakes a consolidation of CETP experience and introduces a retrofitting activity to this effect, then in the long run, the CETPs could potentially become sustainable. The IPP project may also consider consolidating the experiences from the IPC and develop fact sheets / manuals so as to institutionalize CETPs. This will contribute greatly to ensuring the sustainability of CETPs.

89. *Sustainability of the institutional strengthening component is also unlikely*. Not enough technically qualified and trained staff have been brought in, and critical enforcement and regulatory requirements remain unmet. Despite long delays, the equipment received should improve the monitoring and analytical capabilities of participating boards – though again, assuming that adequate staffing and budget for Operation & Maintenance are assured. The SPCBs made substantial progress towards financial self-sufficiency, but it will be imperative that these funds be used wisely. Specifically, effectiveness of the boards needs to be enhanced in the area of strategic planning and management. Their administrative autonomy needs to be increased. Changes in national policies allowing boards to impose heavy financial penalties on defaulters and a functioning system of effluent charges based on pollution load would considerably enhance their effectiveness.

90. For the institution building aspect of this project to be truly sustainable, the project would have had to not just strengthen the relevant authorities to design strategies to implement court orders. It should have gone beyond this by building the capacity to anticipate and avoid the need for court orders by designing improved regulations and enforcing them. In fact, the evidence suggests that the environmental institutions did not internalize the intent of the court orders. Thus, monitoring indicators to assess environmental improvement were not prepared until the end of project implementation, and several SPCBs did not hire adequate technical staff (even though they would have had the funds to do so). Similarly, the financial intermediaries did not develop in-house technical expertise to independently evaluate future investment proposals brought to them from private industry, even though this would have been a major objective of the credit line component of the project.

E. Bank Performance

91. Overall Bank performance was certainly not at its best. During *preparation*, the Bank failed to anticipate implementation difficulties, which could have been foreseen. During *implementation*, most major issues were identified in the course of supervision, but the Bank did not always pursue their speedy and complete resolution. These include problems associated with procurement of equipment for SPCBs, which were raised with GOI, however, the Bank was not able to obtain sufficient changes in procurement design and timing²⁰. With respect to CETPs, the Bank spent considerable staff and consultant time in supervising and evaluating experience. However, despite having identified lack of proper sludge disposal as one of the problems, the Bank did not press for the incorporation of sludge disposal investments in sub-project designs, although this type of investment was eligible. This was due to the decision to leave hazardous waste investments to a follow-up project which was under preparation during implementation of this project. With respect to individual investments, Bank missions never reported that subloan interest rates had become *de-facto* substantially subsidized, and made no effort to press for changes (perhaps out of a realization that Bank funds would not disburse if interest rates were aligned with market rates, due to the the added heavy bureaucratic requirements to secure approval and, principally, disbursements). Pressure for quick disbursements when new operations were under preparation may also have been a reason for accepting to re-finance a substantial number of subprojects or substitute IBRD funds for other existing financing sources. Finally, no efforts were made to press for a review of eligibility criteria to exclude pollution control facilities of new plants or expansions. The demonstration sub-component suffered several design flaws. In addition, the decision to remove the cap on asset value was not supported by adequate efforts to ensure replication²¹. In general, the frequency of missions, only annually except in 1996 and 1997, may not have been sufficient at times, given the novelty of the project in India and the problems that emerged. Furthermore, the Bank did not pay adequate attention to the financial control systems in MoEF including the procedures adopted by MoEF for approval of grants to CETPs. The Bank mission did not include financial management specialist to conduct a review of financial records maintained by MoEF, IDBI and ICICI during the implementation of the project, except at the ICR stage. Such reviews are required to assure adequacy of the financial systems and eligibility of expenditures. Bank resources and timing, composition and scope of missions are presented in Tables 12 and 13.

²⁰ The Task manager handled most procurement matters of the project from Washington until late 1997. Major involvement of PDAT staff from New Delhi Office in this project started only towards the end of project in 1998.

²¹ Moreover, waiver of the limit of US\$5 million for fixed assets was done informally through supervision report and the follow-up action letter.

F. Borrower Performance

Government of India

92. Performance of MoEF was inadequate. Performance of CPCB was mixed, satisfactory for the training component but deficient for equipment procurement. Most of the delays which affected project implementation can be attributed to weak project coordination and management arrangements. As required as a condition of Board presentation, MoEF established a Project Implementation Cell to supervise the execution of the Institutional Component and manage the procurement and disbursement activities required for its implementation. The unit was also responsible for monitoring allocation and disbursements of grant funds for CETPs and Demonstration subprojects and for overseeing implementation of TA component as well as the overall project. The Cell was to consist of a Director (Deputy Secretary level), two scientists, and a senior Project Analyst, plus secretarial staff. Despite Bank's repeated requests, the IC was never adequately staffed to fully perform its functions, particularly after it assumed the responsibility of the second project "Industrial Pollution Prevention". In the past few years the IC was in effect reduced to one full time Scientist and a secretary. The lack of adequate attention to project coordination and monitoring is largely responsible for delays and poor reporting and communications on the Institutional Strengthening, Technical Assistance, Demonstration Projects and CETP components. MoEF did not develop adequate project management system, including proper systems of approval, compilation and reporting. Also MoEF did not develop performance indicators until close to the loan closing date. Although there was no covenant for development of the performance indicators for the project, MoEF and the Bank during the supervision mission of Fall 1994, had agreed that there is a need to develop such indicators to allow evaluation of the relative success of the investments and institutional strengthening components of the project. It was subsequently agreed that a study would be contracted under the TA component to develop these indicators. Finally, MoEF did not comply with the Loan/Credit Agreements when it committed and even in some cases disbursed IDA grants for CETPs not appraised by IDBI, without seeking Bank's formal approval.

93. Coordination procedures were also excessively bureaucratic. A Steering Committee was to be established as a condition of Board approval to approve the allocation of grants under the CETP, Demonstration and Technical Assistance components and guide and monitor their execution. The Steering Committee was created, with 18 members, chaired by MoEF Secretary, and including high-level representatives from state governments, SPCBs, CPCB, and MoEF. The Steering Committee appears to have met a few times in the early years of the project, but there is no information about the frequency of its meetings later on. Its effectiveness was hampered by the difficulty of organizing frequent meetings of such a large number of high level officials and by frequent changes in high-level officials in SPCBs as well as in MoEF. In the end, in order to reduce delays, the requirement of approval of CETPs and demonstration subprojects by the Steering Committee was dropped. It is not clear, however, that the committee continued to meet to establish or review policies and guidelines to govern the allocation of grants, which was its most important role.

94. Finally, disbursement applications were sent by MoEF, IDBI and ICICI to the Department of Economic Affairs (DEA) of the Ministry of Finance. There too, there were long delays, as it took sometimes up to nine months for actual disbursements made by DFIs to be reflected in Bank's project account.²²

²² As reported in Annex 1 of Aide Memoire of October 1992 Supervision Mission.

Development Finance Institutions

95. Performance of IDBI and ICICI was satisfactory to the extent that they committed and disbursed funds within the specified time frame to subprojects complying with the established eligibility criteria, and met their obligations under the Loan and Project Agreements. Interest rate levels provided them with incentives to privilege their existing clients and projects which were already in their portfolio, and, although some may not have been within the spirit of the project in terms of pollution control, they did so in conformity with the legal documents and with the Bank's agreement. They generally met the financial covenants, but IDBI's performance on CETPs and demonstration subprojects was less than satisfactory. In a few cases, the DFIs have charged interest rates in excess of 15% by extending "bridge loans" to beneficiaries while awaiting the necessary approvals, and have maintained these bridge loans sometimes substantially beyond the approval date. However, part of this was due to delays in obtaining reimbursement from the Bank, during which the DFIs had to advance the funds from their own, more costly, resources. In order to obtain reimbursement from the Bank, they had first to obtain the complete documentation from all sub-borrowers on their expenditures, and then submit their reimbursement requests to DEA, which sometimes took months to process them.

96. However, with respect to individual investments, neither DFI made any special marketing effort to reach clients beyond their best customers. Also, neither DFI however, used the opportunity of the project and the technical assistance grant funds allocated for strengthening their own environmental capabilities. This certainly affected their ability to appraise the environmental justification of the subprojects, to follow up on implementation beyond financial aspects, and to assess subproject results. Strong environmental groups within the DFIs and the development of guidelines for environmental lending might have helped to better direct project funds and prepare these institutions for future activities in the environmental sector.

G. Assessment of Outcome

97. The picture that emerges from the project is mixed: overall, in terms of its original objectives, the outcome of the project is generally satisfactory with respect to physical outcome (Table 1) but unsatisfactory in terms of environmental outcome. However, Project sustainability is unlikely. Bank performance was marginal in light of a number of serious lapses: excessively broad investment eligibility criteria, poorly designed interest rate covenant, lack of reporting of interest rate subsidies during implementation, and failure to press for incorporation of sludge disposal in subproject designs. As well, Demonstration projects are not replicable and there has been no follow-up on technical assistance studies. The Borrower's (GOI) performance was satisfactory in terms of securing counterpart funds from the state governments, but inadequate with respect to procurement and project coordination and management. Performance of the DFIs was satisfactory with respect to their commitments under the Project Agreement, but was less than satisfactory with respect to building-up their own environmental capabilities under the project. Performance of SPCBs was satisfactory, to the extent that they provided all the required counterpart funds for the Institutional Strengthening component (not difficult in light of the increased funds available from the water cess) and showed institutional improvements during the project implementation period. Most of this came in response to court orders, however, and three out of four SPCBs did not, in fact, increase their technical capacity enough to seriously improve their policy making and enforcement capacity. As mentioned, the incremental benefits from individual and demonstration subprojects are questionable, as well.

H. Future Operation

98. To ensure the sustainability of the project and consolidate its achievements, a number of actions are recommended, some of which have been included as part of the follow-up Industrial Pollution Prevention (IPP) Project.

- GOI should propose the enactment of legislation to create emission charges based on pollution load and allow SPCBs to impose high financial penalties on defaulters. At a minimum, further substantial increases in water cess should be implemented to further enhance the financial autonomy of SPCBs and provide incentives to reduce water use. As part of the IPP Project, a task force was created to review the recommendations of a study financed as part of preparation of IPP Project and propose the introduction of economic instruments. Progress in the work of this task force should be assessed and appropriate legislation enacted to allow at least some testing of these recommendations; increased decentralization of priority setting, and planning and decision-making to the state level should be promoted;
- Each of the four state governments and SPCBs should prepare and carry out a specific action plan to further implement the recommendations of the State Board Staffing and Organization Study, in particular towards increased managerial autonomy, strategic planning, decentralization of priority setting and manpower assessment and restructuring; GOI should promote similar actions in other states (four other boards are being assisted under the IPP Project);
- Guidelines for CETP design (including sludge management), operation and management (including cost recovery); should be developed. Standards for CETP (both influent and effluent) should be reviewed in terms of relevance and practicability. (e) CETPs that have design (e.g. sludge management) and operational deficiency (including cost recovery) should be examined for technical and financial assistance.
- For individual investments, emphasis should turn to medium and small-scale industry, whether or not they are part of CETPs. In this perspective, the choice of DFI may be re-visited. Under the IPP project, technical assistance funds are available for extension services and Waste Minimization Circles focusing on small-scale industries, but individual investments continue to focus on large-scale industry (ref para 97). For medium to large industries, efforts should be made towards promotion of voluntary initiatives rather than providing direct financial assistance. It may also be useful to review the eligibility criteria for the investment component to stress on the multimedia approach.
- To facilitate effective dissemination of the experiences of the IPC Project particularly with respect to the investment component, fact - sheets or guidance manuals maybe developed for technologies introduced through individual industry projects, demonstration projects and CETPs.
- Operation of facilities is as important as investment if real environmental benefits are to be achieved due to installation of pollution abatement measures. It is recommended that efforts are made to establish training and certification of pollution abatement plant operators.
- One of the high priorities should be to build the environmental capacity in the financial intermediary institutions, especially at the two DFIs viz. IDBI and ICICI.
- It is important that IPP project sets quantifiable environmental performance indicators and initiates collection and analyses of data to this effect. This will allow more effective

evaluation of IPP unlike IPC. The performance indicators developed towards the end of IPC project may be useful for such an exercise.

- It is now difficult to justify Bank lending to large-scale industry in India given the availability of alternative funding with less bureaucratic requirements and progress made by the highly polluting large industries towards compliance. Emphasis should turn to medium and small-scale industry. Under the IPP Project, technical assistance funds are available for extension services and Waste Minimization Circles focusing on small industry. Yet the design of the IPP project with respect to individual investments continues to focus on large-scale industry, which constitutes the client base of IDBI and ICICI. The Bank and GOI should explore the feasibility of channelling more IBRD funds to small-and medium-scale industry by identifying one or several financial intermediaries more suitable for this type of clientele.
- Finally, significant attention needs to be given on how to follow up on the technical assistance studies.

I. Key Lessons Learned

99. A number of lessons may be drawn from this project. The institutional strengthening and technical assistance components should be complementary to – or better, built around – the investment component, and concrete implementation programs should be agreed with the borrower at the time of project preparation. In the design of institutional strengthening components, organization studies should be followed by the preparation and implementation of specific action plans within a specified time frame; and procurement of equipment should be decentralized to beneficiaries. In line with this, delegation of procurement responsibilities to the World Bank Offices in the member countries has already taken place.

100. With respect to CETPs, before new CETPs are established, a model should be developed addressing issues of design, scope, management, ownership and cost charging systems to ensure their sustainable and equitable operation in the particular circumstances. Project design should include all investments necessary to contain pollution, including for sludge management. CETP management should have sufficient powers to act against firms not complying with their pre-treatment obligations or in default on their payments. All CETPs should have a professional management team with responsibility for their establishment and operation, and private efforts to organize, own and manage CETPs for profit should be encouraged, as long as their clients are well represented in the company's board of directors to avoid risks of monopolistic behavior. Subsidies, if any, should be limited to investment and accrue only to SSIs. On the other hand, medium- and large-scale enterprises should not be forced to participate merely to get financial equity participation. The cost recovery system should be equitable, take into account pollution load, and provide incentives to members for water recycling and waste minimization. Technical and financial clearances should be delegated to several institutions to reduce delays and permit access to funding through other DFIs.

101. Environmental lines of credit have been shown to rarely contribute to improved environmental outcomes. Large, well-run industries can afford to make the necessary investments, drawing on well-established lines of credit. Small industries typically do not avail themselves of environmental credit lines unless they are subsidized, in which case they often only take the money in order to comply with court orders. Poor operation and maintenance on the part of the small-scale industry, combined with lax enforcement on the part of the environmental authorities, often undermines the benefits of these subsidies. All of this points to the fact that it is the quality of management and other "intangible" factors that influence the environmental performance of industries, not the availability of credit lines. This places all the more pressure on

well-designed technical assistance and institution-building activities, which harness the ingenuity of industries to improve their management – and indirectly improve their environmental performance.

102. At a minimum, credit line eligibility criteria should specifically exclude pollution control facilities of new plants or capacity expansion units, and sub-projects which have already secured financing from other sources and are under implementation should be excluded. Sub-project appraisal should ensure that investments are addressing the entire pollution issue and are not resolving a pollution problem just by shifting it to a different medium (*i.e.*, from liquid effluents to solid waste). Early during project implementation, financial intermediaries should be required to develop an in-house environmental group capable of appraising the environmental soundness of projects, supervise implementation, and monitor the environmental performance of their clients. Access to World Bank financing – if at all – should be confined to financial intermediaries capable of reaching small- and medium-scale clients, as large scale industry has access to alternative sources of funds. With respect to overall management of the project physical and financial reporting systems should be agreed upon at appraisal, and financial criteria and monitoring indicators and the frequency of the reporting should be agreed before project implementation starts. During implementation, missions should include financial management specialist to review the adequacy of financial reporting systems.

103. For Demonstration Projects, agencies responsible for promoting demonstration projects should not be financial intermediaries, but agencies capable of administering a competitive grant program. Eligibility criteria for demonstration projects should include provisions for Intellectual Property Rights over results and should require a commercialization and dissemination program.

Table 1: Summary of Assessments¹

<u>A. Achievement of Objectives</u>	<u>Substantial</u>	<u>Partial</u>	<u>Negligible</u>	<u>Not applicable</u>
Macro policies				X
Sector Policies		X		
Financial Objectives		X ¹		
Institutional Development		X		
Physical Objectives	X			
Poverty Reduction				X
Gender Issues				X
Other Social Objectives				X
Environmental Objectives		X ¹		
Public Sector Management		X		
Private Sector Development				X
	<u>Likely</u>	<u>Unlikely</u>	<u>Uncertain</u>	
<u>B. Project Sustainability</u>		X		
	<u>Highly satisfactory</u>	<u>Satisfactory</u>	<u>Deficient</u>	
<u>C. Bank Performance</u>				
Identification		X		
Preparation Assistance		X		
Appraisal			X	
Supervision			X	
	<u>Highly Satisfactory</u>	<u>Satisfactory</u>	<u>Deficient</u>	
<u>D. Borrower Performance</u> (Government of India)				
Preparation		X		
Implementation:				
Provision of counterpart funds		X		
Project Implementation Cell			X ²	
Covenant Compliance			X	
<u>E. Executing Agencies</u> (DFIs)				
Provision of counterpart funds		X		
Covenant Compliance		X		
Environmental Management			X	
<u>F. Beneficiaries</u> (State Pollution Control Boards)		X ³		
<u>E. Assessment of Outcome</u>	<u>Highly satisfactory</u>	<u>Satisfactory</u>	<u>Unsatisfactory</u>	<u>Highly unsatisfactory</u>
			X ³	

¹ To take into account lack of reporting on unintended interest rate subsidies and not for pressing for adequate disposal of sludge of CETPs.

² With respect to the Implementation Cell and committing IDA funds to CETPs without consultation with the Bank.

³ The satisfactory rating reflects physical outcomes of the project and not environmental outcomes and environmental management which are rated unsatisfactory.

Table 2 - Related Bank Loans/Credits

<i>Project ID</i>	<u>Loan Credit</u>	<u>Purpose</u>	<u>Year of Approval</u>	<u>Status</u>	<u>Loan in Millions of US\$</u>
10463	Loans 37790-IN & 37806-IN & Credit 2645-IN	Industrial Pollution Prevention Project	July 26, 1994	Under Implementation- Closing Date: March 31, 2002.	Loans: 93.0 and 50.0 ; Credit: 17.7
43728	Credit 2930-IN	Environmental Management Capacity Building Technical Assistance Project	December 23, 1996	Under Implementation- Closing Date: June 30, 2003	50.0

IPCPTA02

Table 3: Project Timetable

<u>Steps in project cycle</u>	<u>Date planned¹</u>	<u>Date actual/latest estimate</u>
Identification/ Preparation		October 1989
Pre-appraisal		April-May 1990
Appraisal	October 1990	Nov.-Dec. 1990
Negotiations	February 1991	April 15 –19 1991
Board Presentation	March 1991	May 30, 1991
Signing		July 8, 1991
Effectiveness	October 1991	November 6, 1991
Project Mid-term Review		February 1996
Project Completion	December 31, 1997	²
Loan/Credit Closing ³	June 30, 1998	March 31, 1999

¹ Planned dates for pre-appraisal, appraisal, negotiations and Board presentation are as in Initial Executive Project Summary. Planned date for effectiveness is as in the Memorandum and Recommendation of the President.

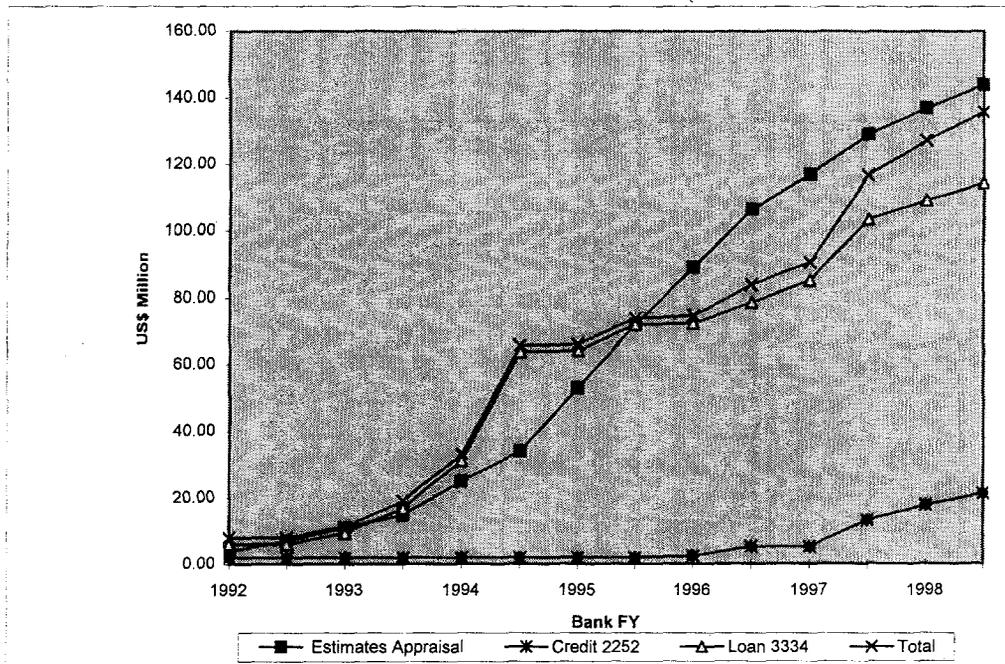
² As of May 31, 1999, a number of CETP's were yet to be commissioned.

³ The closing dates of the Loan and Credit were extended to March 31, 1999.

Table 4 - Loan/Credit Disbursements: Cumulative Estimated and Actual
(US\$ million)

Bank FY and Semester		Cumulative Loan Disbursement					
		Estimates		Actual			Actual as % of Estimate
		Appraisal	Revised	Loan 3334	Credit 2252	Total	
1992	Dec. 1991	4.00	8.03	6.02	2.01	8.03	200.8
	Jun. 1992	7.00	8.03	6.02	2.01	8.03	114.7
1993	Dec. 1992	11.00	11.41	9.40	2.01	11.41	103.7
	Jun. 1993	15.00	19.09	17.08	2.01	19.09	127.3
1994	Dec. 1993	25.00	33.14	31.13	2.01	33.14	132.6
	Jun. 1994	34.00	65.74	63.73	2.01	65.74	193.4
1995	Dec. 1994	53.00	66.16	64.15	2.01	66.16	124.8
	Jun. 1995	72.00	73.92	71.91	2.01	73.92	102.7
1996	Dec. 1995	89.00	74.66	72.22	2.44	74.66	83.9
	Jun. 1996	106.50	83.96	78.71	5.25	83.96	78.8
1997	Dec. 1996	117.00	90.63	85.38	5.25	90.63	77.5
	Jun. 1997	129.00	116.77	103.47	13.30	116.77	90.5
1998	Dec. 1997	137.00	127.16	109.23	17.93	127.16	92.8
	Jun. 1998	144.00	135.81	114.41	21.40	135.81	94.3
1999	Dec. 1998	150.00	138.30	114.88	21.40	136.28	90.9
	Sep. 1999	155.60	155.60	116.48	23.32	139.80	89.8

Date of Final Disbursement:



Notes:

Loan 3334 - IN: About US\$ 7.51 million remained undisbursed as of September 23, 1999, and have been cancelled.
 Credit 2252 - IN: As of September 27, 1999, disbursements totaled about SDR 16.75 million, equivalent to US\$23.32 million, and about XDR 6.65 million remained undisbursed, equivalent to about US\$9.22 million and have been cancelled (assuming an average US\$ equivalent of 1.387 per XDR)

Table 5: Key Indicators for Project Implementation
Table 5A - Summary

Key Implementation Indicators in SAR	Estimated	Actual
A. Institutional Component		
<p>1. <i>Training Program for CPCB and SPCBs</i></p>	<p>Four major areas: (a) quality assurance and quality control to enable all laboratory activities to be accomplished by qualified analysts; (b) laboratory instruments maintenance and operation (including safety for handling samples and equipment); (c) specialized technical training (environmental science), including on environmental chemistry and data handling and processing; and (d) supervisory training for management of laboratories and for project planning, formulation, management and reporting.</p>	<p>About 2000 participants from 25 SPCBs and state pollution control committees were trained through 152 training programs (85% with a one-week duration and the balance with a two-week duration), with a wide range of topics. About 40% of topics pertained to Management of Information; 16% to Environmental Monitoring; 12% to Pollution Abatement Technologies; 11% to Environmental Management and Policy-related issues; 11% to EIA, Audit and Risk Management; 8% to Control of Air and Water Pollution and Solid and Hazardous Wastes; and the balance of 2% to miscellaneous subjects. These programs were delivered by some 30 specialized Indian Institutions.</p> <p>In addition, three major overseas training programs in Canada, USA and Thailand were organized for 38 scientific and engineering staff of SPCBs and MoEF.</p>
<p>2. <i>Equipment to upgrade the technical capabilities of four Boards</i></p>	<p>Analytical and monitoring equipment for central laboratories and regional laboratories</p>	<p>Analytical and monitoring equipment for 4 SPCBs laboratories procured in four rounds of purchases.</p>
<p>3. <i>Refurbishing of laboratory facilities of four Boards</i></p>	<p>Provision or re-furbishing of laboratories, including: (a) civil works and equipment for adequate environmental control inside laboratories; (b) refurbishing of specialized rooms; (c) provision of office and laboratory space for Uttar Pradesh and Maharashtra SPCBs; and (d) utilities and data processing equipment.</p>	<p>22 central and regional laboratories were improved or expanded: 13 in Uttar Pradesh, 5 in Tamil Nadu and 4 in Maharashtra. Uttar Pradesh received 81% of total funding, Tamil Nadu 16%, and Maharashtra 3%. Gujarat did not submit any proposal.</p>

Key Implementation Indicators in SAR	Estimated	Actual
B. Investment Component		
<p>1. <i>Common Treatment Facilities</i></p>	<p>Design and implementation of common treatment facilities for treatment of waste water and solid materials at industrial estates and other sites with a heavy concentration of chemical and related industries, in particular for small scale.</p> <p>About 20 CETPs, for a total of about 4,700 small scale enterprises, processing a total of about 163,700 CM/day of effluent.</p>	<p>All CETPs financed under the project were for treatment of liquid effluents. Potential common solid waste treatment and disposals projects were excluded as they were intended to be financed under another project which was being prepared in parallel (Hazardous Waste Management Project).</p> <p>27 CETPs were implemented under the project, with funding from IDBI. These had 3,926 members as of June 1999. Total processing capacity: 143,000 CM/day of effluent. 26 other CETPs, with 1,613 members, also received grants under the project (but no funding from IDBI).</p>
<p>2. <i>Individual Plant Treatment and Control Facilities</i></p>	<p>Design and implementation of resource recovery, waste minimization and pollution abatement schemes by individual enterprises in targeted sectors (chemical and related industries including fertilizers, leather tanning, dyes, pesticides and insecticides, pharmaceuticals, petrochemicals, pulp and paper, and sugar and distilleries).</p>	<p>75 subprojects were approved and 69 were implemented (32 funded by ICICI and 37 by IDBI) in 14 states and 16 industrial subsectors.</p>
<p>3. <i>Demonstration Projects</i></p>	<p>Grants of up to US\$500,000 for at least eight subprojects by relatively small enterprises (below US\$5 million in fixed assets) and following conditions: (a) consisting of prototype innovative units in the field of waste minimization, resource recovery or pollution abatement; (b) involving an element of risk because of technological novelty and lack of commercial scale experience in India; (c) addressing treatment or disposal of toxic or hazardous waste materials, or having a large environmental impact on surrounding area; (d) requiring a comparatively large investment for pollution control by the sponsors, which cannot be reasonably financed on commercial terms; (e) demonstrating new approaches or techniques with potentially wide replication in India.</p>	<p>Due to difficulties in finding suitable eligible candidates, the ceiling of US\$5 million in fixed assets for sponsors was removed in 1995.</p> <p>12 subprojects were approved (70% submitted by sponsors with more than US\$5 million in fixed assets). Three projects were subsequently canceled. The other nine projects were implemented.</p>

Key Implementation Indicators in SAR	Estimated	Actual
C. Technical Assistance		
1. <i>Pre-investment studies</i>	For projects to be funded under the investment component.	Three studies were financed to prepare subprojects under a proposed Hazardous Waste Project:
2. <i>Technical Studies</i>	To assess the treatability of residues and or waste streams. Including laboratory equipment.	<ul style="list-style-type: none"> • Centralized Hazardous Waste Incineration Plant at Chennai • EIA and Feasibility Study for Common Hazardous Waste Treatment and Disposal Facility for TBIA • EIA and Feasibility Study for Ankleshwar Landfill
3. <i>Pilot Plant Studies</i>	Required to scale-up innovative treatment technologies.	<ul style="list-style-type: none"> • Municipal solid waste processing for production of organic manure (Thane) • Sewage Treatment using biofilter with specialized bio-product (Wockhart) • Treatment of polluted waters using endogenously manufactured specialty products (Wockhart)
4. <i>Technical Handbooks</i>	Preparation of environmental housekeeping manuals at different industries.	
5. <i>Organizational Study of the State Boards.</i>	Review of the functions, structure and staffing of the four participating SPCBs.	<ul style="list-style-type: none"> • Belliappa Committee Reports (two volumes) on Common Staffing Patterns and Present and Future Requirements of State Pollution Control Boards • Organization and Staffing of Pollution Control Boards (Administrative Staff College of India)
6. <i>DFI Training Program</i>	Training Program on Environmental Issues at IDBI and ICICI	Training programs were conducted for IDBI staff by the Indian Institute of Technology (Mumbai), mostly in technologies for pollution abatement and environmental assessment. About 400 officers were trained, mostly with rank of deputy general managers.

Key Implementation Indicators in SAR	Estimated	Actual
7. <i>Other Studies</i>		<ul style="list-style-type: none"> • Development of Environmental Performance Indicators. • Air Pollution Control in the Cement Industry in India. • Preparation of Software for Hazard Analysis in Process Industry • Epidemiological Survey of Effects of Environmental Pollutants in Pune Area; • Regional Environmental Study for Kumbh Mela Region of Haridwar, Rishikesh • EIA of the lime kilns, cement plant and allied units in Katni-Maihar (MP)

**Table 5B- Indicators for Project Implementation
Institutional Strengthening**

1. Training Offered by CPCB- Number of Courses

	1992-93	1993-94	1994-95	1995-96	1998-99	Total
Environmental Management and Policy	7		3	1	4	15
Perspective in Environmental Management	7		2		1	10
Environment and Development Policy Instruments			1	1		2
Environmental Management in Industry					1	1
Application of Spacial Technology in Environmental Management					1	1
Environmental Priorities and Sustainable Development					1	1
Environmental Impact Assessments & Audits	1	1	5		1	8
EIAs in Industrial Projects	1	1	4			6
Environmental Audits and EIAs			1		1	2
Laboratory Management, Monitoring Techniques, Quality Assurance	1		14		9	24
Laboratory Management	1		1		1	3
Sampling and Analysis of Samples (Air & Water)			3		1	4
Advanced Inst. Methods of Analysis			6		1	7
Analytical Quality Control			2		2	4
Bio-monitoring of Water Quality and River Water Quality			1		1	2
River Quality Modelling					1	1
Surveillance of Wastewater Treatment Units					1	1
Computer-based Pollution Studies of Industrial Effluents			1			1
Quantitative Methods in Industrial Pollution Control					1	1
Information Systems	39		10		3	52
Remote Sensing and GIS	6					6
Env. Statistics and Data Management	1					1
Management Information Systems	1				1	2
Documentation	1					2
PC Applications & Developments	30		10		1	41
Zoning Atlas for Siting of Industries					1	1
Solid and Hazardous Waste	2		5		5	12
Hazardous Waste Management	1		3			4
Solid Waste Management			1			1
Solid and Hazardous Waste Management	1		1		2	4
Management of Chemical Accidents					3	3
Air Quality	1		1		2	4
Air Quality Management	1					1
Air Pollution			1			1
Air Quality Monitoring and Control					2	2

	1992-93	1993-94	1994-95	1995-96	1998-99	Total
Water Quality Management/Water Pollution	1		33		6	10
Water Quality Management	1					1
Water Pollution			1		1	2
Waste Water Treatment and Treatment Technologies					1	1
Anaerobic Waste Water Treatment					1	1
Water Waste Management/Agroindustry			2			2
Wastewater Management/Chemical Industry					1	1
Wastewater Management in Textile/Other Industries					1	1
Soil and Groundwater Pollution and Monitoring					1	1
Marine Pollution			1		1	2
Noise Pollution Monitoring and Control					1	1
Industrial Safety, Risk Assessment and Hazard Analysis	1		3			4
Clean Technology	1		1		3	5
Clean Technology Audit and Waste Minimization	1		1			2
Cleaner Technology/Env. Mngt in Tanning Industry					1	1
Waste Minimization/Clean Production					1	1
Clean Coal Technology					1	1
Epidemiological Studies and Health Risk Assessments	2					2
Environmental Management by Specific Industries	2		1		3	6
Radiation and Pollution Control in Nuclear Fuel Cycle	1					1
Env. Improvement and Pollution Control in Cement and Building Materials Industry	1					1
Pollution Control in Coal and coal-based Industries			1			1
Environmental Management in Mining					1	1
Pollution Control in Iron and Steel Industry					1	1
CETP Design, Operation and Other Aspects					1	1
Total Number of Courses	58	1	46	1	39	145

Overseas Training Organized by MOEF:

1. Environmental Pollution Control Technologies, Policy and its Implementation- ETS Inc., USA- February 22 to March 27, 1999.
2. Clean Technologies for Pollution Prevention, Formulation and Implementation of Projects- University of Ottawa, Canada. February 22 to March 27, 1999.
3. Industrial Risk Assessment, Environmental Audit and EIA- AIT, Bangkok. February 22 to March 27, 1999.

**Table 5B-Indicators for Project Implementation
Institutional Strengthening**

2. Equipment Procured

Packages	Bid Invitation	Award	Delivery to Site	Amount
A. Procurement by DGS&D				
• Jeeps (61-64)		Sep. 1994	1994	Rs.12,539,976
• Voltage Stabilizers (114)			1994	n.a.
• Air Conditioners (over 100—103?)			1994-95	n.a.
• Power generators (35)		Sep. 1994	1994	Rs. 1,900,553
• Photocopying Machines (34?)			1995	n.a.
• Other Equipment				n.a.
<i>Sub-total DGS&D</i>				n.a.
B. Procurement by CPCB/NTCP				
1. CPCB I				
• Automatic Absorption Spectrophotometers (34)	May 1996	01-20-97	07-14-98	US\$1,324,537
• Gas Chromatographs (34)	May 1996	03-18-98	07-16-98	JPY75,677,200 =US\$630,600
<i>Sub-total CPCB I</i>				US\$1,955,137
2. CPCB II				
• High Performance Liquid Chromatographs (4)	Jan. 1997	11-05-98	04-30-99	JPY17,573,800
• TOC Analyzers (10)	Jan. 1997	02-15-99	06-30-99	DM621,200
• Digital Spectrophotometers (38)	Jan. 1997	11-10-98	03-25-99	Rs. 3,947,440
• Specific Ion Electrode Meters (34)	Jan. 1997	12-15-98	03-31-99	US\$217,212
• Dissolved Oxygen Meters (68)	Jan. 1997	12-15-98	03-31-99	
• Reverse Osmosis Water Purification Systems (34)	Jan. 1997	02-15-99	05-15-99	Rs. 13,854,640
• Side Loading Balances (38)	Jan. 1997	12-14-98	03-31-99	SFr176,890
• Top Loading Electronic Balances (38)	Jan. 1997	12-14-98	02-13-99	DM115,900 and Rs.114,000
• Noise Level Meters (34)	Jan. 1997	11-09-98	02-09-99	US\$163,186
<i>Sub-total CPCB II</i>				Rs.64,007,175 US\$1,523,980
3. CPCB III				
• Microwave Digesters		02-16-99	05-17-99	Rs. 10,640,000
• Total Kjeldahl Nitrogen Analyzers		02-17-99	05-18-99	Rs. 10,690,000
• Evaporators		03-05-99	06-04-99	RS.4,150,000
• Micro-pipettes		01-29-99	05-02-99	Rs.1,085,000
• Automatic Monitoring Stations		02-18-99	05-20-99	Rs. 26,000,000
• Combustion Analyzers		03-05-99	06-04-99	Rs. 270,000
• High Volume Air Samplers with Respirable Dust Sampling		01-29-99	05-02-99	Rs. 1,288,000

Packages	Bid Invitation	Award	Delivery to Site	Amount
<ul style="list-style-type: none"> • High Volume Samplers • Handy Air Samplers • Stack Monitoring Kits • Smoke Density Meters • Detectro Tubes and Accessories <p style="text-align: center;">Sub-total CPCB III</p>		02-16-99 01-29-99 02-18-99 03-05-99	05-18-99 05-02-99 05-20-99 06-04-99	Rs.4,594,000 Rs.2,026,000 Rs. 3,342,000 Rs. 1,445,000 Rs. 990,000 Rs.65,530,000 US\$1,560,240¹
<p>4. CPCB IV</p> <ul style="list-style-type: none"> • COD Digesters • Freezers • Colony Counter Benches • Laminar Flow Benches • Bacteriological Incubators • BOD Incubators • Muffler Furnaces • Hot Air Oven • Centrifuges • Vandorn Samplers • Heating Mantles • Magnetic Stirrers with Hot Plate • Rotary Shankers • Flocculators • Flame Photometers <p style="text-align: center;">Sub-total CPCB IV</p>		01-29-99 02-01-99 01-25-99 01-25-99 01-29-99 01-29-99 01-29-99 02-02-99 01-08-99 01-29-99 01-29-99 01-29-99 01-29-99 03-05-99	05-02-99 05-02-99 04-28-99 04-28-99 05-02-99 05-02-99 05-02-99 05-05-99 04-10-99 05-02-99 05-02-99 05-02-99 05-02-99 06-04-99	Rs.1,980,000 Rs. 1,334,000 Rs. 1,00,000 Rs.1,148,000 Rs.1,500,000 Rs.1,050,000 Rs.550,000 Rs. 589,000 Rs.1,068,000 Rs.601,000 Rs.775,000 Rs.154,000 Rs.675,000 Rs. 546,000 Rs.449,000 Rs.11,185,000 US\$266,310²
<p>Computer Equipment for DEA and PMUs in 20 Ministries and 20 States (Strengthening of External Portfolio Management)</p>	1995-96	1995-96	1995-96	n.a ³
<p>Implementation Cell Office Equipment</p>	1998?	1998?	1998?	Rs. 905,250= US\$23,000
Total Equipment Funded by IDA				US\$9,512,438⁴

¹ Declared ineligible due to late delivery after closing date.

² Declared ineligible due to late delivery after closing date.

³ Original allocation as per Amendment to DCA was US\$2,000,000.

⁴ Total IDA disbursements for equipment were US\$10.4 million, out of which it is possible that US\$0.89 million was disbursed against improvements to facilities necessary to receive the equipment (MoEF reports that US\$0.89 million were disbursed by IDA for these facilities). For lack of sufficient information, it is not possible to allocate the remaining US\$9.5 million among the various packages listed in this Table.

Table 5C. Indicators for Project Implementation
Common Effluent Treatment Plants Appraised by IDBI & Financed under the Project

1. Distribution by Size

	Number of Projects		Actual Total Project Cost		Sponsors contribution		Loan 3334 Disbursement		Credit 2252 Disbursement		State Subsidy	
	Nb.	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
Less than US\$ 500,000	6	22.2	2,263,614	5.6	1,081,607	6.0	164,291	1.4	491,679	10.0	526,034	8.8
US\$500,000 to US\$1,000,000	10	37.0	5,925,213	14.6	2,344,180	13.0	792,392	6.8	1,396,441	28.5	1,392,199	23.3
US\$1,000,000 to US\$2,000,000	6	22.2	7,990,491	19.7	3,137,401	17.3	2,572,850	22.1	892,944	18.2	1,387,296	23.2
US\$1,000,000 to US\$5,000,000	3	11.1	7,989,136	19.7	4,682,389	25.9	2,241,687	19.2	533,360	10.9	531,700	8.9
More than US\$5,000,000	2	7.4	16,460,535	40.5	6,844,496	37.8	5,882,175	50.5	1,585,956	32.4	2,147,908	35.9
Total Project	27	100.0	40,628,988	100.0	18,090,073	100.0	11,653,394	100.0	4,900,380	100.0	5,985,137	100.0

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Table 5C. Indicators for Project Implementation
Common Effluent Treatment Plants Appraised by IDBI & Financed under the Project

2. Distribution by Industrial Sub-sectors

IBRD Sub-project No.	Number of CETP's		Number of Participants		Treatment Capacity			Total Project Cost		Sponsors contribution		Loan 3334 Disbursement		Credit 2252 Disbursement		State Subsidy	
	Nb.	%	Nb.	%	Total per Sector		per Participant	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
					M3/day	%											
Chemical Industry	6	22	2,129	54	83,450	58	39	9,285,780	23	3,194,005	18	3,818,645	33	863,095	18	1,410,034	24
Tanneries	10	37	530	13	23,800	17	45	13,215,343	33	7,369,053	41	3,181,832	27	1,061,523	22	1,602,935	27
Dyes and Intermediates Industries	9	33	1,028	26	33,950	24	33	17,221,988	42	7,143,939	39	4,502,118	39	2,789,763	57	2,786,168	47
Other Multiple Industries and Shopping Centers (i)	2	7	239	6	1,800	1	8	905,878	2	383,079	2	150,799	1	186,000	4	186,000	3
Total Component	27	100	3,926	100	143,000	100	36	40,628,988	100	18,090,075	100	11,653,394	100	4,900,380	100	5,985,137	100

(i) include a shopping center and an industrial estate with different industries

**Table 5C. Indicators for Project Implementation
Common Effluent Treatment Plants**

3. Distribution by States

CETP's Appraised by IDBI and Financed under the Project

	Number of Projects		Status as of March 99		Total Project Cost		Loan 3334 Disbursement		Credit 2252 Disbursement		State Subsidy	
	Nb.	%	Commissioned or Being Started	Being Implemented	US\$	%	US\$	%	US\$	%	US\$	%
Tamil Nadul	16	59.3	6	10	16,273,235	40.1	3,515,338	30.2	1,868,969	38.1	2,406,787	40.2
Maharashtra	5	18.5	2	3	4,261,787	10.5	1,109,355	9.5	681,095	13.9	681,095	11.4
Gujarat	4	14.8	4		18,941,049	46.6	6,801,281	58.4	2,055,316	41.9	2,602,255	43.5
Uttar Pradesh	2	7.4	2		1,152,916	2.8	227,421	2.0	295,000	6.0	295,000	4.9
Total	27	100.0	14	13	40,628,988	100.0	11,653,394	100.0	4,900,380	100.0	5,985,137	100.0

Other CETP's

	Number of Projects		Status as of March 99		Comments
	Nb.	%	Commissioned or Being Started	Feasibility Study	
Andra Pradesh	3	5.9	3		
Gujarat	3	5.9	1	2	
Haryana	1	2.0	1		
Himachal Pradesh	4	7.8		4	
Karnataka	2	3.9	2		
Madhya Pradesh	1	2.0	1		
Maharashtra	1	2.0	1		
Punjab	4	7.8		4	
Rajasthan	2	3.9	2		
Tamil Nadu	15	29.4	9		of which 6 are not yet started
New Delhi	15	29.4		15	
Total	51	100.0	20	25	6

**Table 5C. Indicators for Project Implementation
Common Effluent Treatment Plants Appraised by IDBI and Financed Under the Project**

4. Distribution according to Treatment Capacity

	No. of CETPs		Average No of Participants	Average Capacity		Average Cost	
	No.	%		of CETP M3/day	Per Participant M3/day	per CETP US\$	per M3 Treated US\$
Up to 1000 M3/day	7	26	71	636	9	633,917	997
1000 to 2000 M3/day	5	19	43	1,460	34	504,233	345
2000 to 3000 M3/day	6	22	72	2,458	34	1,140,746	464
3,000 to 10,000 M3/day	5	19	71	4,700	66	1,512,192	322
More than 10,000 M3/day	4	15	607	23,250	38	4,816,241	207
Total Component	27	100	146	5,296	36	1,504,777	284.1187938

**Table 5C. Indicators for Project Implementation
Common Effluent Treatment Plants Appraised by IDBI & Financed under the Project**

5. Distribution according to Number of Members

	Number of CETPs	Total Number of Participants				Average Capacity of CETP M3/day	Total Project Cost		Sponsors contribution		Loan 3334 Disbursement		Credit 2252 Disbursement		State Subsidy	
		Actual			Initial Estimate		US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
		Total (i)	Medium	Small												
up to 50 Members	12	359	363	1	362	1,938	9,523,641	23	6,208,255	34	845,129	7	1,217,613	25	1,252,643	21
50 to 100 Members	7	456	479	40	439	2,250	6,300,908	16	2,376,421	13	1,606,812	14	914,120	19	1,403,555	23
100 to 500 Members	6	1,218	1,564	49	1,015	6,500	18,075,161	44	7,558,972	42	5,781,573	50	2,368,138	48	2,366,478	40
more than 500 Members	2	1,222	1,520	87	1,363	32,500	6,729,277	17	1,946,427	11	3,419,880	29	400,509	8	962,461	16
Total Appraised by IDBI	27	3,255	3,926	177	3,179	5,296	40,628,988	100	18,090,075	100	11,653,394	100	4,900,380	100	5,985,137	100

(i) It is estimated that most of the balance of 570 members is of large and medium polluting industries

**Table 5D. Indicators for Project Implementation
Individual Investments**

1. Distribution by Size

Number and Size of Individual Loans Approved

USS	<u>Individual Loans Approved</u>		<u>Loans Amounts Approved</u>	
	Nb.	%	Amount USS	%
less than 500,000	21	27.6	5,494,000	4.2
500,000 -1,000,000	16	21.1	11,813,000	8.9
1,000,000-2,000,000	13	17.1	17,870,000	13.5
2,000,000-3,000,000	9	11.8	20,131,072	15.2
3,000,000-5,000,000	12	15.8	46,876,375	35.4
5,000,000-8,000,000	5	6.6	30,125,000	22.8
Total Projects Approved	76	100.0	132,309,447	100.0

Number and Size of Individual Subprojects Implemented

USS	<u>Individual Projects Implemented</u>		<u>Total Cost of Project Implemented</u>	
	Nb.	%	Amount USS	%
less than 500000	11	15.9	3,691,390	0.6
500,000 -1,000,000	8	11.6	5,532,487	0.9
1,000,000-2,000,000	16	23.2	22,330,801	3.8
2,000,000-5,000,000	7	10.1	23,268,982	3.9
5,000,000-10,000,000	13	18.8	90,882,290	15.3
10,000,000-30,000,000	10	14.5	177,158,075	29.8
more than 30,000,000	4	5.8	272,389,111	45.8
Total Projects Implemented	69	100.0	595,253,135	100.0
Projects Cancelled or Undisbursed 1/	7			
Total Projects Approved	76			

1/ As of June 1999.

**Table 5D. Indicators for Project Implementation
Individual Investments**

2. Distribution by Type of Projects

<i>Type of Projects</i>	Number of Projects Approved		Loan Amount Approved		Loan Amount Disbursed		Total Costs of Projects Implemented	
	Nb.	%	US\$	%	US\$	%	US\$	%
	Pollution abatement and resource recovery	45	59.2	63,753,000	48.2	42,925,937	41.8	133,392,561
Cleaner technology through new facilities or process modification	16	21.1	39,738,072	30.0	36,713,071	35.7	254,692,935	42.8
Pollution control facilities for a new plant expansion of an existing plant	9	11.8	17,499,375	13.2	13,629,453	13.3	166,583,523	28.0
New Plants or Units to Recycle Wastes	6	7.9	11,319,000	8.6	9,471,082	9.2	40,584,115	6.8
Total Project	76	100.0	132,309,447	100.0	102,739,543	100.0	595,253,135	100.0

**Table 5D. Indicators for Project Implementation
Individual Investments**

3. Distribution by Category of Industry

Category of Industry	Number of Projects Approved		Loan Amount Approved		Loan Amount Disbursed		Total Costs of Projects Implemented	
	Nb.	%	Nb.	%	US\$	%	US\$	%
<i>Chemical and Related Industries Sector</i>								
Caustic Soda	12	15.8	36,533,000	27.6	33,874,131	33.0	244,898,107	41.1
Sugar/ethanol distillery	11	14.5	6,332,000	4.8	4,652,721	4.5	12,149,990	2.0
Petrochemicals	8	10.5	18,678,000	14.1	13,110,011	12.8	47,455,419	8.0
Pulp and Paper	8	10.5	13,714,000	10.4	9,321,035	9.1	31,450,947	5.3
Dyes and intermediates	7	9.2	8,888,000	6.7	3,515,464	3.4	7,558,518	1.3
Pharmaceuticals	5	6.6	1,015,000	0.8	782,857	0.8	1,337,385	0.2
Fertilizers	4	5.3	13,410,000	10.1	10,017,131	9.8	136,187,370	22.9
Pesticides	1	1.3	2,205,072	1.7	2,205,072	2.1	7,514,610	1.3
<i>Subtotal Chemical and Related Industries Sector</i>	<i>56</i>	<i>73.7</i>	<i>100,775,072</i>	<i>76.2</i>	<i>77,478,422</i>	<i>75.4</i>	<i>488,552,347</i>	<i>82.1</i>
<i>Other Polluting Industries</i>								
steel plant	7	9.2	7,214,000	5.5	6,184,257	6.0	11,720,898	2.0
Cement industry	5	6.6	5,878,000	4.4	4,261,489	4.1	9,081,347	1.5
Aluminium	3	3.9	9,190,000	6.9	7,437,000	7.2	38,680,000	6.5
Copper smelter	1	1.3	3,000,000	2.3	2,524,000	2.5	21,600,000	3.6
Thermal Power	1	1.3	1,530,000	1.2	1,077,000	1.0	16,000,000	2.7
other	3	3.9	4,722,375	3.6	3,777,375	3.7	9,618,543	1.6
<i>Subtotal other Polluting Industries</i>	<i>20</i>	<i>26.3</i>	<i>31,534,375</i>	<i>23.8</i>	<i>25,261,121</i>	<i>24.6</i>	<i>106,700,788</i>	<i>18</i>
Total Project	76	100.0	132,309,447	100.0	102,739,543	100.0	595,253,135	100.0

Note:

The subsectors for which sector profiles were prepared during project preparation are: Dyes and Intermediates,

Fertilizers, Leather Tanneries, Pharmaceuticals, Pesticides and Insecticides, Petrochemicals, Pulp and Paper, and Sugar and distilleries.

**Table 5D. Indicators for Project Implementation
Individual Investments**

4. Distribution by Type of Pollution

Type of Pollution	Number of Projects Approved		Loan Amount Approved		Loan Amount Disbursed		Total Costs of Projects Implemented	
	Nb.	%	Nb.	%	US\$	%	US\$	%
Hazardous Liquid Effluent	33	43.4	46,320,072	35.0	31,287,204	30.5	108,258,769	18.2
Dust and Gaseous Emissions	19	25.0	33,333,000	25.2	27,923,249	27.2	106,007,681	17.8
Solid Waste	4	5.3	3,908,000	3.0	2,980,011	2.9	7,016,419	1.2
Dust and Gaseous Emissions and/or Liquid Effluents and/or Solid Waste	20	26.3	48,748,375	36.8	40,549,079	39.5	373,970,266	62.8
Total Project	76	100.0	132,309,447	100.0	102,739,543	100.0	595,253,135	100.0

**Table 5D. Indicators for Project Implementation
Individual Investments**

5. Distribution by States

State	Number of Projects Approved		Loan Disbursement US\$		Total Cost US\$	
	Number	% of Total	US\$	% of Total	US\$	% of Total
Maharashtra	23	30.3	32,174,489	31.3	103,045,618	17.3
Tamil Nadu	13	17.1	16,646,327	16.2	179,194,535	30.1
Gujarat	9	11.8	16,549,079	16.1	136,410,060	22.9
Uttar Pradesh	2	2.6	5,435,684	5.3	29,726,684	5.0
Subtotal Project-targeted States	47	61.8	70,805,579	68.9	448,376,897	75.3
Madhya Pradesh	6	7.9	8,166,387	7.9	63,790,269	10.7
Rajasthan	2	2.6	6,196,270	6.0	17,485,538	2.9
Andhra Pradesh	7	9.2	4,040,892	3.9	15,186,977	2.6
Orissa	2	2.6	2,958,396	2.9	6,440,551	1.1
Karnataka	4	5.3	2,320,778	2.3	4,524,933	0.8
Pondicherry	2	2.6	1,541,590	1.5	8,600,145	1.4
Haryana	1	1.3	1,077,000	1.0	16,000,000	2.7
Bengal	1	1.3	158,000	0.2	450,000	0.1
Bihar	1	1.3	147,457	0.1	271,002	0.0
Punjab	1	1.3		0.0		
Projects implemented in Many Locations in India	2	2.6	5,327,194	5.2	14,126,823	2.4
Total Individual Projects	76	100.0	102,739,543	100.0	595,253,135	100.0

**Table 5D- Key Indicators for Project Implementation
Individual Investments**

6. Interest Rate Band on IDBI non-project Lending

From August 16, 1991	18-20% p.a
From November 19, 1992	17.5-19.5%
From March 15, 1993	17-19%
From August 10, 1993	16.5-18.5%
From September 8, 1993	15.5-18.5%
From March 1, 1994	14-17.5%
From October 19, 1994	15-17.5%
From February 20, 1995	15-18.5%
From April 20, 1995	15.5-18.5%
From November 1, 1995	15.5-19.5%
From November 20, 1995	16-19%
From February 26, 1996	16-20%
From July 1, 1996	17-21%
From October 23, 1996	16.5-20%
From May 1, 1997	15-18.5%
From July 1, 1997	14.5-18%
From October 24, 1997	13.5-17%
From January 22, 1998	14.5-18%
From April 13, 1998	14-17.5%
From March 17, 1999	13.5-17%

Source: IDBI

IPCPTA05D6

Table 6. Key Indicators for Project Operation

Table 6A- State Pollution Control Boards

1. Facilities

	Maharashtra		Gujarat		Tamil Nadu		Uttar Pradesh	
	1990/91	1998/99	1990/91	1998/99	1990/91	1998/99	1990/91	1998/99
Offices								
Regional Offices	5	11	4	7	4	5	13	16
District Offices	13	25	2	-	17	18	-	-
Field Offices	-	1	-	-	-	2	-	-
Laboratories								
Central	1	1	1	1	1	1	1	1
Regional	2	4	2	5	7	9	9	13
Field	-	2	-	-	-	-	-	-
Mobile Units	-	8	-	na	6	3	-	-

2. Staff

	Maharashtra ^{1/}			Gujarat			Tamil Nadu			Uttar Pradesh		
	1990/91	1992/93	1996/97	1990/91	1992/93	1996/97	1990/91	1992/93	1997/98	1990/91	1992/93	1998/99
Technical (Eng.) Staff	146	152	149	40	42	81	135	147	164	93	na	110
Scientific Staff	42	48	71	73	79	142	73	73	132	89	na	106
Admin., Financial & Legal	223	218	285	214	228	222	408	451	400	289	na	325
Total Staff	411	418	505	327	349	445	616	671	696	471	na	541
Increase over Period (%)												
Total Staff	-	2%	23%	-	7%	36%	-	9%	13%	-	-	15%
Tech. & Scientific Staff	-	6%	17%	-	7%	97%	-	6%	42%	-	-	19%
Tech. & Scientific as % of Total	46%	48%	44%	35%	35%	50%	34%	33%	43%	39%	na	40%

1/ Total staff by 1998/99 increased to 650, including 250 technical and engineering staff, or 38% of the total.

Table 6A. Key Indicators for Project Operation- State Pollution Control Boards

3. Regulatory Activity

	Maharashtra ^{1/}			Gujarat				Tamil Nadu			Uttar Pradesh		
	1990/91	1992/93	1997/98	1990/91	1992/93	1996/97	1998/99	1990/91	1992/93	1997/98	1990/91	1992/93	1998/99
Consents													
Granted	7,755	6,535	8,556	na	484	1,855	na	2,500	2,885	2,268	na	1,654	1,134
Rejected	na	-	-	na	153	895	na	-	-	232	na	1,959	1,486
NOC/Location Clearance													
Issued	283	na	na	na	1,210	693	na	-	-	8	na	na	1,414
Rejected	na	na	na	na	232	145	na	-	-	-	na	na	1,536
Industrial Samples Collected/ Analyzed	6,943	10,215	27,677	4,676	na	12,471	20,964	7,521	10,955	18,812	47916 1/	46,611	90,964
Inspections	5,266	6,710	10,542	9,058	11,500	22,480	24,801	20,000	20,000	21,649	14000 1/	14,500	20,500
Notices and Orders													
Notices Issued	na	na	na	na	na	516	na	na	17	7,879	na	na	1,281
Directions Issued (for time-bound programs) (cum)	na	na	1696 2/	na	na	38	na	na	na	10,916	na	na	
Closure orders issued	na	na	372 2/	na	na	na	na	na	na	1,299	3	na	630
Litigation (cumulative no.)													
Cases Filed	381	458	532	na	2,317	2,921	na	435	435	454	530	na	1,037
Cases Resolved in Favor of Board	138	199	240	na	490	704	na	108	128	176	148	na	646
Cases Pending	172	na	213	na	1,629	1,838	na	205	185	154	na	na	na

4. Productivity Indices (1990/91=100)

	1990/91	1992/93	1997/98	1990/91	1992/93	1996/97	1998/99	1990/91	1992/93	1997/98	1990/91	1992/93	1998/99
Productivity Indices													
Samples per Total Staff	17		55	14			47	12	16	27	102		168
Samples per Technical and Scientific Staff	37		126	41			94	36	50	64	263		421
Inspections per Total Staff	13		21	27			56	32	30	31	30		168
Inspections per Technical and Scientific Staff	28		48	80			111	96	91	73	77		95
Productivity Growth													
Samples per Total Staff	100		325	100			330	100	134	221	100		175
Samples per Technical and Scientific Staff	100		342	100			228	100	138	176	100		168
Inspections per Total Staff	100		163	100			228	100	92	96	100		130
Inspections per Technical and Scientific Staff	100		171	100			137	100	95	76	100		126

1/ Refers to 1991/92

2/ Refers to 1998/99

Table 6A. Key Indicators for Project Operation- State Pollution Control Boards

5. Revenues and Expenditures (Rs. Lakhs)

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
MAHARASHTRA										
<i>Revenues</i>										
Consent and Consent Form Fees	44	48	64	63	141	167	214	228	429	773
Water Cess Reimbursement	45	181	122	188	147	554	521	317	1001	560
Analysis Charges	0	0	1	1	1	1	1	26	60	86
Interest on Investments	na	na	44	46	44	95	128	265	307	na
Miscellaneous Sources	na	na	1	4	0	7	4	2	4	0
<i>Sub-total- Internally Generated</i>			232	302	333	824	868	838	1801	na
Grants from State Government	124	142	150	166	125	223	234	206	162	na
Grants from Central Government	20	8	11	136	61	70	8	6	1	56
Total Revenues			393	604	519	1117	1110	1050	1964	na
<i>Expenditures</i>										
Operating Expenses	na	na	220	257	280	410	462	540	759	na
Capital Expenditures	na	na	158	31	45	91	61	58	57	na
Total Expenditures			378	288	325	501	523	598	816	na
Surplus/Deficit			15	316	194	616	587	452	1148	na
<i>Share of Internally Generated to Total Resources</i>			59%	50%	64%	74%	78%	80%	92%	
<i>Share of Internally Gen. Resources to Expenditures</i>			61%	105%	102%	164%	166%	140%	221%	
<i>Share of Cess to Total Resources</i>			31%	31%	28%	50%	47%	30%	51%	
<i>Growth of Resources in Nominal terms</i>	100									
<i>Growth of Resources in Real terms</i>	100									
GUJARAT										
<i>Revenues</i>										
Consent and Consent Form Fees	8	12	6	na	na	na	na	na	226	425
Water Cess Reimbursement	38	52	44	na	na	13	116	103	178	203
Analysis Charges	na	87	105							
Interest on Investments	na	53	89							
Miscellaneous Sources	na	10	40							
<i>Sub-total</i>									554	862
Grants from State Government	150	90	na	na	na	na	na	na	248	466
Grants from Central Government	32	24	17	na	na	na	na	na	-	-
Total Revenues									802	1,328

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Expenditures										
Operating Expenses	na	na	713	1,280						
Capital Expenditures	na	na	89	48						
Total Expenditures									802	1,328
Surplus/Deficit										
Share of Internally Generated to Total Resources									69%	65%
Share of Internally Gen. Resources to Expenditures									69%	65%
Share of Cess to Total Resources									22%	15%
Growth of Resources in Nominal terms										
Growth of Resources in Real terms										
TAMIL NADU										
Revenues										
Consent and Consent Form Fees	39	252	288	338	461	492	516	616	750	1,368
Water Cess Reimbursement	4	28	41	68	103	11	253	446	455	100
Analysis Charges	25	30	30	72	85	107	127	126	120	196
Interest on Investments										
Miscellaneous Sources	12	35	31	1	76	217	137	251	151	638
Sub-total	80	345	391	479	726	828	1,032	1,439	1,475	2,302
Grants from Central Government	87	85	50	38	23	10	35	4	80	-
Total Revenues	167	431	441	517	749	838	1,067	1,443	1,555	2,302
Expenditures										
Operating Expenses	146	261	311	276	244	215	557	502	823	881
Capital Expenditures	37	40	41	100	180	252	30	119	96	91
Total Expenditures	183	301	352	375	424	466	587	621	920	973
Surplus/Deficit										
Surplus/Deficit	(16)	129	89	142	324	372	479	823	635	1,329
Share of Internally Generated to Total Resources	48%	80%	89%	93%	97%	99%	97%	100%	95%	100%
Share of Internally Gen. Resources to Expenditures	44%	115%	111%	128%	171%	178%	176%	232%	160%	237%
Share of Cess to Total Resources	2%	6%	9%	13%	14%	1%	24%	31%	29%	4%
Growth of Resources in Nominal terms	100	257	263	309	447	501	637	862	929	1375
Growth of Resources in Real terms	100	239	222	229	302	312	358	451	456	638

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
UTTAR PRADESH										
<i>Revenues</i>										
Consent and Consent Form Fees	72	88	45	89	124	102	95	125	135	283
Water Cess Reimbursement	7	65	92	106	766	836	1261	868	758	953
Analysis Charges	na									
Interest on Investments	na									
Miscellaneous Sources	na									
Sub-total										
Grants from State Government	19	20	na	0	10	41	90	108	202	0
Grants from Central Government	29	23	16	na	na	167				
<i>Total Revenues</i>										
<i>Expenditures</i>										
Operating Expenses										
Capital Expenditures										
<i>Total Expenditures</i>										
<i>Surplus/Deficit</i>										
<i>Share of Internally Generated to Total Resources</i>										
<i>Share of Internally Gen. Resources to Expenditures</i>										
<i>Share of Cess to Total Resources</i>										
<i>Growth of Resources in Nominal terms</i>										
<i>Growth of Resources in Real terms</i>										
Wholesale Price Index	100.0	107.4	118.4	134.7	148.2	160.6	178.0	191.1	203.7	215.5

Note: Table to be completed.

IPCPTA06A.XLS

**Table 6B. Key Indicators for Project Operation
Pollution Control in the Highly Polluting 17 Categories of Industries**

Year-end	Number of Units				Compliance Rate	
	Total	In Compliance	Closed	In Non-compliance	Total	Excluding Closures
Total India						
1992/93	1551	960	51	540	62%	64%
1993/94	1551	1154	74	319	74%	78%
1994/95	1551	1178	121	252	76%	82%
1995/96	1551	1237	111	203	80%	86%
1996/97	1551	1260	125	166	81%	88%
1997/98	1551	1261	125	165	81%	88%
1998/99	1551	1269	135	147	82%	90%
Total of Four States under the Project						
1992/93	855	644	20	191	75%	77%
1993/94	855	744	26	85	87%	90%
1994/95	855	737	34	84	86%	90%
1995/96	855	742	34	79	87%	90%
1996/97	855	764	39	52	89%	94%
1997/98	855	764	39	52	89%	94%
1998/99	855	766	42	47	90%	94%
Gujarat						
1991/92					72%	
1992/93	177	152	0	25	86%	86%
1993/94	177	162	2	13	92%	93%
1994/95	177	167	2	8	94%	95%
1995/96	177	167	2	8	94%	95%
1996/97	177	167	3	7	94%	96%
1997/98	177	167	3	7	94%	96%
1998/99	177	167	3	7	94%	96%
Maharashtra						
1991/92					62%	
1992/93	335	263	11	61	79%	81%
1993/94	335	289	14	32	86%	90%
1994/95	335	293	14	28	87%	91%
1995/96	335	293	14	28	87%	91%
1996/97	335	296	19	20	88%	94%
1997/98	335	296	19	20	88%	94%
1998/99	335	296	21	18	88%	94%
Tamil Nadu						
1991/92					70%	
1992/93	119	92	1	26	77%	78%
1993/94	119	108	2	9	91%	92%
1994/95	119	109	2	8	92%	93%
1995/96	119	114	2	3	96%	97%
1996/97	119	114	2	3	96%	97%
1997/98	119	114	2	3	96%	97%
1998/99	119	114	2	3	96%	97%
Uttar Pradesh						
1991/92					20%	
1992/93	224	137	8	79	61%	63%
1993/94	224	185	8	31	83%	86%
1994/95	224	168	16	40	75%	81%
1995/96	224	168	16	40	75%	81%
1996/97	224	187	15	22	83%	89%
1997/98	224	187	15	22	83%	89%
1998/99	224	189	16	19	84%	91%

Source: 1991/92: State Boards Annual Reports (Staff Appraisal Report of IPP Project)
1992/93 and beyond: Statistics Provided by CPCB •

Compliance is measured as having adequate facilities to comply with the standards and/or actual compliance.

Table 6C. Key Indicators for Project Operation
Common Effluent Treatment Plants Appraised by IDBI and Financed under the Project

1. Main Characteristics

IBRD Sub-project No.	Name of Sponsor, and CETP Location	No of Participants				Sector	Capacity M ³ /day	Type of Treatment	Preliminary Treatment	Effluent Recycling	Sludge	Transport	Actual Cost US\$
		Initial	Total	MSI	SSI								
C-IDBI-001	Common Effluent Treatment Plant (Thane Belapur) Association, Thane Belapur, Maharashtra (M).	345	404	49	355	Mixed Chemical Industries	12000	Activated sludge required from and tertiary treatment	required from members	partly (ind. and gardening)	sw project through association bieng implemented	drainage	1,215,231
C-IDBI-002	TIMA CETP Co-op. Society Ltd., Tarapur, M	106	150		150	mixed industries		Activated sludge required from members	no	plans for Sludge and waste disposal are being developed with MIDC	tankers sub-contracted		561,602
C-IDBI-003	Pallavaram Tanneries Industries Effluent Treatment Co. Ltd., Pallavaram, Tamil Nadu (TN)	106	152		152	tanneries	1000 3000	aerobic treatment	required, common chromium treatment unit	no	Sludge disposal plastic lined	pipeline with pumping stations	2,205,939
C-IDBI-005	Unnao Tanneries Pollution Control Company Ltd., Unnao, Uttar Pradesh (UP)	17	21		21	tanneries	2150	two stage aerobic process, based on ASP	required chrome is recovered	no but R&D for recycling for irrigation or in tannereis	temporary deposit. SPCB is developing a new Hazardous w deposit	gravity pipeline	614,020
C-IDBI-006	Kodaikanal Effluent treatment company Ltd., Kodaikanal, TN	89	89		89	commercial center	800	two stage aerobic process, based on ASP	not required	no		in house drainage	344,276
C-IDBI-007	Gujarat Industrial Development Corporation (GIDC) Ltd., Vapi, Gujarat (G)	966	615	30	550	Chemicals in industrial area	55000	two stage biological process, based on ASP	preliminary and primary treatment required from members	no, but R&D for irrigation	sludge used in plant as soil conditioner. R&D for generalization. Also designing a common waste deposit	pipeline	5,140,078
C-IDBI-009	Ayyampet Muthialpet Bleaching & Dyeing Ind. Effluent Treatment Co. Ltd., Ayyampet-Muthialpet, TN.	58	58		58	dying and bleaching industries	1500	two stage acorobic process, based on ASP		n.a	used as land fill	pipe conveying system	448,898
C-IDBI-010	Ranipet SIDCO Finished Effluent Treatment Co. Ltd., Ranipet, TN	88	86		86	tanneries	2500	two stage acorobic process, based on Activated sludge process	required from members	used for irrigation	temporary secured landfill. TNPCB is developing common Hazardous w deposit	underground pipe	1,102,405
C-IDBI-011	Vaniyambadi Effluent Treatment Co. Ltd., Valayampet, Vaniyambadi, TN	20	20		20	tanneries	1200	two stage acorobic process	required from members	to be used for irrigation	to be stored in a site to be identified by TNPCB	pipeline	568,918

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IBRD Sub-project No.	Name of Sponsor, and CETP Location	No of Participants				Sector	Capacity M ³ /day	Type of Treatment	Preliminary Treatment	Effluent Recycling	Sludge	Transport	Actual Cost US\$
		Initial	Total	MSI	SSI								
C-IDBI-012	TALCO Ranipet Tannery Effluent Treatment Company Ltd, Ranipet, TN	76	76		76	tanneries	3850	activated sludge	not required from members, chromium is precipitated in CETP;	na	11/2 year secured landfill. other disposal to be indicated by TNPCB	common collection and pumping to CETP	1,483,216
C-IDBI-013	Karur Thiruvai Dyeing Enviro Ltd., Karur, TN	57	57	20	37	dying and bleaching industries	2100	activated sludge			land filling	conveying main	617,335
C-IDBI-014	Perfect Enviro Control Systems Pvt. Ltd. Sarigam, Gujarat	6	6	1	5	chemical	200	activated sludge (secondary & tertiary)	all members also have primary treatment	to GIDC drainage.	operate a secure hazardous waste storage with the authorization for 6 t/m	pumping and pipeline transport	445,516
C-IDBI-015	Amravati Pollutech Ltd., Karur. TN	52	52	20	32	dying and bleaching industries	2500	activated sludge			land filling	conveying main	758,055
C-IDBI-017	Karur Andankoil Pollution Control Ltd., Andankoil.	47	47		47	dying and bleaching industries	1900	activated sludge			land filling	conveying main	507,029
C-IDBI-018	Vishram Tanners Enviro control Systems (P.) Ltd., Melivishram, TN	36	36		36	tanneries	3400	activated sludge	required from members	released in agricultural land	land filling	conveying main	1,053,717
C-IDBI-019	Perumalpet Effluent Treatment (P) Ltd., Perumalpet, TN- not yet completed	50	50		50	tanneries	4000	activated sludge and solar evaporation for soak liquor		released in agricultural land	land filling	conveying system	3,748,198
C-IDBI-021	Taloja CETP Co-operative Society Ltd., Taloja.	256	905	57	813	chemical	10000	activated sludge	preliminary treatment required from small-scale members, primary and secondary treatment required from medium- and large-scale members		to be stored in a site to be identified by MPCB	MIDC collection and drainage pipeline	1,589,199
C-IDBI-022	Mathura Audyogik Chettra 'A' Pradhushan Nivaran Co.Ltd., Mathura, UP	30	30		30	dying industries; saries printing unit	6250	two stage acorobic process, based on ASP	required from members	UPSIDC drain	temporary deposit. UPPCB to identify a suitable site for Hazardous w deposit	underground conveyance system	538,896
C-IDBI-023	ACAMA CETP Cooperative Society lida. Ambemath-Maharashtra	34	34		34	chemical	250	two stage acorobic process, based on ASP					158,822

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IBRD Sub-project No.	Name of Sponsor, and CETP Location	No of Participants				Sector	Capacity M ³ /day	Type of Treatment	Preliminary Treatment	Effluent Recycling	Sludge	Transport	Actual Cost US\$
		Initial	Total	MSI	SSI								
C-IDBI-024	Dombivli CETP Plant Ltda. Dombivly, Maharashtra.	165	165		165	chemical and textile industries	6000	two stage aerobic process, based on ASP	Preliminary Treatment and detoxication of effluent by members required	landfill in sites as indicated by MPCB	MIDC underground collection and conveyance system	736,934	
C-IDBI-025	Karur Taluka Dyeing & Bleaching Effluent Treatment Company. Ltd., Ramkrishnapuram. (not completed as of June 18, 1999)	45	45		45	dying and bleaching industries	1500	two stage aerobic process, based on ASP		landfill in sites as indicated by SPCB	collection and conveying system	475,597	
C-IDBI-026	Karur Vanchi Dyeing Enviro Tech Ltd., Light House Sector, Karur.	46	46		46	dying and bleaching industries	1200	two stage aerobic process, based on ASP		landfill in sites as indicated by SPCB	collection and conveying system	520,723	
C-IDBI-028	Enviro Technology Ltd. Ankleswar	96	193		193	dying and bleaching industries	1000	two stages aerobic process based on ASP plus tertiary to reduce COD.	not required: members pay according to their effluent	to GIDC drainage system. TDS and chlorides yet to high for recycling	from primary treatment to cement or landfill. Other sludge in centralised secured landfill developped & operated by CETP	CETP's rubber lined tankers	2,034,998
C-IDBI-029	Melvisharam Tanneries Effluent Treatment Co. Ltd, Melpudupet, TN. (not completed as of June 18, 1999)	19	19		19	leather processing	600	combined aeration and biosolar treatment process	soak liquor is evaporated by the industries in solar pans and prelimin. treatment required	disposed to a land filling at sites nullah identified by TNPCB	collection and pumpng system	501,701	
C-IDBI-030	Melvisharam Tanneries Effluent Treatment Co. Ltd Chettythangal, TN (not completed as of June 18, 1999)	9	9		9	leather processing	600	combined aeration and biosolar treatment process	soak liquor is evaporated by the industries in solar pans and prelimin. treatment required	disposed to a land filling at sites nullah identified by TNPCB	collection and pumpng system	390,505	
C-IDBI-031	TALCO Dindigul Tanners Enviro Control Systems Pvt. Ltd., Dindigul, TN	36	61		61	leather processing	2500	anaerobic treatment	soak liquor is evaporated by the industries in solar pans and prelimin. treatment required	proposed for use temporarily in irrigation in plastic bags in CETP premises	collection, pumping and under ground conveyance system	1,546,723	
C-IDBI-032	Green Environment Services Co-operative Society Ltd. Vatva, G	400	500			dyes and intermediates	16000	biological aerobic process	pre-treatment and desintoxication treatment required from beneficiaries	to Pirana sewerage system	deposit in a solid waste dumping site.	network of piplies	11,320,457
Total		3255	3926	177	3179							40,628,988	

Notes: SSI and MSI are respectively small and medium scale industries; ASP: Activated Sludge Process

Table 6C. Key Indicators for Project Operation
Common Effluent Treatment Plants Financed under the Project
2. Outcome of a Sample of 13 CETPs

IBRD Sub-project No.	Name of Sponsor, and CETP Location	Legal Compliance 1/			Capacity Utilization	Cost Charging System	Revenue Collection System	Type of Ownership and Management
		Influent	Effluent	Sludge				
C-IDBI-001	Common Effluent Treatment Plant (Thane Belapur) Association, Thane Belapur, Maharashtra (M).	in compliance	compliance (meets standards except for TDS)	not in compliance	optimal	initial capital contribution and monthly fixed cost are differently charged for SSI and other units. treatment costs are based on 65% of water consumption for SSI and consumption and COD for other units. Favorable to SME	Satisfactory. Through MIDC water bills	The CETP association (Thane Bellapur). At the initiative of MIDC and MPCB.
C-IDBI-002	TIMA CETP Co-op. Society Ltd., Tarapur, M	not in Compliance	not in compliance	not in compliance	optimal. an upgrade and expansion is being implemented to meet the standards	fixed cost levied based on water consumption with a minimum level of up to 99m3 and a maximum level for consumptions above 4500 m3. Variable costs are equally devised between units.	Satisfactory. Through MIDC water bills	Tarapur Industrial Manufacturer Association (TIMA) cooperative. At the initiative of MIDC and MPCB.
C-IDBI-003	Pallavaram Tanneries Industries Effluent Treatment Co. Ltd., Pallavaram, Tamil Nadu (TN)	in compliance	not in compliance process modifications are being implemented	in compliance for the short term	operating at 80% of total design capacity.	equity contribution, fixed costs and variable costs are the same for all members units irrespective of their size	not satisfactory. The company is in default to repay the loan to IDBI and will probably become a sick unit.	Pallavaram Tanners Industrial Effluent Treatment Company Ltd
C-IDBI-005	Unnao Tanneries Pollution Control Company Ltd., Unnao, Uttar Pradesh (UP)	in compliance	in compliance	not in compliance	optimal. application for other potential members	Equity participation according to size. charge on 100% water consumption at a flat Rs. 9.25/m3	Good, only the 5 smaller units have some problems due to recession in the industry however, the CETP has some financial cushion	Unao Tanneries Pollution Control Co. registered under the Cos act 1956 based on no-profit no loss concept
C-IDBI-007	Gujarat Industrial Development Corporation (GIDC) Ltd., Vapi, Gujarat (G)	not always in Compliance		not in compliance	in addition effluents from small non polluting industries and some domestic sewage are treated without charge	project cost to repay IDBI loan and operational costs are shared based on 60% of water consumption. For COD higher than 1000mg/l, a 100% operating cost penalty is charged	some problem in collection	initially GIDC. Now the VAPI Waste and Effluent Management Company Ltd. The large industries were obliged to join the CETP, while they had their own facilities.
C-IDBI-010	Ranipet SIDCO Finished Effluent Treatment Co. Ltd., Ranipet, TN	in compliance	in compliance	in partial compliance for the short term. Sludge is also partially used for manure used in green belt development.	optimal	the initial contribution and the charges are being shared equally.	Satisfactory.	Ranipet SIDCO effluent treatment Co Ltd
C-IDBI-011	Vaniyambadi Effluent Treatment Co. Ltd., Valayampet, Vaniyambadi, TN	primary treatment is already performed in member units	not yet completed	not in compliance	not yet started	flat fixed and variable charges per m3 effluent		VANIYAMBADI effluent Treatment Co Ltda.
C-IDBI-012	TALCO Ranipet Tannery Effluent Treatment Company Ltd, Ranipet, TN	compliance	compliance (meets standards except for TDS)	compliance	optimal and full membership	contribution paid by all members. Service charges are based on flat price per Kg of skin or hide treated. Possible since all the tanneries are of the same type	Satisfactory. Leverage through TNPCB: in case of non-payment the effluent is not accepted and TNPCB is informed. TNPCB initiates action against non-compliers.	Talco Effluent Co. Ltd.

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IBRD Sub-project No.	Name of Sponsor, and CETP Location	Legal Compliance 1/			Capacity Utilization	Cost Charging System	Revenue Collection System	Type of Ownership and Management
		Influent	Effluent	Sludge				
C-IDBI-014	Perfect Enviro Control Systems Pvt. Ltd. Sarigam, Gujarat	in compliance they all have a primary treatment	generally in compliance	in compliance.	optimal. members inclined to do more recycling	all members have contributed to the initial satisfactory equity and to a bridge deposit (interest free). Charges are based: (i) on a pollution factor calculated for each unit from the BOD and COD of its effluent; and (ii) the effluent quantity of each unit. Cost plus		organized by the member units which set up the CETP under a new company, when the SPCB norms were revised and it became imperative to the units to have a secondary treatment
C-IDBI-021	Taloja CETP Co-operative Society Ltd., Taloja.	SSI are required to have a preliminary treatment and the medium to large ind. which were obliged to join CETP must have primary and second. treatment.	not yet started			For large and medium industries charges are based only on volumes of effluent. For small industries they are based on pollutants (COD) and BOD.	should be satisfactory. will be by MIDC through the monthly water bills	cooperative company, with tripartite agreement between GIDC, CETP and the members
C-IDBI-028	Enviro Technology Ltd. Ankleswar	in compliance	in compliance. the CETP provide primary, secondary and tertiary treatment and ensure removal of acidity, COD, BOD, heavy metals from SSI effluent	in compliance	optimal. waste minimization is carried out by members to reduce cost. This helped accommodate new members and 200 m3 of sewage from GIDC colony	Members are not required to have primary treatment. Flat fixed and variable costs are charged per volume treated. Variable charge is based on pollution load (acidity and COD) of effluent received. Have paid 10% dividend to all equity holders.	satisfactory. A deposit is required from all members as working capital.	Company operated on a commercial basis. United Phosphorus is the main promoter (51%) and 36 members are also equity partners. The major promoters who are in large and medium industries are not utilizing the facility which is kept for SSI.
C-IDBI-031	TALCO Dindigul Tanners Enviro Control Systems Pvt. Ltd., Dindigul, TN	in compliance	generally in compliance, except for TDS and chlorides	not in compliance, stored in plastic bags in premises	satisfactory	flat charge based on a price per kg of raw hide or skin treated	satisfactory. Leverage through SPCB	cooperative company. All members contributed in equity and in deposit
C-IDBI-032	Green Environment Services Co-operative Society Ltd. Vatva, G	Claimed to be in compliance, consent requested	Claimed to be in compliance, consent requested	not in compliance	the project has recently started and as of May 99 was operating at 50% of its capacity	Equity contribution was collected. Fixed charges on booked volume of effluent. Treatment charges based on COD load of effluent. Penalties are also charged if influent is above standards for SS, ammon. N, heavy metals, oil&grease, and phenolic compounds	treatment costs started to be charged only in April 99	cooperative society Ltd. with a 14 directors board. day to day operation is supervised by a six-member office

1/ According to information obtained from questionnaires sent to CETPs and to the Environmental Performance Indicators Study.

Table 6C. Key Indicators for Project Operation
3. Gujarat- Impact of 9 CETPs in Operation on Quality of Receiving Water Bodies

Location of CETP	Name of Receiving Body	Parameter (mg/l except PH)	Prior to Operation	After Operation
Vapi *	Estuary of Damanganga	PH	7.3	7.3
		DO	2.6	5.6
		BOD	29	13
		COD	260	29
Sarigam *	Estuary of Tokar-khadi	PH	7.6	7.4
		DO	Nil	6.2
		BOD	194	15
		COD	583	68
Ankleshwar *	Amala Khadi, going to Estuary of Narmada	PH	5.5	5.7
		DO	0.9	1.5
		BOD	336	71
		COD	1,358	191
Nandesari	ECP going to Estuary of Mahi	PH	7.8	7.7
		DO	Nil	1.2
		BOD	228	74
		COD	550	103
GIDC, Vatva *; GIDC, Odhav; and Gumsav, Odhav	Going to Khari River	PH	2.1	7.5
		DO	Nil	Nil
		BOD	983	307
		COD	1,793	761
GIDC, Dhareshwar (Rajkot)	Public sewer of Rajkot (CETP outlet)	PH	6.9	7.2
		DO	Nil	0.5
		BOD	575	57
		COD	2,386	151
Jetpur	Open land for irrigation, at outlet (formerly going to river)	PH	7.25	7.5
		DO	Nil	3.5
		BOD	53	10
		COD	305	50

*: Financed under the project.

Source: Gujarat State Pollution Control Board

Table 6C. Key Indicators for Project Operations
4. SPCB Standards for Typical Common Effluent Treatment Plants

Parameter	Gujarat	Uttar Pradesh	Tamil Nadu	Maharashtra
PH	6.5-8.5	7-8.5	6.5-9.0	6.5-9.0
BOD (mg/l)	20	30	30	100
COD (mg/l)	250	250	250	250
TSS (mg/l)	100	100	100	100
TDS (mg/l)	2,100		2,100	2,100
Chromium (Cr)(mg/l)	2.0	<0.5	2.0	Nil
Hexavalent Chromium (mg/l)	1.0		0.1	Nil
Mercury (Hg) (mg/l)	0.01			0.01
Arsenic (mg/l)	0.2			0.2
Chlorides (mg/l)			1,000	600
Phenolic Compounds (mg/l)	1.0			

Table 6D. Key Indicators for Project Operation - Individual Investments - Main Characteristics and Outcome

Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
ICICI-B-001	Ballarpur Industries Ltd.	Haryana	Emissions control	Thermal Power	Waste minimization, and resource recovery. Use of fly ash from an other industrial unit for concrete blocks production	Waste minimization through the use of fly ashes	1,530,000	16,000,000
ICICI-B-002	Malladi Drugs & Phar.Ltd	Tamil Nadul	Liquid effluent control and treatment	Pharmaceuticals	Pollution abatement, resource and energy recovery by adding an effluent treatment facility with a biogas reactor	The company now comply with the state discharge standards. In addition to the treatment of plant effluent the system produce methane and allow a reduction in fuel costs	290,000	480,000
ICICI-B-003	Hukumchand Jute Ind. Ltd.	Madhya Pradesh	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology. replacement of 12 mercury cells by 8 membrane cells out of a total of 38 installed (financed by IDBI B06) and installation of an effluent treatment system for about 150 m3/day	The plant effluent is now in compliance (Hg is less than 0.006 mg/l and COD less than 40 mg/l)	1,030,000	7,420,000
ICICI-B-004	Bayer India Ltd.	Maharashtra	Emissions control	Petrochemicals	Cleaner technology. Production of pastille products in replacement of flakes produced in old plant to reduce dust emissions, minimize recycling and increase capacity.	Easier handling and dust free working environment	660,000	1,610,000
ICICI-B-005	Century Text. & Ind. Ltd.	Maharashtra	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology. Replacement of 9 mercury cells by 4 membrane cells out of 34 installed for the fabrication of caustic soda.	Partial reduction of Hg pollution. In addition the process allows energy savings. However, large part of the company mercury cells is yet in operation	2,230,000	10,170,000
ICICI-B-006	Nath Pulp & Paper Ltd.	Maharashtra	Liquid effluent control and treatment	Pulp and Paper	Pollution abatement and resource recovery, through the black liquor treatment for BOD, COD and color	BOD and COD were reduced respectively 2000ppm and 7000 ppm before the project to respectively 30 and 250 ppm. In addition, alkali and lignin are recovered.	1,830,000	5,400,000
ICICI-B007; IDBI-B011	Atul Products Ltd.	Gujarat	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology. Replacement of all mercury cells by membrane cells for the manufacture of caustic soda.	Reduction of Hg pollution. In addition the process allows energy savings. No liquid effluent is discharged from this new plant. In addition to the control systems in place in its complex, Atul is implementing a secure land fill.	2,668,000	7,500,000

Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
ICICI-B-008	Atic Ind. Ltd./Atul	Gujarat	Liquid effluent control and treatment	Dyes and Dye Intermediates	Pollution abatement. construction of an effluent treatment facility	Except for COD, which is in the range 220-350, the effluent is now in conformity	2,280,000	3,710,000
ICICI-B-009	IPCA Labs. Ltd.	Madhya Pradesh	Liquid effluent and toxic waste control	Pharmaceuticals	Cleaner technology and pollution abatement and resource and energy recovery. Waste minimization through process changes. Waste heat recovery from gases before they are scrubbed. modernization of the effluent treatment facility.	The company now is complying with state discharge standards. BOD and COD were respectively reduced from 400 and 2000 mg/l to less than 50 and 200 mg/l. Treated water is used for agriculture. Waste was minimized. and by products are recovered and sold.	145,000	270,000
ICICI-B-010	Indian Aluminum Co. Ltd.	Orissa	Fluoride emissions control	Aluminu Smelter	Pollution abatement		3,370,000	4,520,000
ICICI-B-011	Gujarat Alkalis & Chem. Ltd.	Gujarat	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology		4,710,000	63,200,000
ICICI-B-012	Hindalco Ind. Ltd.	Uttar Pradesh	Fluoride and dust emissions control	Aluminu Smelter	Pollution abatement and resource recovery, through the installation of a dry scrubber and modernization of alumina plant	Fluorine and dust emissions are now in compliance with standards. They are respectively 0.725 kg/t produced and 30 mg/Nm ³ (standards are 150mg/Nm ³ and 1kg/t) economy of Rs. 500,000/day for alumina and aluminum fluoride recovered. Certified ISO 14001.	5,000,000	28,410,000
ICICI-B-013	Alufluoride Pvt. Ltd.	Andra Pradesh	Toxic liquid effluent (fluosilicic acid)	Aluminu Fluoride plant	Aluminu fluoride plant based on by-product fluosilicic acid produced in a nearby fertilizer industry during gas scrubbing	This is an industrial project to produce 3,500t/y of aluminu fluoride recycling about 4,000 t/y by product fluosilicic acid. The acid can also be used in drinking water production for dental protection.	820,000	5,750,000
ICICI-B-014	Gokak Patel Volkart	Karnataka	Liquid effluent control and treatment	Dyes and Dye Intermediates	Pollution abatement		164,000	236,000
ICICI-B-015	Sudarshan Chem.Ind.Ltd	Maharashtra	Liquid effluent control and treatment	Dyes and Dye Intermediates	Pollution control facilities of a new industrial plant.	Effluent treatment facility at a new dye plant. The plant is within the standard limits of SPCB for COD and BOD	670,000	900,000

Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
ICICI-B-016	Kap Chem Ltd.	Karnataka	Liquid effluent control and treatment	Ethanol distillery	Pollution abatement and energy recovery through the setting up of a bio-methanization effluent treatment plant.	The plant is stopped since 1993. The project is expected to start by July 1999. In addition to effluents levels guaranteed which are in compliance with standards the plant will produce about 20,000m3 of methane	680,000	1,200,000
ICICI-B-017	Rohit Pulp & Paper Ltd.	Gujarat	Liquid effluent control and treatment	Pulp and Paper	Pollution abatement		220,000	
ICICI-B-018	Finolex Ind. Ltd.	Maharashtra	Air and water effluent control	Petrochemicals	Pollution abatement and resource recovery in a PVC plant	The plant effluents are now in conformity with the SPCB standards.	2,430,000	6,500,000
ICICI-B-019	NRC Ltd (Nat.Rayon Corp)	Maharashtra	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology, through the replacement of all 24 mercury cells by 8 membrane cells for the manufacture of caustic soda.	Elimination of Hg pollution and in addition, the process allows energy savings. no liquid effluent is discharged.	2,000,000	2,365,483
ICICI-B-020	Madras Fertilizers Ltd.	Tamil Nadul	Liquid effluent control and treatment	Fertilizers	Pollution abatement and resource recovery through the modernization of the existing effluent treatment plant and installation of monitoring equipment	The plant is in conformity and with the SPCB load standards for the fertilizer industry. In addition, the company treat the city sewage and use it as cooling water, reducing its needs by 10%	2,100,000	8,010,000
ICICI-B-021	Thiru Arooran Sugars Ltd.	Tamil Nadul	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution abatement and energy recovery through the installation of a bio methanization reactor.	In addition to the removal of 87% of COD and BOD, important energy costs savings and the treated effluent is transformed in bio compost.	833,000	1,714,286
ICICI-B-022	Globe Organics Ltd.	Andra Pradesh	Liquid effluent control and treatment	Pharmaceuticals	Pollution abatement and resource recovery		130,000	
ICICI-B-023	Kothari Sugars & Chem.Ltd.	Andhra Pradesh	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution abatement and energy recovery through the installation of a bio methanization reactor.	In addition to the removal of 90% of COD and BOD, important energy costs savings (210 KWh are generated) and the treated effluent is transformed in bio compost.	580,000	4,000,000

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Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
ICICI-B-024	Rama Newsprint & Papers Ltd.	Gujarat	Liquid effluent control and treatment	Pulp and Paper	Pollution control facilities of a new industrial plant, based on second hand equipment. Include an effluent treatment plant, ash handling, and electrostatics precipitators.	Gas emissions and effluents are within the SPCB limits. About 96% and 93% of BOD and TSS are removed from effluent and 99.7% of the fly ash is collected.	3,000,000	5,364,000
ICICI-B-025	IFB Agro Ind. Ltd.	Bengal	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution abatement and energy recovery through the installation of a bio-methanization reactor.	In addition to the removal of 90% of COD and BOD, important energy costs savings. The statutory requirement is met by some dilution.	170,000	450,000
ICICI-B-026	Sterlite Industries Ltd.	Maharashtra	Emissions control	Copper smelter	Pollution control facilities of a new copper smelter plant with a double absorption sulfuric acid plant to recover the sulfur dioxide gases.	The plant has a continuous monitoring plan for stack emissions and ambient air, effluents and solid wastes. The company meets all standards. It achieved zero discharge of effluents by full recycling. Solid waste is stored in plastic lined ponds.	3,000,000	21,600,000
ICICI-B-027	Grasim Ind. Ltd.	Madhya Pradesh	Emissions control	Petrochemicals	Pollution abatement, through the installation of electrostatic separators to control fly ash from boilers	Compliance with standards and improvement of working conditions	500,000	1,300,000
ICICI-B-028	Shreyans Ind. Ltd.	Punjab	Liquid effluent control and treatment	Pulp and Paper	Pollution abatement		270,000	
ICICI-B-029	Rajashri Sugars Ltd.	Tamil Nadu	Solid waste control and disposal	Sugar/ethanol distillery	Pollution abatement		330,000	
ICICI-B-030	Century Text. & Ind. Ltd.	Maharashtra	Air and water effluent control	Petrochemicals	Pollution abatement, through the modernization of control facilities. Dust control and ETP in the rayon plant	SPM level of exhaust gases came down from 150 mg/Nm ³ to less than 100 mg/Nm ³ , and is within SPCB norms. Liquid effluent from ETP well below the limits for pH, TSS, BOD and COD.	968,000	1,300,000
ICICI-B-032	Aurangabad Paper Mills Ltd.	Maharashtra	Emissions and liquid effluent control and treatment	Pulp and Paper	Pollution abatement and resource recovery		2,000,000	

Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
ICICI-B-033	Lanco Ind. Ltd.	Andhra Pradesh	Solid waste control	Pig-iron cement plant	Pollution abatement and resource recovery	Use of solid waste such as iron ore fines, clinker, slag, coke fines in the production of slag cement	2,218,000	4,310,000
ICICI-B-034	Jaysynth Dyestuff Ltd.	Gujarat	Liquid effluent control and treatment	Dyes and intermediates (Pigments factory)	Pollution abatement through the construction of an ETP	ICR mission found the ETP very bad in terms of operation and maintenance. The wet sludge were bagged and stored in plastic bags by workers in very bad working conditions. Also they were obliged to join the CETP and decided to stop the biologic treatment.	750,000	1,010,000
ICICI-B-035	Indian Dyestuff Ltd.	Maharashtra	Liquid effluent control and treatment	Dyes and intermediates	Pollution abatement		4,200,000	
ICICI-B-036	Mysore Petrochem. Ltd.	Maharashtra	Liquid effluent control and treatment	Petrochemicals	Pollution abatement, waste minimization, and resource recovery. Use of liquid effluent from phthalic anhydride plant to produce Maleic anhydride	Minimization of liquid effluent and resource recovery	4,760,000	10,808,000
ICICI-B-037	SIV Ind. Ltd.	Tamil Nadul	Liquid effluent control and treatment	Petrochemicals	Pollution abatement and prevention. Resource recovery	Not yet completed, partly financed under the IPP project.	8,000,000	23,231,000
ICICI-B-038	Travancore Chemicals Ltd.	Tamil Nadul	Air, water effluent, and solid waste control	other, barium salts	Pollution abatement and resource recovery		211,000	
ICICI-B-039	Tuticorin Alkali Ch. & Fert. Ltd.	Tamil Nadul	Solid waste minimization and liquid effluent control and treatment	other, Ammonium chloride	Cleaner technology. The process is modified to recover ammonium chloride from effluents by crystallization eliminating the use of lime, reducing solid wastes and liquid effluents and resulting in additional production of ammonium chloride	The project is expected to be commissioned in July 1999. It will allow minimization of solid waste and liquid effluents and will result in the production of an additional 10,000 tpy of ammonium chloride.	875,000	1,100,000
B-IDBI--001	Sandur Mang. & Iron Ores Ltd.	Karnataka	Emissions control	Pig iron and Ferro silicon	Pollution abatement		430,000	751,933
B-IDBI--003	Mouldwell Polymers	Maharashtra	Solid waste Recycling plant	Plastic recycling plant	New plastic recycling plant		780,000	1,965,179
B-IDBI--004	Nath Pulp and paper mills	Maharashtra	Liquid effluent control and treatment	Pulp and Paper	Pollution control facilities of for the expansion of an industrial plant.		1,255,000	14,728,617

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Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
B-IDBI-005	Polyolefins Lts.	Maharashtra	Solid waste incineration	Petrochemicals	Pollution abatement - Incinerator with caustic scrubbing system	115 kg /hour of waste produced at design capacity are incinerated and the plant meets the statutory emissions norms. The actual emissions of SO2 and NOx are in the range 15 -20 ppm well below the MPCB limit.	580,000	741,241
B-IDBI-006	Hukumchand jute	Madhya Pradesh	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology	Replacement of 12 mercury cell by 8 membrane cells for the manufacture of caustic soda. In addition the process allows energy savings. No liquid effluent is discharged.	1,560,000	9,446,539
B-IDBI-007	Rashtriya Chem&Fert. Ltd.	Maharashtra	Emissions control	Fertilizers	Pollution abatement, and resource and energy recovery	The project resulted in zero emission of purge and flash gases and recovery of products such as Hydrogen, nitrogen, ammonia, methane and argon. Significant reduction in odor.	6,910,000	14,473,156
B-IDBI-008	EID Parry	Tamil Nadul	Emissions control	Fertilizers	Cleaner technology for the replacement of a single by a double absorption H2SO4 plant. Pollution abatement for the installation of a scrubber in an existing super phosphate plant	Reduced SO2 emissions, reduction in sulfur and energy consumption in the sulfuric acid production. Reduced fluorine emissions in fertilizer plant. Information on the use of the fluorine scrubbing liquor is not available.	1,010,000	1,326,717
B-IDBI-009	Emmellen Biotech Pharma Ltd.	Maharashtra	Liquid effluent control and treatment	Pharmaceuticals	Pollution abatement, waste minimization and energy recovery. Bio digester with methane recovery	The entire plant is claimed to be in conformity. The sludge is used as bio fertilizer and bio gas is recovered for the boiler and allow a 30% reduction in fuel cost. Has eliminated the odor nuisance in the neighborhood.	320,000	451,286
B-IDBI-010	Gujarat Alkalis & Chem.Ltd.	Gujarat	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology	Replacement of 30 mercury cell by 17 membrane cells for the manufacture of caustic soda. In addition the process allows energy savings. No liquid effluent is discharged.	4,710,000	52,566,944
B-IDBI-012	Som Distilleries	Madhya Pradesh	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution abatement and energy recovery		960,000	1,109,059

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Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
B-IDBI-013	Colour Chem	Maharashtra	Liquid effluent control and treatment	Dye pigment	Modernization of effluent treatment plant to comply with COD and BOD limits	COD is now in the range 150-250 ppm and BOD in the range 30-70 ppm thus now the company is in compliance except for color. Production of 2,900 tons of solid waste stored in secured plastic lined pit with leachate recovery.	574,000	669,900
B-IDBI-014	Shree Vindhya Paper Mills Ltd.	Maharashtra	Liquid effluent control and treatment	Pulp and Paper	Pollution control facilities of for the expansion of an industrial plant.		4,800,000	5,629,649
B-IDBI-015	Tata Yodogawa Ltd.	Bihar	Dust and gaseous emissions control	steel plant	Pollution abatement		145,000	271,002
B-IDBI-016	Kopargaon Sahakari Sakhar Karkhana	Maharashtra	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution abatement, energy saving and resource recovery		633,000	857,607
B-IDBI-017	Grasim Industries	Madhya Pradesh	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology	Replacement of mercury cell by 8 membrane cells for the manufacture of caustic soda. In addition the process allows energy savings. No liquid effluent is discharged.	5,000,000	44,244,670
B-IDBI-018	Modi Alkalis & Chemicals Ltd.	Rajasthan	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Expansion with cleaner technology	Replacement of mercury cell by membrane cells for the manufacture of caustic soda. In addition the process allows energy savings. no liquid effluent is discharged.	4,300,000	16,008,658
B-IDBI-019	Sagar Cements Ltd.	Andhra Pradesh	Dust and gaseous emissions control	Cement industry	Pollution abatement		372,000	543,437
B-IDBI-020	Jai Bhavani SSk Ltd.	Maharashtra	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution control facilities of an expansion project		420,000	554,479
B-IDBI-021	Sandur Mang.& Iron Ores Ltd.	Karnataka	Emissions control	Pig iron and ferro silicon	Pollution abatement. Installation of bag filters	Manufacturing activities are stopped since August 1998	1,500,000	2,336,999
B-IDBI-023	Tilaknagar Distill.& Industries Ltd.	Maharashtra	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution abatement, energy saving and resource recovery		250,000	433,987
B-IDBI-026	Sumangla Steels	Pondicherry	Dust and gaseous emissions control	steel plant	Pollution abatement		280,000	379,476

Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
B-IDBI-027	ACC	8 locations in India	Dust and gaseous emissions control	Cement industry	Pollution abatement. Installation dust emissions control systems on kiln, coal mill, and boiler stacks	Project permitted compliance and recovery of resources such as kiln dust, coal dust which are reused in the system. SPM were reduced from 400-500 ppm to less than 90 ppm and are now well below SPCB standards.	3,000,000	5,608,280
B-IDBI-029	Raptakoss Brett	Maharashtra	Liquid effluent control and treatment	Pharmaceuticals	Pollution abatement and resource recovery		130,000	136,100
B-IDBI-032	Ispat Alloys	Orissa	Dust and gaseous emissions control	Ferro alloy plant	Pollution abatement. Reverse gas filters were installed to treat 390,000 Nm ³ of flue gas	SPM level of exhaust gases came down from 2543 mg/Nm ³ to less than 30 mg/Nm ³ , and are well below the SPCB norms. SO _x and NO _x are also well below the standards	1,430,000	1,920,551
B-IDBI-033	Tamil Nadu Cements	Tamil Nadu	Dust and gaseous emissions control	Cement industry	Pollution abatement		950,000	1,197,891
B-IDBI-034	Kakatia Cements Ltd.	Andhar Pradesh	Dust and gaseous emissions control	Cement industry	Modernization of Pollution abatement system		190,000	254,859
B-IDBI-035	Shree Cement Ltd.	Rajasthan	Dust and gaseous emissions control	Cement industry	Modernization of Pollution abatement system		1,366,000	1,476,880
B-IDBI-036	EID Parry, Nellikuppam	Tamil Nadu	Liquid effluent control and treatment	Sugar/ethanol distillery	Pollution control facilities of an expansion project		438,000	513,889
B-IDBI-37/30	Simbhaoli Sugar Mills	Uttar Pradesh	Liquid effluent control and treatment	Sugar/ethanol distillery	Modernization of Pollution abatement system		1,038,000	1,316,684
B-IDBI-038	Gujarat Heavy Chemicals Ltd.	Gujarat	Dust control	Caustic Soda	Pollution control of an expansion project. A pneumatic transport system with its dust control system was installed to reduce dust during handling of soda ash	The dust control of the plant during material handling was improved through the use of a pneumatic conveyor. Emissions are now in compliance (under 150 mg/Nm ³). Dust is recovered and recycled in the system	1,690,000	2,026,499

Sub-Loan No.	Name of Company	State	Type of Pollution	Type of Industry	Type of Project	Outcome	IBRD Loan Approved US\$	Total Cost US\$
B-IDBI-039	Chemfab Alkalis	Pondicherry	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology	Replacement of mercury cell by membrane cells for the manufacture of caustic soda. In addition the process allows energy savings. No liquid effluent is discharged.	1,420,000	8,220,669
B-IDBI-040	Vamshadara Paper Mills Ltd	Andhar Pradesh	Liquid effluent control and treatment	Pulp and Paper	Pollution abatement and energy recovery		339,000	328,681
B-IDBI-042	Southern Petrochem Ind Ltd	Tamil Nadul	Toxic waste, and toxic emissions and energy savings	Caustic Soda	Cleaner technology. replacement of use of hazardous chemicals with that of non hazardous chemicals	Replacement of 50% of mercury cell by membrane cells for the manufacture of caustic soda. In addition the process allows energy savings. No liquid effluent is discharged.	5,215,000	21,728,645
B-IDBI-043	Ispat Industries	Maharashtra	Spent acid treatment plant	steel plant	New spent acid regeneration plant for recycling		1,211,000	1,750,936
B-IDBI-045	Madras Fertilizer Ltd	Tamil Nadul	(i) dust and gaseous emissions control; and (ii) liquid effluent control	Fertilizers	Pollution schemes of an expansion project. It includes: (i) modification of urea prilling tower for better dust control and urea recovery; (ii) an HDS flare stack; (iii) a condensate boiler to recover steam, and NH3; and (iv) hydrolizer/stripper in urea p	The prilling tower is now meeting the state standards and is less than 50 mg/Nm3. Urea recovered is estimated to about Rs17 million per year. Process condensate increased from 30 o 45 tons/h. liquid effluent and dust emissions are in compliance.	3,390,000	112,377,497
B-IDBI-047	Dintex Dychem Ltd	Gujarat	Liquid effluent control and treatment and dust control and recovery.	dye intermediate, vinyl sulfone production.	Development of efficient pollution prevention and control and resource recovery. Additional financing to a demo project which received a grant.		250,000	1,032,618
B-IDBI	EID Parry (2)	Tamil Nadul	Pollution of aqueous streams	Bio pesticides production from seeds	Additional financing to a demo project which received a grant.	See demo project	2,205,072	7,514,610
B-IDBI	JK Corp.(3)		Liquid effluent control and treatment and dust control and recovery.	Other	Pollution control facilities of a new project		3,636,375	8,518,543
TOTAL INDIVIDUAL PROJECTS							132,309,447	595,253,135

**Table 6E. Key Indicators for Project Operation
Demonstration Projects**

Project Number	Sponsor	Description and Status	Results/Impact
D-IDBI-001	<p>EID Parry Ltd. (Neelikuppam Sugar Mills, Tamil Nadu)</p> <p>Gross fixed assets of sponsor: US\$22.9 million at date of approval</p>	<p><u>Description</u> Setting up of Demonstration unit at a sugar/distillery plant located at Ennore for the manufacture of bio-gas (2.8 Cu.m per year), and organic fertilizers (20,000 MT/year) from sugar-mill press mud and distillate (31,500 MT/year). Through anaerobic digestion of press mud and distillery effluent with methanogenic bacteria. This unit was the first of its kind in India.</p> <p><u>Status</u> Approved in June 1995. Implementation started September 1995 and was completed in February 1997. Operations started in mid-1997.</p> <p>Technical know-how developed by sponsor without outside collaboration, he also developed the tubular reactors used in the process.</p>	<p><u>Environmental Impact</u> Avoids (usually inadequate) disposal of presumed, which is also unsuitable for application as organic manure into fields due to high C/N ratio. Effluents generated are partially recycled and the filtered effluent used in house for gardening.</p> <p><u>Other Benefits</u> Financial benefits from resource recovery: Sales of Biogas and of enriched organic manure. However, sponsors has found energy costs for drying very high, making marketability of the final product difficult. Efforts are underway to reduce the energy cost.</p> <p><u>Replicability</u> Innovative technology for waste utilization in the sugar/distillery sector. Could greatly enhance the economics of resource recovery and reduce the negative environmental impact of their operation (solid waste disposal) and have a wide application among over 50 similar plants currently in operation.</p> <p>However, technology is proprietary (patent pending) and sponsor is unwilling to commercialize it for the moment, at least as long as energy costs are not reduced.</p>

Project Number	Sponsor	Description and Status	Results/Impact
D- IDBI-002	<p>Krishna Sahakari Sakhar Karkhana (Satara; Maharashtra), and Vasantdada Sugar Institute, Pune</p> <p>Gross fixed assets of Krishna SSK: US\$11.1 million at time of approval.</p>	<p><u>Description</u> Treatment of distillery spentwash, with cogeneration of steam and power. Technology consists of conversion of distillery spentwash into dry product so as to use it as a fuel in combination with bagasse. Pilot plant is treating the effluent of a 30,000 liters/day distillery.</p> <p><u>Status.</u> Approved in August 1995 Completion was planned for July 1996, but technical problems related to drying have delayed completion till December 1999.</p> <p>Technology developed by Vasantdada Sugar Institute (VSI) , Pune.</p>	<p><u>Environmental Impact</u> Eliminates solid waste generation: reduction in the organic load by 99.9% from pre-treatment levels of 30,000-50,000 mg/liter to 30-500 mg/liter, resulting in load reduction from 13.5 tons of BOD per day to 10 kg per day. Air quality from boiler stack has not yet been monitored.</p> <p><u>Other Benefits</u> Energy recovery</p> <p><u>Replicability</u> Due to problems related to continuous drying, the plant has not yet operated at full capacity and operating costs have thus not yet been established. Potential of replicability is large if the problems are solved and operations are economical. It could offer a solution for many of the some 200 distilleries in India. Dissemination through commercialization will be carried out by VSI, which has taken a patent for the process.</p>
D- IDBI 003	<p>Century Pulp and Paper Ltd (Lalkuan, Uttar Pradesh)</p>	<p><u>Description</u> Development of a treatment method for pre-hydrolysate liquor from a rayon-grade pulp plant, through anaerobic digestion in a bulk volume fermenter.</p> <p><u>Status</u> Application was filed in December 1995 and approved in May 1996. Initial implementation schedule called for completion in June 1995, but due to delays in imports, actual completion was in June 1996 (indicating retroactive financing)</p> <p>Technology developed by sponsor, in collaboration</p>	<p><u>Environmental Impact</u> Substantial reduction in pollution load of pre-hydrolysate liquor (310 cu.m/day) by 60%-70% for COD (from 35,000-40,000 mg /liter) and by 80%-90% for BOD (from 65,000-70,000 mg/liter). Reduction in odor.</p> <p><u>Other Benefits</u> By-product bio-gas of about 23,800 cu.m/day at full capacity (equivalent to 3,700 mtons of coal per year).</p> <p><u>Replicability</u> Plant has only achieved 50% efficiency so far . Full stabilization of reactor could not be achieved due to various</p>

Project Number	Sponsor	Description and Status	Results/Impact
		with Utility Equipment and Management (UEM), India, and ADI International, Canada.	teething problems being resolved (including through addition of hot water and soda ash), but sponsor hopes to achieve good efficiency of the reactor within another 3-4 months. Sponsor has declared a commitment to share the technology. Dissemination will be organized jointly by the sponsor and UEM. There are four units in India similar to that of the sponsor.
D- IDBI-004	Gabriel India Ltd. (Parwanoo, Himachal Pradesh)	<p><u>Description</u> Treatment of effluent from electroplating process of an engine bearings manufacturing plant. Involved the development of a vacuum evaporator system to recover salts (first time application in India).</p> <p><u>Status</u> Approved in February 1996. Completed in March 1996 (indicating retroactive financing)</p> <p>Technology developed by sponsor in collaboration with Federal Mogul Corporation, USA.</p>	<p><u>Environmental Impact</u> Aimed at zero liquid effluents. Data sheets from January 1997 show that copper, tin, lead and fluoboric acid have been completely recovered from the effluents.</p> <p><u>Other Benefits</u> Recycling of ten tons of chemicals and 36,000 cu.m of water per year. Total estimated savings : US\$37,000 per year.</p> <p><u>Replicability</u> Large potential when applied to electroplating plants in India. No information available on sponsor's policy and efforts for dissemination.</p>
D-IDBI-005	Ashoka Pulp and Paper Mills (Delhi) Gross fixed assets of sponsor: US\$0.4 million (at time of approval)	<p><u>Description</u> Pollution prevention/ waste minimization measures at a small scale agro-residue based pulp and paper mill with a capacity of 36 tons per day. These measures were part of a comprehensive Clean Production (CP) program being implemented at the plant, with technical assistance provided under the Demonstration in Small Industries for Reducing Waste (DESIRE) Program supported by UNIDO. Measures financed included a deduster with conveyer to recover fine particles from straw; a screw press washer to de-water the cured pulp to</p>	<p><u>Environmental Impact</u> The CP program reduced effluent volume by 30%, pollution load by 30%, and gaseous emission by more than 10%. Plant effluents were brought in compliance with SPCB norms, in particular, BOD was reduced from 370 ppm to 28 ppm (SPCB standard: 30 ppm), and COD from 1,100 ppm to 83 ppm (SPCB standard: 250 ppm). Other pollutants which were already in compliance were also further brought down (PH, TSS in liquid effluents, SPM, NOx and CO in air emissions).</p> <p><u>Other Benefits</u> After one year of implementation: 17% increase in production</p>

Project Number	Sponsor	Description and Status	Results/Impact
		<p>recycle most black liquor; a high efficiency hood to reduce power consumption; and a sedimentation save-all system to recover fiber from waste streams.</p> <p><u>Status</u> Approved in April 1996 Some of the four measures were already under implementation in 1994, pointing at retroactive financing.</p> <p>75% of program measures were implemented by March 97, the remaining 25% were suspended due to plant shifting order. Part of the grant was consequently canceled.</p>	<p>capacity; 17% reduction in cost of effluent treatment, 7% reduction in cost of chemicals and 9% reduction in energy costs. Overall pay-back period was less than one year.</p> <p><u>Replicability</u></p> <p>Potentially large replicability, as among 340 small pulp and paper mills in India, 90 are purely based on agro-residues using a sulfate chemical pulping process without any chemical recovery.</p> <p>Experience and techno-economic studies for the plant were published as case studies in Technical Manuals of the National Productivity Council, and a Clean Production Manual produced by the United Nations Environmental Programme (UNEP).</p> <p>According to the sponsor, the measures demonstrated have been adopted by quite a few pulp and paper industries in the country. It does not seem however that the same Clean Production approach has been replicated so far.</p> <p>Further developments in this particular unit will not take place, as the plant has received an order to shift to another location, where the owner plans to apply the same principles.</p>
D-IDBI 006	<p>Western Paques (India) Ltd (Kumarapatnam, Karnataka)</p> <p>Gross fixed assets: US\$4.9 million at time of approval</p>	<p><u>Description</u> Development of treatment facilities on a BOOT basis, at Harihar Polyfibers rayon plant, to improve the existing treatment facilities and generate bio-gas as a product. First application of anaerobic digestion of rayon residues (prehydrolysate liquor and alkali backwater) using an upflow sludge blanket reactor.</p> <p><u>Status</u> Approved in October 1996. Plant commissioned in April 1995 (retroactive financing)</p>	<p><u>Environmental Benefits</u> BOD and PH were reduced to compliance levels, but COD levels still significantly above standards.</p> <p><u>Other Benefits:</u> Sale of Biogas and energy savings</p> <p><u>Replicability</u> No information is available on efforts and success to replicate. Since sponsor is engaged in the supply and installation of effluent treatment plants on a turnkey basis, replication if any is expected through sale of technology and/or plants.</p>

Project Number	Sponsor	Description and Status	Results/Impact
		Technology developed in collaboration with Paques BV, Netherlands.	
D-IDBI-007	Wockhardt Ltd (Ankleshwar, Gujarat)	<p><u>Description</u> Demo. plant for treatment of complex organic effluent from batch process multi-purpose bulk drug plant. Treatment of high COD effluent containing complex and refractory organic compounds using specialized bio-products (biological culture and fixed film process specifically developed for the purpose).</p> <p><u>Status</u> Approved in November 1996, when plant was already completed. Plant started operations at the end of 1995. (retroactive financing).</p> <p>Products developed and manufactured by Wockhardt, in collaboration with Techniques et Biochimie Appliquees, France.</p>	<p><u>Environmental Impact</u> Plant has been able to meet SPCB effluent standards, which it did not previously for PH (previously 6.5 to 9.0; now 7.5 to 8.5); COD (previously 2,500 to 7,000 mg/l; now less than 250 mg/l); TSS (previously 500 to 1,500 mg/l; now less than 100 mg/l) and oil and grease (previously 100 to 400 mg/l; now less than 10 mg/l):</p> <p>Solid waste from the treatment plant is sent to a secured landfill, and other hazardous solid waste are stored within the plant site in designated area complete with leachate collection system and treatment.</p> <p><u>Other Benefits</u> Sale of the technology together with specialty bio-products developed for each application (so far about US\$250,000).</p> <p><u>Replicability</u> The sponsor is commercializing the technology through the sale of technological packages which include the fixed matrices and the bio-products (strain of microorganisms) which are developed for each application. Its technology has already been adopted in four of Wockhardt plants, a CETP for treatment of effluents from dyes and dye intermediates, treatment of a water body; and for pollution control in aquaculture farms (6,000 hectares).</p> <p>Efforts are being made by the sponsor to extend this technology to areas such as the treatment of water bodies, industrial effluent and solid waste treatment, treatment of municipal and agricultural solid waste; compact treatment</p>

Project Number	Sponsor	Description and Status	Results/Impact
			<p>systems for sewage treatment, and pollution control in aquaculture (prawn and fish breeding farms).</p> <p>Technology and bio-products are patented.</p>
D-IDBI-009	<p>EID Parry Ltd Cuddalore, Tamil Nadu). Gross fixed assets: US\$22.9 million at time of grant approval.</p>	<p><u>Description</u> Design, construction and operation of a commercial-scale facility for the production of a botanical pesticide from locally available neem seeds. Process consists of extraction and manufacture of a solution of 5% azadirachtin from the seeds of the <i>Neem tree</i>.</p> <p><u>Status</u> Grant approved in October 1996. Construction completed and start of operations: March 1998</p> <p>Technical collaboration from Trifolio-M, Germany (provision of laboratory scale technology).</p>	<p><u>Environmental Impact</u> Proven in field trials to effectively replace toxic chemical pesticides without their harmful side effects on the environment and on humans. Extensive field trials have been conducted on tea plantations.</p> <p><u>Replicability</u> Sponsor has patented the product and does not intend to commercialize the technology. Only the product will be sold.</p>
D-IDBI-012	<p>Dintex Dyechem Ltd (Ahmedabad, Gujarat)</p>	<p><u>Description</u> Application of the Cleaner Technology Approach to a dyes intermediate (Vinyl Sulfone) plant, chosen as demonstration plant under the Special Program on Environment of the Asian Productivity Organization. Grant financed part of the eight steps required in the methodology, which goes from diagnostic of the production process through implementation of the recommended measures. Main pollution problems to be addressed included acidic wastewater from sulfonation (the neutralization of which result in large quantities of gypsum waste), high-salt concentration of</p>	<p><u>Environmental Impact</u> HCL recovery increased from 43% to 83%; HCL gas discharge now much below standards (previously ranging from 231 grams per cu.m to 6,803 grams per cu.m; now only 19 milligrams per cu.m—standard is 50 milligrams); Acidic mother liquor recovered and sold to pulp and paper and textile industry (with consent of Regulatory Board); Glauber salt from condensate wastewater recovered and sold; Reduction of gypsum sludge generation and solid waste generation from filter press; Quasi-elimination of particulate matter emission from the flash dryer assembly (previously from 400 mgrams per cu.m, now less than 50 mgrams—standard is 50 mgrams), and of</p>

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Project Number	Sponsor	Description and Status	Results/Impact
		<p>wastewater from condensation; hydrochloric acid gaseous emission from sulfonation; and gaseous emission from condensation.</p> <p><u>Status</u> Request submitted in November 1996 Grant approved in January 1998., Implementation started December 1996, and completed in March 1999. The project in all its phases was financed by the Grant and own sponsor's resources.</p> <p>Technological assistance was provided by the National Productivity Council.</p>	<p>SO₂ and bisulfite emission from the reduction vessel.</p> <p><u>Other Benefits</u> Substantial financial benefits from cost savings and product recovery, allowing pay-back of investments in 1.3 years on average.</p> <p><u>Replicability</u> Potentially high in the 40 vinyl sulfone manufacturers in the region, all invited to a workshop by NPC at the start of the project. Plant open to visitors during project implementation. Industries manufacturing this and similar products in process of forming groups aiming at waste minimization circles.</p>

Table 7: Technical Assistance and Studies Included under the Project

Study	Purpose as defined at appraisal/redefined	Status	Impact of Study
<p>1. Organization and Staffing of Pollution Control Boards</p>	<ul style="list-style-type: none"> • Analyze the structure, internal organization, staffing and training requirements of the SPCBs in relation to their existing and envisaged functions and to the volume of work required to undertake these functions effectively. • Make recommendations to MOEF, SPCBs and state governments on: (a) prioritization of functions of the SPCBs; (b) the key external coordination and participation functions of the boards with other agencies of government and private sectors; (c) any changes to the structure of SPCBs, including their legal and regulatory status; (d) the internal organization of the SPCBs in relation to their overall functions and the priorities in their states; (e) the equipment, staffing and training requirements (including remuneration and career structure); and (f) the financial requirements for the SPCBs and recommendations on financing sources and financial management. • Propose for each SPCB a management, staffing and financing plan, which would be discussed with the State and Central Governments, and, after adjustments, adopted by them. 	<p>On the basis of broad terms of reference discussed at negotiations and suggestions sent by the Bank in May 1991; two studies were prepared by a government committee (the Belliappa Committee) and presented to the Bank for comments in October 1992: "Belliappa Committee Report on Common Staffing Patterns for State Pollution Control Boards", and "Report of the committee on the Present and Future Requirements of State Pollution Control Boards in the context of the World Bank project on Industrial Pollution Control".</p> <p>Following review, a new study was commissioned with revised terms of reference with an increased focus on the management and institutional analysis of the four SPCBs included in the project.</p> <p>The study was carried out by Administrative Staff College of India (ASCI) and completed in April 1994.</p> <p>The study concluded the need for a number of changes in policy, implementation management, and operational procedures, which are further detailed in Annex F.</p>	<p>A workshop was organized in Hyderabad on February 6, 1995 to discuss the recommendations of the study. Participants included representatives from ASCI, CPCB, MOEF and eight SPCBs, with the Bank as observer. The recommendations of the workshop were summarized in a plan of action. It was agreed that the Implementation Cell would monitor its implementation, but there is no subsequent report on implementation.</p> <p>The study did not result in the preparation of specific programs to adapt the recommendations of the study to each one of the four SPCBs. Nevertheless, each of the Boards has since implemented a number of changes in line with the recommendations of the study.</p>

Study	Purpose as defined at appraisal/redefined	Status	Impact of Study
2. Development of Environmental Performance Indicators	As per TORs prepared in 1995, the objectives of the study were: (a) to propose measurements that could be used to evaluate the attainment of the objectives of the project once completed; (b) to estimate the impact of the activities taken under the institutional component on the ability of the Boards on their monitoring and enforcement tasks; (c) to evaluate the extent to which the studies and other tasks sponsored under the technical assistance component have contributed to achieve the objectives of the project; and (d) to evaluate the impact of the schemes undertaken under the investment component on the environmental performance of the companies investing in these measures and on the improvement of environmental indicators in the surrounding area.	Originally awarded to Anna University in 1995, the study was eventually commissioned by the Environmental Management Center- Mumbai in August 1998. The study was completed in March 1999.	The study was a useful basis for the preparation of the Borrower's completion report and the Bank's ICR. It did not achieve the original objectives.
3. Centralized Hazardous Waste Incineration Plant at Chennai	Environmental and social impact assessments and related technical site studies for establishing an incinerator near Chennai.	Completed. The Environmental Impact Assessment was carried out by Anna University and the Social Assessment by C.P. Ramaswamy Foundation. Technical studies were not submitted.	Project sponsored by Pure Tech. The site has been identified and site clearance obtained from TNPCB. Pending further processing of the EA/SA, including public consultations.
4. Common Hazardous Waste Treatment and Disposal Facility for Thane-Belapur Industrial Estate (TBIA)	EIA and feasibility studies for establishment of a common hazardous waste treatment and disposal facility to manage the hazardous waste of industries in the region.	Study completed and report submitted to MoEF.	No information on findings of the study and current status.

Study	Purpose as defined at appraisal/redefined	Status	Impact of Study
5. Air pollution Control in the Cement Industry in India	Technical assistance to the Indian Cement Industry to improve air pollution control at eight selected cement plants.	Carried out by World Environment Center (contracted by ASSOCHAM, the Associated Chambers of Commerce and Industry of India)	Technical assistance focused on eight large privately owned cement plants, all technologically sound and comparable in technology and environmental performance to plants in Europe and USA. Its contribution to solving the air pollution problem for the cement industry at large is thus rather modest, since it left aside state companies and small and medium industry. It did not lead to the development of a manual on good practices for the cement industry with a focus on air pollution control.
6. Municipal Solid Waste Processing Project	Studies to demonstrate production of organic manure through microbial degradation of municipal solid waste.	Completed. Proposed technology demonstrated, using municipal solid waste from Thane, Mumbai.	Though not focused on industrial pollution control, this study demonstrated a technology for municipal waste utilization.
7. Preparation of software for Hazardous Analysis in Process Industry	Development of software for use in the identification of industrial process and operational hazards, and formulation of strategies for the mitigation of accidents.	Completed. Carried out by the Department of Chemical Engineering, Indian Institute of Technology (Kanpur).	No information available to assess impact.

Study	Purpose as defined at appraisal/redefined	Status	Impact of Study
8. EIA and Feasibility Study for Ankleshwar Landfill	EIA and feasibility study for a centralized secured landfill facility at Ankleshwar for industries in Bharuch District, Gujarat. Sponsored by Ankleshwar Industry Association and Ankleshwar Environmental Preservation Society.	Completed. National Productivity Council carried out the EIA and prepared the design criteria for the landfill. Also carried out an inventory of hazardous waste generation for the state.	On the basis of this study and subsequent authorizations from GPCB, the landfill was developed according to German standards, using the expertise of NPC and GTZ. Construction was completed and operations have commenced. The landfill is managed by a private company (Bharuch Enviro Infrastructure Limited—BEIL), with 160 companies as members, but controlled by United Phosphorus Ltd.
9. Epidemiological Survey in Pune Area	Epidemiological survey of effects of environmental pollutants on health status of population residing in and around the industrial complex of Pune.	Implemented by the Ramazini Institute of Occupational Health Services, Pune. Study being completed.	Study being completed.
10. Performance evaluation of pollution control techniques in selected thermal power plants in Kumbh Mela Region of Haridwar, Rishikesh	Assessment of pollution abatement measures adopted in thermal power plants and provision of data on air pollution control equipment in these plants.	Implemented by Bharat Heavy Electricals Limited, and the Pollution Control Research Institute, Haridwar.	No information available to assess impact.
11. EIA of lime kilns, cement plant and allied units in Katni-Maihar area, Madhya Pradesh	Assess damage caused by these units on health of the surrounding population, flora and fauna; propose suitable processes to improve thermal efficiency of the lime kilns; propose mitigation measures; and formulate an environmental management package and an action plan, including allocation of responsibilities for implementation among various agencies.	Carried out by Madhya Pradesh Consultancy Organization Ltd, Raipur.	No information available to assess impact.

Study	Purpose as defined at appraisal/redefined	Status	Impact of Study
<p>12. Technology Development for Sewage Treatment using Simplified Treatment with Biofilter with Specialty bio-Products for Reuse of Water.</p>	<p>Development of technology (lab-scale and pilot plant studies) for high COD sewage treatment using simplified treatment with specialized bio-products developed and manufactured indigenously, in collaboration with Techniques et Biochimie Appliquees, France (micro-organisms, support matrices for fixed films and nutrients). Plants can treat sewage with a capacity of 80 CM/day with COD loadings of up to 10 CM of filter bed volume.</p>	<p>Carried-out by Wockhardt Ltd, Mumbai.</p>	<p>Associated with Project-financed Demonstration Project IDBI D-07 , which financed the pilot plant for treatment of high COD effluent containing complex and refractory organic compounds at Wockhardt bulk drug plant.</p> <p>Technology has high replicability potential and can be extended to any building or situations where a full-scale plant is not practical. Study contributed to introduction of innovative technology for treatment of high COD content sewage.</p>
<p>13. Technology Development for Treatment of Polluted Water Body using Endogenously Manufactured Specialty Products of Wockhardt Ltd.</p>	<p>Use of above-described technology for biological cleaning of a eutrophied lake in Thane, Mumbai, using Wockhardt proprietary specialty products. Selected naturally occurring microbes (not genetically altered) are being used in these studies.</p>	<p>Carried out by Wockhardt Ltd., Mumbai</p>	<p>This method does not involve any chemical treatment and it controls algal bloom, reduces phosphate and nitrate levels in the water. The technology has a high degree of replicability to other lakes across the country.</p>

Table 8A - Project Costs

	In Rs. Million						In Million US\$					
	Appraisal Estimate			Actual/Latest Estimate			Appraisal Estimate			Actual/Latest Estimate		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
<u>Institutional Component</u>												
Training	26.0	10.0	36.0	38.5	15.0	53.5	1.3	0.5	1.8	1.2	0.4	1.6
Equipment	20.0	116.0	136.0	54.6	309.6	364.2	1.0	5.8	6.8	1.4	8.1	9.5
Facilities	26.0	6.0	32.0	20.8	5.2	26.0	1.3	0.3	1.6	0.7	0.2	0.9
Operation	92.0		92.0				4.6		4.6			
<i>Base Cost</i>	164.0	132.0	296.0	113.9	329.8	443.7	8.2	6.6	14.8	3.3	8.7	12.0
Contingencies												
- Price	8.0	26.0	34.0				0.4	1.3	1.7			
- Physical	6.0	24.0	30.0				0.3	1.2	1.5			
Subtotal Institutional Component	178.0	182.0	360.0	113.9	329.8	443.7	8.9	9.1	18.0	3.3	8.7	12.0
<u>Investment</u>												
<u>Common Treatment Facilities</u>												
- Implemented through IDBI				1,233.0	137.0	1,370.0				36.5	4.1	40.6
- Implemented directly by MOEF				858.2	95.4	953.6				17.3	1.9	19.2
Subtotal Common Treatment Fac.	1,080.0	120.0	1,200.0	2,091.2	232.4	2,323.6	54.0	6.0	60.0	53.8	6.0	59.8
Individual Projects	2,680.0	660.0	3,340.0	17,693.0	4,423.3	22,116.3	134.0	33.0	167.0	476.1	119.0	595.1
Demonstration Projects	120.0	80.0	200.0	357.6	238.4	596.0	6.0	4.0	10.0	10.3	6.8	17.1
Subtotal Investments	3,880.0	860.0	4,740.0	20,141.8	4,894.1	25,035.9	194.0	43.0	237.0	540.2	131.8	672.0
<u>Technical Assistance</u>	20.0	80.0	100.0	28.4	7.1	35.5	1.0	4.0	5.0	0.8	0.2	1.0
<u>Total Project Cost</u>	<u>4,078.0</u>	<u>1,122.0</u>	<u>5,200.0</u>	<u>20,284.1</u>	<u>5,231.0</u>	<u>25,515.1</u>	<u>203.9</u>	<u>56.1</u>	<u>260.0</u>	<u>544.3</u>	<u>140.7</u>	<u>685.0</u>

Notes:

(i) Appraisal Estimates Exclude taxes and duties

(ii) Except for the technical assistance component, the % of actual foreign exchange is estimated at the same level as at appraisal.

The actual % of foreign exchange for the technical assistance component is estimated at 20%.

Table 8B - Project Financing
In US\$ million

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Component	IBRD	IDA	DFI's	Sponsors & Other Financing	GOI	State Government	Total
Appraisal Estimates							
<u>Institutional Component</u>							
Training		2.2					2.2
Equipment		8.6					8.6
Facilities		1.8					1.8
Operation					5.4		5.4
Subtotal Institutional Component		12.6			5.4		18.0
<u>Investment Component</u>							
Common Treatment Facilities							
- Implemented through IDBI	24.0	12.0		12.0	12.0		60.0
- Implemented directly by MOEF							
<i>Subtotal Common Treatment Fac.</i>	24.0	12.0		12.0	12.0		60.0
Individual Projects	100.0		25.0	42.0			167.0
Demonstration Projects		4.0		6.0			10.0
Subtotal Investments	124.0	16.0	25.0	60.0	12.0		237.0
Technical Assistance		3.0		2.0			5.0
Total Project Cost	124.0	31.6	25.0	62.0	17.4		260.0
Actual Estimates							
<u>Institutional Component</u>							
Training		0.7			0.9		1.6
Equipment		9.5					9.5
Facilities		0.9					0.9
Operation							
Subtotal Institutional Component		11.1			0.9		12.0
<u>Investment Component</u>							
Common Treatment Facilities							
- Implemented through IDBI	13.8	4.9		16.0		5.9	40.6
- Implemented directly by MOEF		3.7		15.5			19.2
<i>Subtotal Common Treatment Fac.</i>	13.8	8.6		31.5		5.9	59.8
Individual Projects	102.7		57.3	435.1			595.1
Demonstration Projects		2.8		14.3			17.1
Subtotal Investments	116.5	11.4	57.3	480.8		5.9	672.0
Technical Assistance		0.8		0.2			1.0
Total Project Cost	116.5	23.3	57.3	481.0	0.9	5.9	685.0

Notes

Due to discrepancies between IDA disbursements for the institutional strengthening component and actual costs as reported by MoEF, the following assumptions were made:

(a) Training costs: according to MoEF, these amounted to about US\$1.6 million equivalent. Since IDA disbursed only the equivalent of about US\$0.7 million, the balance was assumed to have been financed out of GOI counterpart funds.

(b) Equipment: IDA disbursements were about US\$10.4 million equivalent and there were no disbursements made under Civil Works.

Yet, according to MoEF, about US\$0.89 million were disbursed by IDA for facilities. Assuming that disbursements against facilities are included in the equipment category, this leaves about US\$9.5 million for disbursements against equipment per se.

Table 8C. Costs and Financing- Common Effluent Treatment Plants Appraised by IDBI

IDBI Sub-project No.	Name of Sponsor, CETP location	Project Costs Estimates (Rs.)						Actual Costs and Financing									
		Total Cost		Loan Approved (Ln.3334)		Credit Approved (Cr. 2252)		Total Project Cost		Sponsors contribution		Loan 3334 Disbursement		Credit 2252 Disbursement		State Subsidy	
		Rs.	US\$	Rs.	US \$	Rs.	US \$	Rs.	US\$	Rs.	US\$	Rs.	US \$	Rs.	US \$	Rs.	US\$
C-IDBI-001	Common Effluent Treatment Plant (Thane Belapur) Association, Thane Belapur, Maharashtra (M)	30,200,000	959,285	14,000,000	367,100	5,000,000	170,000	40,000,000	1,215,231	16,000,000	508,230	14,000,000	367,001	5,000,000	170,000	5,000,000	170,000
C-IDBI-002	TIMA CETP Co-op. Society Ltd., Tarapur, M	12,000,000	381,173	3,600,000	160,000	3,000,000	80,000	18,760,000	561,602	9,360,000	297,315	3,400,000	104,287	3,000,000	80,000	3,000,000	80,000
C-IDBI-003	Pallavaram Tanneries Industries Effluent Treatment Co. Ltd., Pallavaram, Tamil Nadu (TN)	70,300,000	2,233,037	46,200,000	1,540,000	5,000,000	166,000	73,560,000	2,205,939	17,410,000	553,018	46,200,000	1,322,581	5,000,000	166,000	4,950,000	164,340
C-IDBI-005	Unnao Tanneries Pollution Control Company Ltd., Unnao, Uttar Pradesh (UP)	19,500,000	619,406	5,800,000	190,000	4,875,000	160,000	19,800,000	614,020	4,250,000	134,999	5,800,000	159,021	4,875,000	160,000	4,875,000	160,000
C-IDBI-006	Kodaikanal Effluent treatment company Ltd., Kodaikanal, TN	13,400,000	425,643	4,000,000	130,000	3,350,000	106,000	11,200,000	344,276	2,700,000	85,764	2,000,000	46,512	3,250,000	106,000	3,250,000	106,000
C-IDBI-007	Gujarat Industrial Development Corporation (GIDC) Ltd., Vapi, Gujarat (G)	204,000,000	6,479,935	153,200,000	4,640,000	5,000,000	160,000	181,957,000	5,140,078	45,477,000	1,444,549	108,919,000	2,813,577	5,000,000	160,000	22,561,000	721,952
C-IDBI-009	Ayyampet Muthialpet Bleaching & Dyeing Ind. Effluent Treatment Co. Ltd., Ayyampet-Muthialpet, TN	14,200,000	451,054	4,260,000	137,000	3,550,000	115,000	13,983,000	448,898	4,163,000	132,235	2,700,000	86,015	3,550,000	115,000	3,570,000	115,648
C-IDBI-010	Ranipet SIDCO Finished Effluent Treatment Co. Ltd., Ranipet, TN	32,000,000	1,016,460	15,600,000	500,000	5,000,000	160,000	34,890,000	1,102,405	10,994,000	349,218	13,896,000	433,188	5,000,000	160,000	5,000,000	160,000
C-IDBI-011	Vaniyambadi Effluent Treatment Co. Ltd., Vaniyambadi, TN	20,600,000	654,346	6,480,000	210,000	5,000,000	169,000	18,400,000	568,918	4,100,000	130,234	4,300,000	100,684	5,000,000	169,000	5,000,000	169,000
C-IDBI-012	TALCO Ranipet Tannery Effluent Treatment Company Ltd, Ranipet, TN	46,000,000	1,461,162	21,800,000	690,000			51,017,000	1,483,216	24,517,000	778,768	15,000,000	398,744		0	11,500,000	305,704
C-IDBI-013	Karur Thiruvai Dyeing Enviro Ltd., Karur, TN	20,800,000	660,699	6,640,000	215,000	5,000,000	162,000	20,860,000	617,335	4,160,000	132,140	6,300,000	148,235	5,200,000	168,480	5,200,000	168,480
C-IDBI-014	Perfect Enviro Control Systems Pvt. Ltd. Sangam, G	12,900,000	409,761	3,100,000	99,000	3,200,000	102,000	14,005,000	445,516	6,076,000	256,529		3,200,000	102,000	2,729,000	86,987	
C-IDBI-015	Amravati Pollutec Ltd., Karur.	24,400,000	775,051	9,520,000	303,000	5,000,000	160,000	26,080,000	758,055	4,880,000	155,010	9,000,000	211,765	6,100,000	195,640	6,100,000	195,640
C-IDBI-017	Karur Andankoil Pollution Control Ltd., Andankoil	22,800,000	724,228	8,240,000	260,000	5,000,000	160,000	15,888,000	507,029	5,888,000	187,029		5,000,000	160,000	5,000,000	160,000	
C-IDBI-018	Vishram Tannery Enviro control Systems (P.) Ltd., Melivishram, TN	40,300,000	1,280,105	22,240,000	709,000	5,000,000	159,000	35,385,000	1,053,717	8,060,000	256,021	17,500,000	485,261	4,825,000	153,435	5,000,000	159,000
C-IDBI-019	Perumalpet Effluent Treatment (P) Ltd., Perumalpet, TN- not yet completed	61,500,000	1,953,510	39,200,000	1,250,000	5,000,000	160,000	118,000,000	3,748,198	118,000,000	3,748,198		0	0	0	0	
C-IDBI-021	Taloja CETP Co-operative Society Ltd., Taloja.	41,600,000	1,321,399	23,300,000	670,000	5,000,000	144,000	55,802,000	1,589,199	15,800,000	501,877	23,300,000	606,304	8,351,000	240,509	8,351,000	240,509
C-IDBI-022	Mathura Audyogik Chettra 'A' Pradhushan Nivaran Co.Ltd., Mathura, UP	18,800,000	597,171	5,000,000	144,000	4,700,000	135,000	18,212,000	538,896	6,312,000	200,497	2,500,000	68,399	4,700,000	135,000	4,700,000	135,000
C-IDBI-023	ACAMA CETP Cooperative Society Itda Ambemath- Maharashtra	4,000,000	115,000	1,000,000	29,000	1,000,000	29,000	5,000,000	158,822	2,000,000	63,529	1,000,000	31,764	1,000,000	31,764	1,000,000	31,764
C-IDBI-024	Dombivli CETP Plant Ltd. Dombivli, Maharashtra	26,200,000	748,571	6,000,000	172,000	5,000,000	144,000	23,200,000	736,934	13,200,000	419,290		5,000,000	158,822	5,000,000	158,822	
C-IDBI-025	Karur Taluka Dyeing & Bleaching Effluent Treatment Company Ltd., Ramkrishnapuram. (not completed as of June 18, 1999)	19,300,000	613,053	5,790,000	165,000	4,825,000	137,000	15,996,000	475,597	6,352,000	201,767		4,822,000	136,915	4,822,000	136,915	
C-IDBI-026	Karur Vanchi Dyeing Enviro Tech Ltd., Light House Sector, Karur	17,000,000	539,995	5,100,000	145,000	4,250,000	121,000	17,000,000	520,723	11,149,000	354,141		3,000,000	85,412	2,851,000	81,170	
C-IDBI-028	Enviro Technology Ltd. Ankleswar	55,000,000	1,747,041	33,000,000	890,000	5,000,000	140,000	71,240,000	2,034,998	12,000,000	381,173	33,000,000	919,105	13,120,000	367,360	13,120,000	367,360
C-IDBI-029	Melvisaram Tanneries Effluent Treatment Co. Ltd., Melpadupet, TN. (not completed as of June 18, 1999)	13,700,000	435,172	4,110,000	115,000	3,425,000	96,000	16,500,000	501,701	10,500,000	332,526		3,000,000	84,088	3,000,000	84,088	
C-IDBI-030	Melvisaram Tanneries Effluent Treatment Co. Ltd Chettythangal, TN (not completed as of June 18, 1999)	12,500,000	397,055	3,750,000	105,000	3,125,000	88,000	12,500,000	390,505	10,760,000	341,785				1,740,000	48,720	
C-IDBI-031	TALCO Dindigul Tannery Enviro Control Systems Pvt. Ltd., Dindigul, TN	50,200,000	1,594,572	18,250,000	514,000	6,000,000	169,000	53,900,000	1,546,723	23,400,000	743,287	12,000,000	282,353	6,000,000	169,000	12,500,000	352,083
C-IDBI-032	Green Environment Services Co-operative Society Ltd. Vatva, G	258,200,000	8,201,565	163,000,000	4,600,000	10,000,000	280,000	386,854,000	11,320,457	170,000,000	5,399,946	115,000,000	3,068,599	50,927,000	1,425,956	50,927,000	1,425,956
	Sub-total	1,161,400,000	36,795,448	632,180,000	18,949,100	120,300,000	3,672,000	1,369,989,000	40,628,986	569,508,000	18,090,073	435,815,000	11,653,395	163,920,000	4,900,380	200,746,000	5,985,137
	Adjustments for disbursements under loan 3334 made after closing date and for which detailed information is not available									(78,454,252)	(2,097,813)	78,454,252	2,097,813				
	TOTAL	1,161,400,000	36,795,448	632,180,000	18,949,100	120,300,000	3,672,000	1,369,989,000	40,628,986	491,053,748	15,992,260	514,269,252	13,751,208	163,920,000	4,900,380	200,746,000	5,985,137

Table 8D - List of CETPs Approved by MOEF
(not forwarded for Bank Approval)

States/CETPs	Number of CETPs which Received Grants		Total Project Cost	Grant Under IDA Credit		Status of Commissioning	Date	Members		Flow M3/day
	for Implementation	for Feasibility Study		for Implementation	for Feasibility Study			Design	Actual	
Rs. Lakhs										
Andhra Pradesh										
Progressive			252.00	42.00		Yes			33	
Pattencheru			624.00	40.00		Yes			76	
Jeedimetla			997.00	50.00		Yes	10/98		91	
Sub total Andhra Pradesh	3		1,873.00	132.00						
Gujarat										
Odhav			468.00	77.95		Yes	2/99		57	
Panoli			-		5.00	-	-			
Sachine Infra			1,950.00		5.00	-	-			
Subtotal Gujarat	1	2	2,418.00	77.95	10.00					
Haryana										
Kandli			79.00	11.98		Yes	5/97			
Subtotal Haryana	1		79.00	11.98						
Himachal Pradesh										
Barotiwala					3.15	No	-			
Parwanoo					3.15	No	-			
Melatpur					3.15	No	-			
Kala Amb					3.15	No	-			
Subtotal Himachal Pradesh		4			12.60					
Karnataka										

States/CETPs	Number of CETPs which Received Grants		Total Project Cost	Grant Under IDA Credit		Status of Commissioning	Date	Members		Flow
	for Implementation	for Feasibility Study		for Implementation	for Feasibility Study			Design	Actual	
Rs. Lakhs										
Pai & Pai			150.24	29.84		Yes	93			
Lidkar Tanners			160.00	30.00		Yes	7/94			
Subtotal Karnataka	2		310.24	59.84						
Madhya Pradesh										
Govindpura			190.00	47.50		No Progress		38		
Subtotal Madhya Pradesh	1		190.00	47.50						
Maharashtra										
L.K.Akiwate Ind. State			35.70	8.90		Yes	12/97	20		
Maharashtra	1		35.70	8.90						
Panjab										
Industrial Area A					2.60	No Progress				
Batala Road					11.70	No Progress				
Gill Road					1.30	No Progress				
Rahon Road					4.30	No Progress				
Subtotal Punjab		4			19.90					
Rajasthan										
Mandya Road			325.00	50.00		Yes	9/98	363		
Punyata Road			400.00	50.00		Yes	10/98	404		
Subtotal Rajasthan	2		725.00	100.00						
Tamil Nadu										

States/CETPs	Number of CETPs which Received Grants		Total Project Cost	Grant Under IDA Credit for Implementation	Status of Commissioning	Date	Members		Flow M3/day
	for Implementation	for Feasibility Study					Design	Actual	
				Rs. Lakhs					
Madhavaram			125.00	25.00	Yes	4/99			
Ambar			270.00	50.00	Yes	4/99			
Andipalayam			328.70	53.70	Yes	n.a	21	21	4500
Mannarai			271.00	67.75	Yes	2/99	32	4200	2500
Manickpuran			127.00	31.75	Yes	2/99	11	1600	800
Angeripalayam			720.00	180.00	Yes	2/99	92	10000	5000
Veerapandi			675.00	168.75	Yes	11/98	75	10000	10000
Chinnakarai			305.70	61.25	Yes	2/99	31	5000	3200
Kasipalayam			347.00	55.00	Yes	2/99	20	4000	4000
Kunangpalayan			216.00	54.00	n.a		19	4200	4200
Karur Karuppam Palayan			108.00	27.00	n.a	5/99			
Sipcot Sidco (Phase II)			252.00	50.00	In Progress				
Talco Perinambut			160.00	40.00	n.a				
Sellandipalayam				56.25	In Progress	12/99	150	2600	2600
Sukhaliur				42.13		7/99	80	1700	1700

States/CETPs	Number of CETPs which Received Grants for Implementation	Number of CETPs which Received Grants for Feasibility Study	Total Project Cost	Grant Under IDA Credit		Status of Commissioning	Date	Members		Flow M3/day
				for Implementation	for Feasibility Study			Design	Actual	
				Rs. Lakhs						
Subtotal Tamil Nadu	15		3,905.40	962.58						
New Delhi (Design for 15 CETPs) 15 CETPs: Feasibility Det. Eng. comp. Wall										
					215.00					
					30.00					
					150.00					
Subtotal New Delhi		15			395.00					
Sub -total	26	25	9,536.34	1,400.75	437.50					
Total CETPs (Rsmillion)			953.63	183.83						
US\$million equivalent (@Rs.41 per US\$)			23.26	4.48						
Adjustment (1)			-4.07	-0.78						
Total CETPs (US\$ million)			19.19	3.70						

Note (1): Adjustment to compensate for discrepancies between total actual disbursements under category 2-B and costs in US\$ as reported by IDBI for Demonstration projects and IDBI's approved CETPs.

Table 8E. Costs and Financing- Individual Investments

IBRD Sub-Loan No.	Name of Company	IBRD Loan Approved US\$	Loan Disbursement US\$	DFI's Other		Sponsors & Other		Total Cost million Rs.	Loan Disbursement million Rs.	DFI's Other		Sponsors & Other	
				Loans	US\$	Financing	US\$			Loans million	Rs.	Financing million	Rs.
ICICI Sub-projects													
ICICI-B-001	Ballarpur Industries Ltd	1,530,000	1,077,000			14,923,000	16,000,000	418.5	40.0				378.5
ICICI-B-002	Malladi Drugs & Phar.Ltd	290,000	237,000			243,000	480,000	16.8	8.3				8.5
ICICI-B-003	Hukumchand Jute Ind. Ltd.	1,030,000	863,000			6,557,000	7,420,000	259.7	30.2				229.5
ICICI-B-004	Bayer India Ltd.	660,000	687,000			923,000	1,610,000	56.4	24.0				32.3
ICICI-B-005	Century Text. & Ind. Ltd.	2,230,000	2,548,000			7,622,000	10,170,000	278.3	73.9				204.4
ICICI-B-006	Nath Pulp & Paper Ltd.	1,830,000	1,440,000			3,960,000	5,400,000	300.0	90.0				210.0
ICICI-B007 & B011	Atul Products Ltd.	2,668,000	1,989,659	1,281,818		4,228,523	7,500,000	247.5	64.9	42.3			140.3
ICICI-B-008	Atic Ind. Ltd.	2,280,000	1,414,000			2,296,000	3,710,000	97.5	60.0				37.5
ICICI-B-009	IPCA Labs. Ltd.	145,000	141,000			129,000	270,000	9.6	5.0				4.6
ICICI-B-010	Indian Aluminium Co. Ltd.	3,370,000	2,022,000			2,498,000	4,520,000	158.2	70.8				87.4
ICICI-B-011	Gujarat Alkalies & Chem. Ltd.	4,710,000	3,830,000			59,370,000	63,200,000	2212.0	134.1				2078.0
ICICI-B-012	Hindalco Ind. Ltd.	5,000,000	4,675,000			23,735,000	28,410,000	895.0	157.5				737.5
ICICI-B-013	Alufluoride Pvt. Ltd.	820,000	740,000			5,010,000	5,750,000	201.3	25.9				175.4
ICICI-B-014	Gokak Patel Volkart	164,000	111,000			125,000	236,000	8.3	3.9				4.4
ICICI-B-015	Sudarshan Chem.Ind.Ltd	670,000	640,000			260,000	900,000	40.0	20.0				20.0
ICICI-B-016	Kap Chem Ltd.	680,000	412,000			788,000	1,200,000	30.0	13.0				17.0
ICICI-B-017	Rohit Pulp & Paper Ltd.	220,000											
ICICI-B-018	Finolex Ind. Ltd.	2,430,000	1,557,000			4,943,000	6,500,000	227.5	54.5				173.0
ICICI-B-019	NRC Ltd (Nat.Rayon Corp)	2,000,000	1,999,000			366,483	2,365,483	71.0	60.0				11.0
ICICI-B-020	Madras Fertilisers Ltd.	2,100,000	819,000	???for loan in US\$		7,191,000	8,010,000	243.6	130.0				113.6
ICICI-B-021	Thiru Arooran Sugars Ltd.	833,000	800,000	914,286			1,714,286	60.0	25.0	35.0			
ICICI-B-022	Globe Organics Ltd.	130,000											
ICICI-B-023	Kothari Sugars & Chem.Ltd.	580,000	558,000			3,442,000	4,000,000	140.0	19.5				120.5
ICICI-B-024	Rama Newsprint & Papers Ltd.	3,000,000	2,533,000			2,831,000	5,364,000	187.7	90.0				97.7
ICICI-B-025	IFB Agro Ind. Ltd.	170,000	158,000			292,000	450,000	15.8	5.5				10.2
ICICI-B-026	Sterlite Industries Ltd.	3,000,000	2,524,000			19,076,000	21,600,000	660.0	90.5				569.5
ICICI-B-027	Grasim Ind. Ltd.	500,000	492,000	307,692		500,308	1,300,000	45.1	15.4	10.0			19.7
ICICI-B-028	Shreyans Ind. Ltd.	270,000											
ICICI-B-029	Rajashri Sugars Ltd.	330,000											
ICICI-B-030	Century Text. & Ind. Ltd.	968,000	808,000			492,000	1,300,000	36.3	28.7				7.6
ICICI-B-032	Aurangabad Paper Mills Ltd.	2,000,000											
ICICI-B-033	Lanco Ind. Ltd.	2,218,000	1,952,000			2,358,000	4,310,000	150.9	68.3				82.5
ICICI-B-034	Jaysynth Dyestuff Ltd.	750,000	660,000			350,000	1,010,000	32.5	24.0				8.5
ICICI-B-035	Indian Dyestuff Ltd.	4,200,000											
ICICI-B-036	Mysore Petrochem. Ltd.	4,760,000	4,025,000			6,783,000	10,808,000	378.3	140.9				237.4
ICICI-B-037	SIV Ind. Ltd.	8,000,000	4,513,000	5,196,788		13,521,212	23,231,000	867.0	165.0	190.0			512.0
ICICI-B-038	Travancore Chemicals Ltd.	211,000											
ICICI-B-039	Tuticorin Alkali Ch.& Fert.Ltd.	875,000	141,000			959,000	1,100,000	43.7	5.5				38.2
	Sub-total ICICI	67,622,000	46,365,659	7,700,584		195,772,526	249,838,769	8,388.3	1,744.3	277.3			6,366.7
	Less IDBI 011	1,330,000	1,282,659							42.3			
	Total ICICI	66,292,000	45,083,000	7,700,584		195,772,526	249,838,769	8388.3	1702.0	277.3			6366.7
IDBI Sub-projects													
B-IDBI--001	Sandur Manganese & Iron Ores Ltd.	430,000	363,058	121,019		267,856	751,933	23.3	11.3	3.8			8.3
B-IDBI--003	Mouldwell Polymers	780,000	611,063	154,803		1,199,313	1,965,179	60.3	18.8	4.8			36.8
B-IDBI--004	Nath Pulp and paper mills	1,255,000	1,039,292	2,467,521		11,221,803	14,728,617	462.0	32.6	77.4			352.0
B-IDBI--005	Polyolefins Lts.	580,000	416,948	0		324,293	741,241	23.2	13.1				10.2

IBRD Sub-Loan No.	Name of Company	IBRD Loan Approved US\$	Loan Disbursement US\$	DFT's Other		Sponsors & Other		Total Cost million Rs.	Loan Disbursement million Rs.	DFT's Other		Sponsors & Other	
				Loans	US\$	Financing	US\$			Loans million Rs.	Financing million Rs.		
B-IDBI-006	Hukumchand jute	1,560,000	1,099,805	441,886		7,904,848	9,446,539	288.6	33.6	13.5		241.5	
B-IDBI-007	Rashtriya Chemicals and Fertilizers Lt	6,910,000	6,688,376	0		7,784,780	14,473,156	460.7	212.9			247.8	
B-IDBI-008	EID Party	1,010,000	997,507	0		329,210	1,326,717	40.3	30.3			10.0	
B-IDBI-009	Emmellen Biotech Pharma Ltd.	320,000	300,857	0		150,429	451,286	15.0	10.0			5.0	
B-IDBI-010	Gujarat Alkalies & Chemicals Ltd.	4,710,000	4,577,817	0		47,989,127	52,566,944	1638.0	142.6			1495.4	
B-IDBI-011	& ICICI Atul Products Ltd.	2,668,000	1,989,659	1,281,818		4,228,523	7,500,000	247.5	64.9	42.3		140.3	
B007													
B-IDBI-012	Som Distilleries	960,000	783,234	0		325,825	1,109,059	35.4	25.0			10.4	
B-IDBI-013	Colour Chem	574,000	478,500	0		191,400	669,900	21.0	15.0			6.0	
B-IDBI-014	Shree Vindhya Paper Mills Ltd.	4,800,000	4,060,631	0		1,569,018	5,629,649	185.5	133.8			51.7	
B-IDBI-015	Tata Yodogawa Ltd.	145,000	147,457	0		123,545	271,002	8.5	4.6			3.9	
B-IDBI-016	Kopargaon Sahakari Sakhar Karkhana	633,000	558,893	0		298,714	857,607	29.2	19.0			10.2	
B-IDBI-017	Grasim Industries	5,000,000	4,787,348	27,128,305		12,329,017	44,244,670	1386.3	150.0	850.0		386.3	
B-IDBI-018	Modi Alkalies & Chemicals Ltd.	4,300,000	5,004,118	0		11,004,540	16,008,658	510.0	159.4			350.6	
B-IDBI-019	Sagar Cements Ltd.	372,000	351,636	0		191,801	543,437	17.0	11.0			6.0	
B-IDBI-020	Jai Bhavani SSK Ltd.	420,000	411,899	0		142,580	554,479	17.5	13.0			4.5	
B-IDBI-021	Sandur Manganese & Iron Ores Ltd.	1,500,000	1,434,720	0		902,279	2,336,999	73.3	45.0			28.3	
B-IDBI-023	Tilaknagar Distilleries & Industries Ltd	250,000	210,011	0		223,976	433,987	13.6	6.6			7.0	
B-IDBI-026	Sumangla Steels	280,000	284,607	0		94,869	379,476	12.0	9.0			3.0	
B-IDBI-027	ACC	3,000,000	1,690,819	0		3,917,461	5,608,280	181.0	54.6			126.4	
B-IDBI-029	Raptakoss Brett	130,000	104,000	0		32,100	136,100	4.8	3.7			1.1	
B-IDBI-032	Ispat Alloys	1,430,000	936,396	0		984,155	1,920,551	60.2	29.4			30.9	
B-IDBI-033	Tamil Nadu Cements	950,000	835,738	0		362,153	1,197,891	43.0	30.0			13.0	
B-IDBI-034	Kakatia Cements Ltd.	190,000	191,144	0		63,715	254,859	8.0	6.0			2.0	
B-IDBI-035	Shree Cement Ltd.	1,366,000	1,192,192	0		284,728	1,476,880	53.4	43.1			10.3	
B-IDBI-036	EID Parry, Nellikuppam	438,000		0		513,889	513,889	18.5				18.5	
B-IDBI-37/30	Simbhaoli Sugar Mills	1,038,000	760,684	0		556,000	1,316,684	44.0	25.4			18.6	
B-IDBI-038	Gujarat Heavy Chemicals Ltd.	1,690,000	1,332,639	0		693,860	2,026,499	72.7	47.8			24.9	
B-IDBI-039	Chemfab Alkalies	1,420,000	1,256,983	1,536,313		5,427,373	8,220,669	294.3	45.0	55.0		194.3	
B-IDBI-040	Vamshadara Paper Mills Ltd	339,000	248,112	0		80,569	328,681	12.0	9.1			2.9	
B-IDBI-042	Southern Petrochemicals Industries Lt	5,215,000	4,585,762	6,701,711		10,441,172	21,728,645	880.0	185.7	271.4		422.9	
B-IDBI-043	Ispat Industries	1,211,000	1,066,019	0		684,917	1,750,936	65.7	40.0			25.7	
B-IDBI-045	Madras Fertilizer Ltd	3,390,000	1,512,248	5,190,103		105,675,146	112,377,497	6015.0	80.9	277.8		5656.3	
B-IDBI-047	Dintex Dychem Ltd	250,000	211,964	235,516		585,138	1,032,618	43.8	9.0	10.0		24.8	
B-IDBI	EID Parry (2)	2,205,072	2,205,072	2,894,157		2,415,381	7,514,610	272.6	80.0			105.0	
B-IDBI	JK Corp.(3)	3,636,375	3,636,375	2,752,532		2,129,636	8,518,543	338.2	144.4	109.3		84.6	
	<i>Sub-total IDBI</i>	<i>67,355,447</i>	<i>58,363,543</i>	<i>50,905,684</i>		<i>243,645,139</i>	<i>352,914,366</i>	<i>13,975</i>	<i>1,995</i>	<i>1,820</i>		<i>10,160</i>	
	<i>less ICICI B007</i>	<i>-1338000</i>	<i>-707000</i>						<i>-22.6</i>				
	Total IDBI	66,017,447	57,656,543	50,905,684		243,645,139	352,914,366	13,975	1,973	1,820		10,160	
	<i>Subtotal Individual Projects</i>	<i>132,309,447.0</i>	<i>102,739,543.0</i>	<i>58,606,268.07</i>		<i>439,417,664.65</i>	<i>602,753,134.72</i>	<i>22,363.75</i>	<i>3,674.9</i>	<i>2097.5</i>		<i>16526.5</i>	
	<i>less Joint Project IDBI 011</i>			<i>(1,281,818.18)</i>		<i>(4,228,522.82)</i>	<i>(7,500,000.00)</i>	<i>(247.50)</i>		<i>-42.3</i>		<i>-140.3</i>	
	TOTAL INDIVIDUAL PROJECTS	132,309,447	102,739,543	57,324,450		435,189,142	595,253,135	22,116.3	3,674.9	2,055.2		16,386.2	

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Notes

(1) IDBI 011 and ICICI B007 have been implemented jointly and are presented for both financial institutions

(2) - IDBI other loans include a grant of 15 million Rs under the project, and a loan of 90 million Rs under the IPPP project (loan 3779)

(3) - It is the pollution prevention component of a project totalling Rs 4,760 million. IDBI other loan is a loan of about 109.3 million Rs. under IPPP project (loan 3779). This project also benefited from other financing from IDBI

INDIVIDUALCOSTS.XLS

Table 8F- Costs and Financing- Demonstration Projects
1. List of Projects and Costs in Rupees

Project	Original Cost in Rupees		Actual Cost in Rupees			
	Total	Grant	Total Cost	Sponsor	IDA	Loans/Other
Projects Implemented						
D01- EID Parry-Sugar Distillery	80,000,000	15,000,000	96,900,000	46,900,000	15,000,000	35,000,000
D02- KSSK Distillery	52,500,000	14,500,000	78,146,000	33,146,000	15,000,000	30,000,000
D03- Century Pulp & Paper	16,500,000	6,600,000	16,500,000	9,900,000	6,600,000	
D04- Gabriel India Electroplating	15,600,000	6,240,000	15,600,000	9,360,000	6,240,000	
D05- Ashoka Pulp & Paper	5,400,000	2,160,000	3,948,000	2,348,000	1,600,000	
D06- Western Paques HPF Rayon Plant	43,040,000	15,000,000	43,040,000	28,040,000	15,000,000	
D07- Wockhardt Effluent Treatment	22,910,000	9,200,000	25,430,000	16,230,000	9,200,000	
D09- EID Parry Botanical Pesticide	300,000,000	15,000,000	272,632,000	102,632,000	15,000,000	155,000,000
D12- Dintex Dyechem Dye Intermediate	27,500,000	10,000,000	43,845,000	33,845,000	10,000,000	
<i>Total</i>	<i>563,450,000</i>	<i>93,700,000</i>	<i>596,041,000</i>	<i>282,401,000</i>	<i>93,640,000</i>	<i>220,000,000</i>
Projects Canceled						
D08- Okhla Sewage Treatment Plant	70,200,000	17,600,000				
D10- Pudumjee Pulp & Paper Mill	108,000,000	18,000,000				
D11- Kothari Sugar & Distillery Plant	18,000,000	7,200,000				
<i>Total</i>	<i>196,200,000</i>	<i>42,800,000</i>				
<i>Total Approved</i>	<i>759,650,000</i>	<i>136,500,000</i>				

Table 8F- Costs and Financing- Demonstration Projects
2. List of Projects and Costs in USDollars

Project	Date of Approval	Exchange Rate at Approval	Original Cost in USDollars		Implementation Period	Actual Cost in USDollars			
			Total	Grant		Total Cost	Sponsor	IDA	Loans/Other
<u>Projects Implemented</u>									
D01- EID Parry-Sugar Distillery	June-95	31.5	2,540,000	500,000	Mostly 1996	2,840,000	1,340,000	500,000	1,000,000
D02- KSSK Distillery	Aug-95	31.4	1,670,000	480,000	Mid-95-mid 98	2,284,171	947,029	480,000	857,143
D03- Century Pulp & Paper	Dec-95	34.4	480,000	190,000	First half 96	477,791	287,791	190,000	-
D04- Gabriel India Electroplating	Jan-96	34.4	440,000	180,000	1995	463,636	283,636	180,000	-
D05- Ashoka Pulp & Paper	Jul-95	34.3	158,000	63,000	94-96	117,604	70,937	46,667	-
D06- Western Paques HPF Rayon Plant	Oct-96	35.5	1,214,000	423,000	Mid 94-Apr.95	1,315,994	892,994	423,000	-
D07- Wockhardt Effluent Treatment	Nov-96	36.0	640,000	260,000	1995	767,188	507,188	260,000	-
D09- EID Parry Botanical Pesticide	Oct-96	36.0	8,330,000	460,000	1997	7,616,444	2,850,889	460,000	4,305,556
D12- Dintex Dyechem Dye Intermediate	Jan-98	36.0	764,000	280,000	97-98	1,194,730	914,730	280,000	-
<i>Total</i>			<i>16,236,000</i>	<i>2,836,000</i>		<i>17,077,557</i>	<i>8,095,192</i>	<i>2,819,667</i>	<i>6,162,698</i>
<u>Projects Canceled</u>									
D08- Okhla Sewage Treatment Plant	Dec-96	35.2	1,994,318	500,000					
D10- Pudumjee Pulp & Paper Mill	Jun-97	36.0	3,000,000	500,000					
D11- Kothari Sugar & Distillery Plant	Jul-97	36.0	500,000	200,000					
<i>Total</i>			<i>5,494,318</i>	<i>1,200,000</i>					
<i>Total Approved</i>			<i>21,730,318</i>	<i>4,036,000</i>					

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Table 8G. Costs and Financing- Technical Assistance

Study	Total Cost Rupees	Total Cost US\$
1. SPCB Organization Study	n.a 1/	n.a 1/
2. Environmental Performance Indicators	2,730,000	78,000
3. Assessments for Incineration Plant at Chennai	4,000,000	114,286
4. Hazardous Waste Facility at TBIA	5,500,000	157,143
5. Air Pollution Control in the Cement Industry	2,730,000	78,000
6. Municipal Solid Waste Processing	5,700,000	162,857
7. Software for Hazardous Analysis in Process Industry	618,562	17,673
8. Studies for Ankleshwar Landfill	980,000	28,000
9. Epidemiological Survey in Pune Area	1,184,000	33,829
10. Evaluation of Thermal Power Plants Pollution Control	578,000	16,514
11. EIA of Katni-Maihar Lime kilns & Cement Plants	4,703,000	134,371
12. Simplified Sewage Treatment Using Bio-filter	2,500,000	71,429
13. Treatment of Polluted Water Body Using Specialty Bio-products	2,500,000	71,429
Total Studies	33,723,562	963,530
Environmental Training Program for DFI Officers (IDBI)	1,750,000	50,000
Total Technical Assistance Costs	35,473,562	1,013,530
Financing:		
IDA		805,380
Sponsors		208,150

Assumes the following exchange rate: US\$1=Rs.35

1/ Financed by the Central Government- Cost not available.

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Table 9- Economic Costs and Benefits

No economic cost/benefit analysis was performed at Appraisal , as it is difficult to quantify benefits and compare the cost effectiveness of the approach to pollution control adopted under the project with other approaches. No indicators to measure environmental benefits were proposed at Appraisal. Actual environmental benefits of the project are summarized in Table 6.

Table 10: Status of Legal Covenants

<u>Agreement</u>	<u>Section</u>	<u>Covenant Type</u>	<u>Present Status</u>	<u>Original Fulfillment Date</u>	<u>Revised Fulfillment date</u>	<u>Description of Covenant</u>	<u>Comments</u>
Loan & Credit	2.03	Implementation	C	June 30, 98	March 31, 99	Closing Date	At Government request the closing date was extended to March 31, 1999. When the loan and the credit closed.
Loan & Credit		Implementation	C		February 1996	Mid-term Review	Program review took place February 12-28, 1996.
Loan & Credit	4.01 of CA and 3.01 of LA.	Accounts/audit	CD	not later than nine months after end of each fiscal year		The Borrower shall maintain and cause to be maintained separate accounts and have them, and special account and SOEs, audited and furnish and cause to be furnished such reports.	Although with some delays MoEF, IDBI and ICICI audit reports have been sent to the Bank
Loan & Credit	6.01 of CA	Flow and utilization of Funds	C	condition of effectiveness	November 6, 1991	The Borrower to obtain from IDBI a letter of Understanding.	
Loan & Credit	5.01 of LA	Flow and utilization of Funds	C	condition of effectiveness	November 6, 1991	Subsidiary loan agreements to be executed on behalf of the Borrower and IDBI and the Borrower and ICICI.	The Subsidiary agreement between GOI and ICICI was signed on October 25, 1991 and a legal opinion was issued on October 30, 1991.
Credit	Schedule 5, Para 3(a)	Implementation	CD	Dec. 31, 91	April 1994	The Borrower shall undertake and complete a study on the organization and management of SPCB's.	In November 1992, an ongoing study since negotiations was completed by the Belliappa Committee, but the Bank considered that it did not fulfill the TOR's agreed between the Bank and GOI during negotiations. A second study was contracted to the Administration Staff College of India, based on these TOR's. It was completed in April 1994. The recommendations of the study were discussed and an action plan prepared during a seminar in Hyderabad in February 1995.

<u>Agreement</u>	<u>Section</u>	<u>Covenant Type</u>	<u>Present Status</u>	<u>Original Fulfillment Date</u>	<u>Revised Fulfillment date</u>	<u>Description of Covenant</u>	<u>Comments</u>
Project	3.01	Accounts/audit	C	July 31		IDBI and ICICI shall furnish audited financial statements and project accounts for Part B and C2 to the Bank not later than four months after the end of each such fiscal year.	Although with some delays, IDBI and ICICI audit reports have been sent to the Bank regularly
Project	3.02 and 3.03 (a)(i)	Financial Performance	C	At all times		IDBI to maintain their respective consolidated debt/equity ratio at less than 12:1	IDBI maintained its debt/equity ratio between 9 and 10 from 1990/91 to 1994/95 and at about 6 from 1995/96 to 1997/98
Project	3.02 and 3.03 (a)(i)	Financial Performance	***	At all times		ICICI to maintain their respective consolidated debt/equity ratio at less than 12:1	ICICI maintained a debt/equity ratio between 5.2 and 7.0 between 1994/95 and 1997/98.
Project	3.03(a)(ii)	Financial Performance	C	At all times		IDBI to maintain their respective cash generation for each year at least at 1.2:1 times the consolidated debt service for that year	IDBI's debt service coverage ratio was between 1.5 and 1.7 between 1990/91 and 1994/95 and about 1.2-1.3 between 1995/96 and 1997/98.
Project	3.03(a)(ii)	Financial Performance	***	At all times		ICICI to maintain their respective cash generation for each year at least at 1.2:1 times the consolidated debt service for that year	ICICI maintained a DSCR, inclusive of short term debt, at between 1.4 and 1.7 over the period 1994/95 And 1997/98.

Definitions

C = covenant complied with; CD = complied with after delay; CP = complied with partially; NC = not complied with

Table 11: Compliance with Operational Manual Statements

There was no significant lack of compliance with applicable Operational Manual Statements, including with Operational Directive 4.00 (Environmental Policies); Operational Directive 4.30 (Involuntary Resettlement) and Operational Directive 11.00 (Procurement).

Table 12: Bank Resources: Staff Inputs

Stage of project cycle	Planned		Revised		Actual	
	Weeks	US\$ '000	Weeks	US\$ '000	Weeks	US\$ '000
Preparation to Appraisal	n.a	n.a	n.a	n.a	95.9	218.5
Appraisal	n.a	n.a	n.a	n.a	33.8	37.1
Negotiations through Board approval	n.a	n.a	n.a	n.a	10.8	26.5
Supervision:	n.a	n.a	n.a	n.a		
FY90 through FY98	n.a	n.a	n.a	n.a	189.4	241.9
FY98	17.0	42.5	18.5	39.3	8.6	16.3
FY99 ¹	23.5	39.5	28.0	42.1	10.4	23.3
Total Supervision	n.a	n.a	n.a	n.a	208.4	281.5
Completion						
FY99	8.0	12.2	8.0	12.2		
FY00	7.6	30.0	7.6	30.3		
Total Completion	15.6	42.2	15.6	42.2		
TOTAL	n.a	n.a	n.a	n.a		

n.a: not available.

Note: to be updated to include actual figures for FY99 and planned and actual figures for FY2000

¹ Up to February 23, 1999—to be updated

Table 13: Bank Resources: Missions

Stage of project cycle	Month/year	Number of persons	Days in field ¹	Specialized staff skills represented	Performance rating		Types of problems
					Implement action status	Development objectives	
<u>Through appraisal</u>							
Identification	October 1989	3	19	Chemical.Eng (TM).; Env. Specialist; Economist			
Preparation	January 1990	1	14	Chemical Eng. (TM)			
Pre-appraisal	April 1990	1	29	Chemical Eng. (TM)			
Follow-up I	Aug./Sept 1990	3	18	Chemical.Eng (TM).; Env. Specialist; Economist			
Appraisal	Nov./Dec. 1990	7	20	Chemical.Eng (TM).; Env. Specialists; Env. Engineers (C); Instit. Specialists; Economist			
<u>Supervision</u>							
1.	November 1991	6	13	Chemical.Eng (TM).; Env. Engineer (C); Instit. Specialist; Economist; Proc. Specialist; Operations Analyst	1	1	Additional work required on State Boards Organization Study; no demonstration projects identified.
2.	October 1992	4	8	Chemical.Eng (TM).; Env. Engineer (C); Indust. Engineer; Operations Analyst	1	1	Lack of continuity in staff of Implementation Cell; need to simplify approval procedures for Demonstration Projects; need for detailed training schedules and full time training coordinator.
3.	March 1993	3	7	Chemical.Eng (TM).; Env. Engineer (C); Operations Analyst	1	1	Delays in procurement of equipment (Inst. Streng. Component); CETPs approvals lagging behind; difficulties in identifying eligible demonstration projects.

¹ For combined tasks addressed by missions (work on project as well as preparation and/or supervision of follow-up projects).

Table 13 - Page 2 of 3

Stage of project cycle	Month/year	Number of persons	Days in field ¹	Specialized staff skills represented	Performance rating		Types of problems
					Implementation status	Development objectives	
4.	Aug./Sept. 1994	4	15	Chemical.Eng (TM).; Env. Engineer (C); Economist; Operations Analyst	S	HS	Need to strengthen Implementation Cell; delays in procurement of equipment; need to change approval procedures for demonstration projects.
5.	Jan./Feb. 1995	3	13	Chemical.Eng (TM); Env. Engineer (C); Operations Analyst	S	S	No progress in demonstration projects and in committing technical assistance funds; delays in procurement of equipment.
6. (Mid-term Review)	February 1996	5	17	Chemical.Eng (TM).; Env. Engineer (C); Economist; Operations Officer; Res. Assistant	S	S	Need to strengthen Implementation Cell; delays in procurement of equipment; slow pace of disbursements; delays in Performance Indicators Study;; need to review experience on CETPs.
7.	October 1996	1	5	Chemical Eng. (TM)	No rating	No rating	No progress under Technical Assistance Component; delays in release of grants to CETPs; unsatisfactory performance of Implementation Cell.
8.	February 1997	3	17	Chemical.Eng (TM).; Env. Engineer; Economist;	S	S	Counterpart funds from Central Government; delays in release of grants to CETPs; major delays in procurement of equipment; mixed environmental performance of completed CETPs.
9.	July 1997	2	13	Chemical.Eng (TM).; Projects Assistant.	No Rating	No Rating	Delays in release of grants to CETPs and resulting cost overruns; IDBI personal guarantee requirements for CETPs; need to develop a systematic strategy to optimize CETP design, operations and management, and outside monitoring; insufficient attention to sludge management and treatability studies..
10.	August 1997	2	15	Chemical.Eng (TM).; Env. Engineer.	S	S	(Report not found)
11.	September 1998	4	13	Operations Officer (TM); Env. Specialists; Proc. Specialist	S	No Rating	Delays in procurement of equipment; commitment of IDA funds to 15 CETPs in Delhi without Bank agreement may not be eligible.

Table 13 - Page 3 of 3

Stage of project cycle	Month/year	Number of persons	Days in field ¹	Specialized staff skills represented	Performance rating		Types of problems
					Implementation status	Development objectives	
12. Final SPN and ICR Preparation	April 1999	7	18	Operations Officer (TM); Env. Engineer (C); Indust. Engineer (C); Economist (C); Env. Specialist; Proc. Specialist; Financial Specialist.	U	S	Late delivery of equipment; commitment of IDA funds to additional CETPs without IDBI review and Bank approval .

Industrial Pollution Control Project (Loan/Credit 3334/2252-IN)**Final Supervision and Preparation of the Implementation Completion
Report (ICR) Mission (April 5-22, 1999)****Aide Memoire****I. PREAMBLE AND ACKNOWLEDGEMENTS**

1.1 A mission consisting of Mmes./Messrs. Hadjitarkhani (task leader), D. Babelon, C. Dahan, D. Kantawala (consultants), and joined in the field by Messrs. P. Selvam, S. Vani and S. Krishnan of the Bank's New Delhi Office, visited India April 5-22, 1999¹. The purpose of the mission was to carry out the final review of the implementation progress as well as the field work necessary to support the preparation of the Implementation Completion Report (ICR) for the Industrial Pollution Control Project.

1.2 This aide memoire is a brief record of the main findings of the mission, including the overall implementation progress of the project, and outlines some of the key questions that must be addressed to assure sustained future benefits of the project. It also summarizes the project time-table and the next steps agreed by all concerned parties for the more limited objective of producing the ICR.

1.3 In preparing this aide memoire, the mission has drawn on material provided by the Ministry of Environment and Forests (MoEF), the four beneficiary State Pollution Control Boards (SPCBs) of Gujarat, Maharashtra, Tamil Nadu, and Uttar Pradesh, the Industrial Development Bank of India (IDBI), and the Industrial Credit and Investment Corporation of India, Limited (ICICI) in response to a questionnaire sent to them by the Bank. It has also drawn on presentations made by the various project beneficiaries in the four SPCBs. The Aide Memoire was discussed and agreed to in a wrap up meeting with Mr. R. Paul, additional Secretary, MoEF, on April 22, 1999. A list of sites visited by the mission is compiled in **Attachment I**. The observations made in this aide memoire are preliminary and subject to review and confirmation by the Bank's management.

1.4 The mission in the course of its visit met with representatives from the MoEF, Department of Economic Affairs (DEA) and Central Pollution Control Board (CPCB) in New Delhi, IDBI, ICICI in Mumbai and the four SPCBs -- in Mumbai for Maharashtra, in Gujarat for Gandhinagar, on Chennai for Tamil Nadu, and Lucknow for Uttar Pradesh. The mission visited a number of beneficiary enterprises/plants in each of the four States and is deeply appreciative of the warm hospitality offered to it. The mission is especially grateful to the staff of IDBI and ICICI who arranged the site visits and coordinated the mission's work program and logistics. A list of persons met is given in **Attachment II**.

II. PROJECT BACKGROUND AND PREMISES

2.1 The Industrial Pollution Control Project was approved by the Bank's Board on May 30, 1991, and Loan 3334-IN in the amount of US\$124 million and Credit 2252-IN in the amount of US\$31.6 million equivalent became effective on November 6, 1991. The project, which had a total cost of US\$260 million equivalent, was comprised of three main components, namely:

¹ Mr. Vani joined the mission for meetings with IDBI and ICICI in Mumbai and MoEF in New Delhi; Mr. Krishnan joined the mission for meetings with MoEF only. Mr. Bekir Onursal, who was already in India on a different assignment, joined the mission for the visits to project sites in Maharashtra, Gujarat and Tamil Nadu.

- (a) an institutional component designed to strengthen the State Pollution Control Boards in the states of Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh;
- (b) an investment component designed to support efforts by industry to comply with regulations, including support for set up of common effluent treatment plants (CETPs); and
- (c) a technical assistance component designed to assist the MoEF and the development financial institutions (DFIs) to provide specialized technical assistance for the evaluation of environmental problems and for the assessment of their solutions.

2.2 The rationale for the project is derived from the assessment that implementation of the activities included under the project would reduce environmental degradation in India caused by industrial sources, improve effectiveness and coverage of the Boards in their monitoring and enforcement activities and in this manner enable the Government of India (GOI) to promote stricter compliance with provisions of the environmental acts. Key objectives were:

- (a) to strengthen the four SPCBs to improve their effectiveness and coverage in monitoring and enforcement activities;
- (b) to promote construction of the CETPs to improve environmental performance of those small and medium scale industries, which also had the potential of replication elsewhere in India;
- (c) to provide technical and financial support to individual enterprises to support their efforts in waste minimization and resource recovery, in particular in the chemical and related industries; and
- (d) to support the demonstration projects aimed at introducing novel techniques and processes to address pervasive environmental problems in industry.

2.3 Based on a preliminary assessment of the mission, the foregoing objectives have been achieved to a limited degree. Information and data made available to the mission by MoEF, the four SPCBs, IDBI and ICICI suggests that SPCBs are in general functioning more effectively; a total of about 70 individual enterprises have taken advantage of the lines of credit through IDBI and ICICI and 12 demonstration projects have been financed under the project². Moreover, commitments were made for a total of 87 CETPs³. Out of these 87 CETPs 10 have only completed their feasibility studies, 37 CETPs were completed, and the balance 40 are at various stages of construction. These 40 include fifteen CETPs approved by the GOI for New Delhi, for which MoEF has advanced a total of Rs. 225 million to the Delhi Industrial Development Corporation under Supreme Court's Order of 1996 and has claimed reimbursement from the Bank under the statement of expenses (SOE) procedures as actual expenses. Since the procedures followed by MoEF are not in accordance with the Bank disbursement guidelines, DEA has agreed that the Bank can recover the funds by deducting the amount from the withdrawal applications that are currently being filed. So far the Bank has recovered a total of Rs. 30.4 million. Due to the large sum of funds committed and the lack of progress with implementation of some of the CETPs, there is a possibility that GOI may eventually have to refund the funds to the Bank.

² These are rather rapid quantitative assessments, and a detailed analysis of the information and data provided to the mission would be required before a qualitative assessment can be presented and the full impact of the project can be measured. This analysis will be performed during preparation of the ICR.

³ Out of these 87 CETPs, only 27 have followed the proper approval procedures established under the project and have been approved by the Bank. A list of these 27 CETPs is given in **Attachment III** and a more detailed status is given in section IV of the aide memoire.

III. INSTITUTIONAL COMPONENT

Component Description

3.1 The institutional component -- Part A of the Project -- with a total cost of US\$18 million, was to fund training, equipment and facilities requirement at the SPCBs. An IDA allocation of US\$12.6 million equivalent was to cover the costs of training and equipment in the four states and GOI was expected to allocate the balance resources required to meet the operation and maintenance costs of the financed equipment and facilities. The GOI was to pass US\$12.6 million equivalent from the proceeds of the IDA Credit to the MoEF on a grant basis. It was further expected that through the appropriate budgetary allocations, funds would be made available by the GOI to meet the counterpart funding requirement.

3.2 The MoEF had overall responsibility for the execution of this component. It was to coordinate the activities of the beneficiary boards through a Central Sector Scheme (CSS), under which the proceeds of the IDA Credit would be transferred to the Central Pollution Control Board (CPCB) to administer the component on behalf of the SPCBs. The MoEF constituted an Implementation Cell to supervise the execution of this component and directly undertake the procurement and disbursement activities required for its implementation. In order to improve the operational efficiency of the SPCBs and ensure effective use of the investment, the GOI had also agreed to conduct a review of the organization and management of the SPCBs. This study was expected to be completed by December 1991 and its recommendations were to be implemented in due course.

Main Findings

3.3 **Procurement of Monitoring Equipment.** The single most salient feature of this component is the prolonged delays in procurement of laboratory and monitoring equipment. It is clear that MoEF has not managed implementation of this activity effectively, and has completely failed to ensure timely delivery of equipment. The long delays in delivery of the equipment--responsibility for which from 1996 onwards should be equally shared between the CPCB and the procurement agent, National Thermal Power Corporation (NTPC)-- has adversely affected some of the SPCBs. The worst affected SPCB is the Maharashtra Board which as of March 31, 1999, had only received four Jeeps, some air-conditioners, and some sundry equipment. The Maharashtra Board indicated that over the past several years, they were not permitted by the state authorities to procure any monitoring equipment from their own resources as they were never given a clear indication as to when the equipment financed under the project would be delivered to them. As long as this expectation and promise was pending, they could not purchase new equipment. As of the closing date of the project (March 31, 1999) there were still a large number of monitoring equipment items which have been dispatched prior to closing date but are expected to be received by mid-July, 1999. *The mission advised MoEF that the current schedule for final delivery of equipment and settlement of the accounts is too tight and urged MoEF to advance the schedule to avoid the risk of missing the deadline of July 31, 1999, for submitting final reimbursement applications.*

3.4 **Training.** The training programs conducted in India, mostly concentrated in 1992/93 and 1994/95, seem to have been useful and served their purpose. The mission was informed that a total of 2000 staff from 26 SPCBs participated in 150 training courses conducted in 55 training institutions. CPCB staff participated in about 75% of these training programs. Understandably, the MoEF is pleased with the training programs that have been conducted and this feeling is shared by some of the Boards. However, an overseas training program organized by MoEF in late February 1999 for about 36 participants, although rated useful, seems to have been arranged in a hurried manner ahead of the project closing date, which made full participation of all the SPCBs difficult.

3.5 **Facilities.** As stated in para. 3.1 above, provisions were made under the IDA credit for refurbishing of laboratory facilities. This contained civil works and equipment to ensure adequate environmental control inside the laboratories, refurbishing of specialized rooms and the provision of office and laboratory space for the Uttar Pradesh and Maharashtra PCBs, and utilities equipment, i.e. back-up power facilities,

voltage regulators and data processing equipment. Although as of March 31, 1999, the IDA allocation for facilities amounting to US\$1.5 million remained unutilized, according to MoEF the funds have been utilized between 1992/93 to 1996/97 for setting up 22 regional laboratories in Maharashtra, Tamil Nadu and Uttar Pradesh. MoEF has stated that a total of Rs. 29 million (about US\$1.00 million) has been spent on facilities, which might have been filed under different categories for purposes of withdrawal applications that have been processed by the Bank.

3.6 Sustainability. Although the implementation of this component is far from fully satisfactory, the mission's review suggests that this component is moving in the right direction and has a chance of being sustained. Whether as a result of the recommendation of the "Organizational Structure Study of the SPCBs" requested under the project or due to tighter enforcement affected as a response to judicial activism, the four beneficiary SPCBs seem to be on a relatively better footing. In terms of their administrative and financial functioning, they are in a better condition today than were a few years back. They seem to be financially more self sufficient and less dependent on the state budget. Their revenues are generated from water cess, fees for issuing consents and analysis of samples taken from the industries or CETPs. Many new laboratories have been built and equipped under the Project. All four Boards would have access to modern and sophisticated monitoring equipment (after the equipment ordered under the Project is finally delivered), all have had training, and additional training could still be organized under the Industrial Pollution Prevention Project. Most Boards have decentralized their functions and are utilizing their regional and district laboratories more effectively. *However, to maintain the current level of achievements, efforts should be made to: (i) maintain the training and upgradation of the four SPCB's staff, (ii) allocate adequate funding for operation and maintenance of the newly acquired laboratories and monitoring equipment; and (iii) improve overall house-keeping of the laboratories.*

IV. INVESTMENT COMPONENT

Component Description

4.1 The investment component -- Part B of the project -- designed to support investment projects in the chemical and related industries such as fertilizers, leather tanning, dyes, pesticides and insecticides, pharmaceuticals, petrochemicals, pulp and paper, and sugar and distilleries, which as a group had been identified as a major source of industrial pollution. Under the project, efforts to monitor, control and alleviate industrial pollution were focused in the states of Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh. The first three states are home to most of the chemical and related industries in India, while the fourth state is the largest urbanized state with a large number of small and medium sized industrial plants.

4.2 The total cost of the investment component was estimated at about US\$237 million out of which a Bank loan of US\$124 million and an IDA credit of US\$16 million equivalent were allocated and the remaining balance was to be contributions from IDBI, ICICI, the project sponsor and GOI. The GOI was to pass on the proceeds of the Bank loan to IDBI (US\$74 million) and ICICI (US\$50 million) who were acting as financing intermediaries for investment by enterprises in individual plant as well as common treatment facilities⁴ The on-lending rate for IDBI and ICICI in Rupees was fixed at 15%, which was the commercial long term rate for domestic transaction at the time of project negotiations.

4.3. The project had made provision for setting up CETPs for clusters of small and medium scale industries. The financing pattern that has materialized consists of 20% contribution from the promoters, 25% central subsidy (IDA funds)-- with a limit of Rs. 5 million per CETP up to 1996 which was removed

⁴Allocation of Bank loan for individual investment projects was US\$50 million each for IDBI and ICICI. However, since implementation of CETPs was the responsibility of IDBI, Bank loan of US\$24 million allocated for this purpose was also to be made available to IDBI. In 1996 due to low utilization of Bank loan for CETPs, and strong demand for line of credit for individual investment US\$8 million was reallocated from CETPs to individual investment.

later--subject to a matching 25% contribution from the state government. The remaining balance 30% was to be secured from the Bank loan to be administered by the IDBI⁵. An allocation of US\$16 million equivalent from IDA resources were to be utilized for financing of the grant element for CETPs (US\$12 million) and demonstration projects (US\$4 million). The IDA resources were to be channeled through GOI, which was to make the resources available to IDBI to administer on their behalf based on a Letter of Understanding. The use of subsidy grants for CETPs and demonstration projects was justified on the grounds that: (i) these investments had a large elements of externalities and often involved new concepts in India, and without the subsidy the project would not take off; (ii) the CETPs were to assist small and medium scale industries to participate in large investments that were to benefit society as a whole in terms of improvements in human and physical resources; (iii) the target industries were expected to be in general financially viable and facilities were installed before the new emission standards were in place; and (iv) the subsidies were to be partially off-set by the higher water cess, anticipated at time of project launch, as well as the increases in pollution charges. The demonstration projects were expected to introduce pioneering project concepts with high risks and similar externalities as stated above which would make them difficult to finance on a purely commercial basis. The Bank and the GOI had established separate eligibility criteria for the CETPs and demonstration projects.

4.4 IDBI and ICICI were responsible for identifying and appraising the individual projects in line with the established eligibility criteria. Furthermore, IDBI was given the responsibility of financial appraisal for CETPs and administration of the grant on behalf of the GOI. The investment component comprised the following activities:

- (a) investment projects relating to the redesign and implementation of waste minimization, resource recovery and pollution abatement schemes by individual enterprises in targeted sectors;
- (b) investment projects for setting up common effluent treatment plants (CETPs) at industrial states and other sites with a heavy concentration of chemical industries, for the treatment and proper disposal of liquid, gaseous and solid wastes, mainly by small scale industries as well as carrying out of such studies as would be required for the location, design, and implementation of the common treatment facilities; and
- (c) investment projects relating to establishment of eligible demonstration projects selected for targeted incentives due to the relatively small size of the enterprise, the environmental problems associated with their operations, and the potential demonstration effects of these problems in encouraging similar investments and systems by other industries.

Main Findings

4.5 The outcome of this component is quite mixed; it seems commitment of the lines of credit for investment for individual enterprises progressed in a satisfactory manner and a large number of enterprises accessed the fund, although the higher utilization may have been because of the favorable interest rate compared with commercial rates. However, the process of implementation of the CETPs, which in accordance with the legal documents should have been responsibility of the IDBI, has been totally confused because of MoEF interventions in committing the IDA funds (under the Central subsidy Scheme), and the entire exercise has been poorly managed and monitored. Under the demonstration projects which had initial difficulties and delays, a total of 12 projects were approved, but only seven were fully implemented.

4.6 **Individual Investments.** A total of about 70 projects (excluding cancellations) have been approved under Loan 3334-IN for which the total Bank commitment amounted to US\$119 million. Actual

⁵ However, in the SAR the formula seems slightly different, as the Central subsidy contribution which is funded by the IDA is stated as 20%, and the matching grant is also 20% and the balance is to come from the Bank loan. MoEF has stated that the percentage of cost to be funded out of IDA funds increased and a communication to this effect is awaited from MoEF.

disbursements based on the Bank's record amounted to US\$101.3 million as of March 31, 1999. Although some of the investments were considered to be quite innovative and were good examples of environmental improvements and candidates for replication elsewhere in India, a number of investments were for pollution mitigation of either a new plant or expansion of an existing plant. The mission observed one case of total environmental disaster from planning, design, implementation, monitoring, and safety aspects. A list of investment projects implemented by IDBI and ICICI is given in **Attachment IV**.

4.7 **CETPs.** In the initial stage the concept of the CETPs was not taken seriously by the industries, and it was only in 1994 after judicial activism led to closure of some industries that the industries were forced to participate in the formation of the CETPs. Although, according to MoEF, a large number of CETPs have been constructed or are under construction, it is premature to rate the performance of the CETPs in a meaningful manner, as MoEF has not provided detailed information to the Bank yet. Some of the main bottlenecks experienced by the CETPs which contributed to implementation delays in the initial stages are:

- (a) formation of the cooperative or society by small scale industries with compatible effluent quality;
- (b) acquiring land on a subsidized basis; and
- (c) timely release of the subsidies by Central as well as state governments.

4.8 There are major disagreements between the Bank and the MoEF in the way MoEF has committed IDA funds for CETPs. Based on the Bank's records, there are only 27 CETPs that have fully complied with the established eligibility criteria as reflected in the "Project Agreement" dated July 8, 1991. These CETPs have been approved by the Bank and commitments under IDA funds have been issued by the Bank. These CETPs have also used the Bank loan through IDBI and as of March 31, 1999, a total of US\$13 million of Bank loan has been disbursed. These CETPs are located in the four project States and have been mostly completed and are operational. However, some of them are not yet fully stabilized, and therefore, are not complying with all the standard parameters of the SPCBs.

4.9 The disagreement between the Bank and MoEF over the CETPs arises from the fact that from 1996 onwards MoEF decided, without consultation with the Bank, to commit the IDA funds to a large number of CETPs. MoEF's action seems to have been in response to the Supreme Court Order which obligated MoEF to extend the central subsidy equivalent to 25% of cost of the CETPs including 15 of them in Delhi.

4.10 Based on MoEF's account there are 87 CETPs under the IDA credit, including the 27 which have been submitted by IDBI to the Bank for approval. Out of these 87 CETPs, 10 have only conducted the feasibility studies for which the Bank has agreed to reimburse the eligible expenses that were made prior to March 31, 1999 subject to verification of the accounts by the Bank. According to MoEF's records, a total of 37 CETPs have been completed including 27 approved by the Bank, and the remaining 13 have been committed by the MoEF. There are also 40 CETPs that are still under construction, of which 15 are in New Delhi, 16 in Tamil Nadu, and the rest are scattered in other states. In view of the special circumstances under which MoEF committed the IDA funds, the Bank will collaborate with the GOI to resolve this issue. The mission has agreed to recommend to the Bank's management to accord post facto approval of the 13 CETPs that have been completed. This will be subject to their meeting the following eligibility criteria stipulated on page 9 of the Project Agreement dated July 8, 1991, "Schedule" on Procedures for and Terms and Conditions of Sub-loans and Sub-grants and Investment Projects:

- (a) A thorough survey of the effluents situation at the site shall have been undertaken and provisions made for adequate pretreatment or disposal of effluents not suitable for common treatment;
 - (b) A feasibility study shall have been conducted, the economic and financial viability established, and operating and maintenance costs estimated;
 - (c) An adequate Investment Enterprise has been constituted or identified with institutional and technical capabilities to operate the CETP;
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(d) Legal and financial responsibilities have been properly defined and the Investment Enterprise owner is responsible before the enforcement institutions for the quality of the common effluent after treatment; and

(e) Adequate cost recovery formulae have been properly adopted by the Investment enterprise with the associated mechanisms for cost sharing or fees structures for the beneficiary enterprises.

4.11 In order to ensure compliance with the above eligibility criteria, the Bank will need confirmation from the MoEF that the above procedures have been followed. Thereafter, the Bank will require MoEF to make available the full documentation for these CETPs -- feasibility study as well as the financial appraisal-- to the Bank for review the latest by May 15, 1999. ***Any CETP for which full documentation is not made available to the Bank by such date will automatically be declared ineligible for the purpose of IDA review and possible funding.*** After the Bank's review and confirmation of eligibility criteria, the Bank will arrange visits to some of the sites to assess the outcome of the project and status of operations of the CETPs, as well as verification and audit of the accounts.

4.12 For some of the 40 CETPs still under construction, (i.e. 15 in New Delhi) in addition to deviation from the established approval procedures, MoEF has, contrary to the Bank disbursement guidelines, claimed advances -- Rs. 225.8 million equivalent to US\$6.4 million at 1997 exchange rate-- as actual expenditures through SOE procedures. However, this particular issue has been resolved in principle during a meeting held between the Bank, MoEF and DEA in New Delhi on March 8, 1999, where DEA agreed to allow the Bank to recover these funds by deducting the amount from withdrawal applications that are being filed by GOI.

4.13 The mission was informed that the MoEF has as of March 31, 1999 fully committed the entire unutilized balance of the IDA credit to CETPs⁶. The mission again advised MoEF that as per Article III, Section 3.01 (b) of the Development Credit Agreement, dated July 8, 1991, implementation of the CETPs and channeling of IDA funds was assigned to IDBI. Moreover, in para. 4.25 of the Staff Appraisal Report (SAR) it has been indicated that "all proposals for common treatment facilities will be subject to prior review and approval by the Bank". In order to assist the GOI to make most use of IDA funds allocated for CETPs and to extend the benefits of IDA funds to a large number of small and medium scale industries, the Bank mission has agreed to recommend to Bank management the authorization of reimbursement of the eligible expenditures made by these 40 CETPs prior to March 31, 1999 subject to meeting the following eligibility criteria and disbursement conditions:

- (a) The CETPs should fully meet the eligibility criteria approval for the CETPs listed in para. 4.9 above;
- (b) The MoEF should make available for Bank's review similar documentation as mentioned on para. 4.9 above for these CETPs by **May 15, 1999**;
- (c) The Bank will carry out the same review of the documentation (as mentioned in para. 4.10 above) to establish the eligibility criteria and would further visit a large sample of the CETPs to verify what percentage of the work has actually been completed prior to 31 March 1999, to determine the eligible expenditures. ***The Bank review should be completed by 15 June 1999, to allow sufficient time to adjust the withdrawal application before the deadline of 31 July 1999. The mission requested full cooperation and support of the MoEF and DEA with this endeavor to make the review possible in a timely manner. Due to time constraints, any slippage in the stated schedule could result in larger cancellation of IDA funds.***

4.14 **Demonstration Projects.** As mentioned above only 7 of the 12 demonstration projects approved were fully implemented and the balance 5 were cancelled at either the early stages of implementation or due to procedural complications. A list of these projects is given as **Attachment V**. Based on the two demonstration projects that the mission visited, it was observed that funds were extended to rather large companies. The mission, during review of the records of demonstration projects, noted that though the eligible investment enterprises are defined as those with less than US\$5 million in fixed assets -- Loan

⁶ with the exception of IDA funds allocated to demonstration projects. This exclusion is due to the fact that a number of demonstration projects were cancelled and IDBI inform MoEF after March 31, 1999.

Agreement -Schedule - Section 3-- IDBI had approved, and the Bank had cleared, the proposal of Wockhard Ltd which had US\$148 millions in fixed assets. Further observations made seem to indicate that some projects were funded retroactively and there is little evidence of replicability.

4.15 **Sustainability.** After initial difficulties, the project has helped launch the concept of CETPs and propagate their wide acceptance. In terms of size and mix of industries and types of management, there are a wide range of CETPs. In order to ensure sustainability of the CETPs, a number of issues should be addressed, including:

- (a) correcting design deficiencies that exist in some CETPs;
- (b) ensuring financial viability of the CETPs by administering proper charges for treatment commensurate with quality of influent in addition to quantity;
- (c) defining the optimal size of the CETPs for different industries by types and size;
- (d) delegating operations of the CETPs to a group of professional managers or a private company;
- (e) requiring proper disposal and management of the sludge in particular for tannery, dyeing and bleaching, etc., which are classified as hazardous waste; and
- (f) encouraging increased recycling of effluent through fiscal incentives.

V. TECHNICAL ASSISTANCE COMPONENT

Component Description

5.1 The purpose of this component -- Part C of the Project -- was to support a package of technical assistance initiatives to meet the needs for technical expertise, environmental assessment, research and development in environmental technology and extension services on environmental issues in industry. The TA component comprised the following activities:

- (a) pre-investment studies for projects to be funded under the investment component;
- (b) technical studies including required equipment to assess treatability of residues or waste streams;
- (c) pilot plant studies required to scale up innovative treatment technologies;
- (d) preparation of environmental housekeeping manuals at different industries;
- (e) an organizational study of the State Boards; and
- (f) a training program on environmental issues at the DFI's.

Main Findings

5.2 Implementation of this component has not been fully satisfactory. It had a very late start and only in late 1996 and early 1997 were studies under the project commissioned. A total of 12 studies were initiated -- mostly from 1997 onwards-- of which according to MoEF seven are completed. The mission has had access to only the "Organizational Study of the Boards" and, therefore, it is not in a position to confirm whether the studies commissioned are more or less in line with project objectives. However, the mission could not get a clear understanding of what selection criteria was adopted by MoEF in extending the grant for studies to industries.

5.3 As mentioned in para. 5.1 (f) above, the DFIs had the opportunity to utilize the IDA funds to strengthen their in-house environmental capability -- a golden opportunity in terms of utilizing the resources for substantive training -- which they missed. However, they should make an effort to participate in the training programs that will be organized under the Industrial Pollution Prevention Project in the near future. As of March 31, 1999 an amount of US\$2.2 million of this component remained unutilized.

VI. FINANCIAL MANAGEMENT, DISBURSEMENTS, AUDIT

- 6.1 The mission reviewed documentation maintained by the IDBI and ICICI in support of withdrawal applications submitted to the Bank. The mission noticed that in a few sub-loans to CETPs the amount eligible for Bank financing was lower than the amount which was claimed for Bank reimbursement. This discrepancy amounts to about Rs. 45 million over-disbursement, which the Bank would adjust against future withdrawal application.
- 6.2 The mission has advised IDBI to review the audited project expenditure statements of the above sub-loans as well as the rest of the CETPs to determine the extent of excess claim. IDBI has agreed to complete this assessment by **May 15, 1999** and send a report to the Bank.
- 6.3 In respect of individual projects the mission noted that both IDBI and ICICI had, in a few cases, provided finance to the same investment enterprises (for example, Hukumchand Jute, Madras Fertilizers, Atul, Gujarat Alkalies, etc.). The mission has asked ICICI to obtain the audited project financial statements and confirm that there was no excess withdrawal and report it to the Bank by **May 15, 1999**.
- 6.4 The mission noted that MoEF had claimed and the Bank had paid, expenditures for CETPs around Delhi which were not approved by the Bank. The disbursement unit of the Bank has initiated recovery of Rs. 255.8 millions from the eligible claims submitted by the GoI. As of March 31, 1999, the Bank has recovered US\$873,281 from the withdrawal applications submitted by the GoI.
- 6.5 Both IDBI and ICICI have been prompt in submitting the audit reports for the project. However, audit report from MoEF's withdrawal applications for the year 1997/98 is overdue. **The mission has asked MoEF to expedite the submission of this audit report.**
- 6.6 Finally, as of March 31, 1999, according to the Bank's record -- there are no withdrawal applications in the pipeline -- there remained a total undisbursed balance of US\$7.7 million under Loan 3334-In, and about US\$9.00 million under IDA credit. As mentioned above, MoEF has indicated that as of March 31, 1999 a significant amount of undisbursed IDA credit has been committed to the CETPs; however, unless proper utilization of these funds in accordance with the Bank guidelines can be established within the time frame indicated in this Aide Memoire, the remaining balance of the Bank loan and IDA credit will be cancelled as of July 31, 1999.

VII. SUMMARY OF ACTIONS TO BE TAKEN BY THE GOI

- 7.1 As mentioned throughout this Aide Memoire, the management of CETPs approved by MoEF are in total disarray and unless MoEF makes special efforts and dedicates additional resources to this task, it is unlikely that the Bank and MoEF can resolve all the issues in a timely manner. A list of actions to be taken by GOI with respect to overall sustainability of the project in general and to facilitate the resolution of the CETPs' issues in particular is summarized below:
- (a) The mission advised MoEF that the current schedule for final delivery of equipment -- ordered before March 31, 1999 -- and settlement of the accounts is too tight and urged MoEF to advance the schedule to avoid the risk of missing the deadline of July 31, 1999 for submitting final reimbursement applications (para. 3.3).
 - (b) To maintain the current level of achievements made with respect to institutional strengthening of the SPCBs, efforts should be made to: (i) maintain the training and upgradation of the SPCBs' staff, (ii) allocate adequate funding for operation and maintenance of the newly acquired laboratories and monitoring equipment; and (iii) improve overall house-keeping of the laboratories (para. 3.6).

- (c) MoEF should make full documentation for the CETPs -- feasibility study as well as the financial appraisal -- available to the Bank for review the latest by **May 15, 1999**. Any CETP for which full documentation is not made available to the Bank by such date will automatically be declared ineligible for the purpose of IDA review and possible funding (para. 4.11).
- (d) The Bank review should be completed by June 15, 1999 to allow sufficient time to adjust the withdrawal applications before the deadline of July 31, 1999. The mission requests full cooperation and support of the MoEF and DEA with this endeavor to make the timely review by the Bank possible (para.4.13 c).

VIII. NEXT STEPS FOR THE ICR

- 8.1 Prior to arrival of the Bank mission, a questionnaire was sent to MoEF, IDBI, ICICI and the four SPCBs to prepare for discussions. All the agencies had made a good effort and prepared a draft report which was discussed with the mission. These reports should be finalized and forwarded to the Bank in accordance with the schedule indicated below. Some additional information is being requested as given in **Attachment VI** which should also be provided by **May 15, 1999**.
- 8.2 The next steps for producing the ICR are as follows:
- (a) MoEF's should make available the documentation on CETPs which it has authorized to the Bank by **May 15, 1999**, including a detailed table that the Bank has designed for collecting information on CETPs and made available to MoEF;
 - (b) MoEF should complete data submission and the completion report by **May 15, 1999**;
 - (c) IDBI and ICICI should complete their data submission and their portion of the completion report of the credit lines; IDBI should complete data submission and their report of the CETPs and demonstration projects by **May 15, 1999**;
 - (d) MoEF should send to the Bank the consolidated project completion report incorporating the reports of the four beneficiary Pollution Control Boards, IDBI and ICICI by **May 20, 1999**;
 - (e) The Bank should complete the first draft of the ICR by **July 8, 1999** and forward it to MoEF, IDBI and ICICI for comment;
 - (f) MoEF, IDBI and ICICI should send their comments on the first draft to the Bank by **July 30, 1999**. At the same time MoEF, IDBI and ICICI should send a summary of their report -- not to exceed 10 pages each -- as their contribution for inclusion into the ICR; and
 - (g) Finally, MoEF, IDBI and ICICI should send their comments on the Bank's ICR -- which would also be included in the ICR -- by **July 30, 1999**.

LIST OF PROJECT SITES VISITED

1.	Taloja CETP (C-IDBI-021)	Taloja CETP Co-op Society P-24, MIDC, Taloja, Navi Mumbai-410208
2.	Thane Belapur CETP	CETP (Thane Belapur) Association, P-20, Anand Bhakamkar Common Facility Centre, M.I.D.C. Khairane, Thane- Belapur Road, Navi Mumbai -400709
3.	Colour Chem	Colour Chem Limited Mumbai Agra Road, Balkum Thane 400608
4.	Bayer India, Thane (ICICI-B-04)	Bayer (India) Limited Kolshet Road, Thane 400607
5.	Rama Newsprint, Surat (ICICI-B-024)	Rama Newsprint and Papers Ltd. Vil. Barbodhn, Tal. Olpad, Dist. Surat
6.	Atul Products (ICICI-B-07)	Atul Limited, Atul 396020, Gujarat
7.	Attic Ind. (ICICI-B-08)	Atul Limited, Atul 396020, Gujarat
8.	Jaysynth (ICICI-B-034)	Jaysynth Dyechem Ltd. 301, Sumer Kendra, Pandurang Budhkar Marg, Worli, Mumbai
9.	Vapi Waste and Effluent Management Co. Ltd. (C-IDBI-007)	VIA House, Plot-135, GIDC, Vapi-396 195, Gujarat
10.	Saras Chemicals	GIDC, Vapi-396 195, Gujarat
11.	Paras Chemicals	GIDC, Vapi-396 195, Gujarat
12.	United Phosphorous Limited	11,GIDC, Vapi-396 195, Gujarat
13.	Enviro Technology Limited (C-IDBI-028)	2413/14, GIDC, Ankleshwar-393 002, Gujarat
14.	Wokhardt Limited (D-IDBI-007)	Plot No.138, GIDC Estate, Ankleshwar-393 002 Gujarat
15.	Pallavaram Tanneries Industries Effluent Treatment Co. Ltd. (C-IDBI-003)	Pallavaram, Tamil Nadu
16.	EID Parry (D-IDBI-001)	Cuddalore-607 803, Tamil Nadu
17.	EID Parry (D-IDBI-009)	Cuddalore-607 803, Tamil Nadu
18.	Madras Fertilizers (IBDI-B-45)	Madras Fertilizers Ltd., Manali, Chennai
19.	Unnao Tanneries (C-IDBI-05)	Unnao, Uttar Pradesh

LIST OF KEY PERSONS MET

1. **IDBI**
S. Muhnot, General Manager, Treasury & Forex Services Department, IDBI
M. L. Kashyap, Deputy General Manager, Treasury & Funding Division
Kailas Shinde, Manager
2. **ICICI**
Ambikapatap Singh, Deputy General Manager
Rajiv Arora, Assistant Vice-President
N. G. Pai, Deputy Zonal Manager
Girish R. Mahajan, Deputy Manager
3. **Maharashtra Pollution Control Board**
K. H. Mehta, Member Secretary
Ashok B. Jain, Law Officer
4. **Taloja CETP Co-op Society Ltd.**
Shyam Sundar Karkum, Managing Director
M. A. Naik, Managing Director, Aquachem Consulting Engineers PVT. Ltd.
5. **Clariant (Colour Chem)**
Dr. G. G. Patkar, Senior General Manager-Dyestuffs
Dr. M. K. Shah, Manager-Ecology
6. **Thane Belapur CETP**
Sanjay Ghongade Project Manager
J. K. Shinde, Member, Executive Committee
7. **Rama Newsprint**
S. P. Dasgupta, Resident Director
G. R. Karmarkar, Senior Vice-President
C. U. Mangtani, Vice President-Co-ordination
S. K. Jain, Dy. General Manager (Paper)
M. J. Baloch, Asst. Manager (Environment)
8. **Bayer**
John L. Walker, Technical Director
M. C. Badarinarayana, Vice President SHEQ
D. G. Talekar, General Manager Manufacturing
9. **Atul**
Naresh K. Chourishi, Vice President
V. Kumaraswamy, General Manager-Finance
10. **Jaysynth Dyechem Ltd.**
Sanjay Kumar Jain, General Manager-Finance
11. **Vapi-CETP**
Manoj Oza, Managing Director
Sangappa C. Uppaladinni, Chief Executive Officer
C. Jani, Senior Executive
R. J. Mistry, Superintending Engineer, GIDC
12. **United Phosphorous Ltd. in Vapi**
H. V. Ruparel, Vice President (Operations)

13. **United Phosphorous Ltd. in Ankleshwar**
Ashok Panjwani, President - Operations
K. H. Chapatwala, Chief Manager
P. N. Parameswaran Moothathu, Deputy General Manager (Environment)
14. **Enviro Technology, Ltd.**
B. D. Dalwadi, Chief Manager- Works
R. N. Trivedi
15. **WOCKHARDT**
Shiva Singh, Vice-President, Bulk Drugs
J. N. Upadhyay, Deputy General Manager, Engineering Services
Manoj Karmarkar, Scientist
Mahendra Savadikar, Scientist
16. **Gujarat Pollution Control Board**
P.V.S. Swaminathan, IAS(Retd.), Chairman
Dr. G. B. Soni, Member Secretary
17. **Tamil Nadu pollution Control Board**
M. Devraj, IAS, Chairman
Rangaswami, Member Secretary
18. **IDBI, Chennai Branch Office**
B. Krishnamoorthy, General Manger
P. Nagaraju, Deputy General Manager
19. **Pallawaram CETP**
20. **EID Parry**
K. Raman, General Manager, Bio- Products Division
K. N. Radhakrishnan, Dy. General Manager-Finance
K. G. Kandaswamy, Manager (Process & Safety)
Sathyamurthy. A, Dy. Manager (Accounts)
21. **Madras Fertilizers Limited**
N.Y. Mahajan, Chairman & Managing Director
R. Raghunathan, General Manager-Finance & Accounts
G. Natesan, Dy. General Manager-Finance
P.S. Neelaknatan, General Manager, Plant
22. **Uttar Pradesh Pollution Control Board**
Amit Chandra, Regional Officer
23. **Unnao Tanneries Pollution Control Company**
A. K. Agarwal, Director
S. Awasthi, Project Engineer
24. **Central Pollution Control Board (CPCB)**
Dr. B. Sengupta, Member Secretary
25. **Department of Economic Affairs (DEA)**
Mr. Abhas Jha, Deputy Secretary
Ms. Geeta Narayan, Under Secretary
26. **Ministry of Environment & Forests (MoEF)**
Mr. Roy Paul, Additional Secretary
Mr. Vijay Sharma, Joint Secretary
Ms. Archana Joshi, Deputy Secretary
Mr. M. Hota, Deputy Director

List of Common Effluent Treatment Plants Financed by the Bank

Attachment III

Page 1 of 3

Subloan No.	Project	Name	Location	Project Costs		
				Total Project Cost	Subloan Size	Credit
				(million US\$)		
C-IDBI-01	Common treatment for industrial effluents	Thane Bellapur Industries Association (TBIA)	Thane, Bellapur, Maharashtra	1.000	0.467	0.170
C-IDBI-02	Common treatment for industrial effluents	Tarapore Industries Manufacturers Association (TIMA) Co-operative Society Ltd.	Thane, Tarapore, Maharashtra	0.600	0.160	0.080
C-IDBI-03	Common effluent treatment plant for tanneries	Pallavaram Tanners Industrial ETC (PTIETC)	Pallavaram, Tamil Nadu	2.300	1.540	0.166
C-IDBI-05	Common effluent treatment plant for tanneries	Unnao Tanneries Pollution Control Company Ltd. (UTPCCL)	Unnao, Uttar Pradesh	0.650	0.190	0.160
C-IDBI-06	Common effluent treatment plant for a commercial center a Kodaikanal	Kodaikanal Effluent Treatment Company Ltd. (KETCL)	Kodaikanal, Tamil Nadu	0.420	0.130	0.106
C-IDBI-07	Common effluent treatment plant for an industrial estate	Gujarat Industrial Development Corporation (GIDC)	Vapi, Gujarat	6.470	4.640	0.160
C-IDBI-09	Common effluent treatment plant for dyeing & bleaching industrial units	Ayyampet & Muthialpet, Bleaching & Dyeing Effluent Treatment Company	Ayyampet & Muthialpet Villages, Chengai DT. Madras	0.342	0.137	0.115
C-IDBI-10	Common effluent treatment plant for tanneries	Ranipet SIDCO Finished Leather Effluent Treatment Co. Pvt. Ltd. (RETC)	Ranipet, North Arcot District, Tamil Nadu	1.000	0.500	0.160
C-IDBI-11	Common effluent treatment plant for tanneries	Vaniyambadi Effluent Treatment Company Ltd. (VETCO)	Valayampet, North Arcot District, Tamil Nadu	0.681	0.210	0.169
C-IDBI-12	Common effluent treatment plant for tanneries	Ranipet Tannery Effluent Treatment Co. Ltd. (RANITEC)	Ranipet, North Arcot District, Tamil Nadu	1.455	0.506	
C-IDBI-13	Common effluent treatment plant for dyeing & bleaching industrial units	Karur Thiruvai Dyeing Enviro Ltd. (KTDEL)	Karur, Tamil Nadu	0.673	0.215	0.162
C-IDBI-14	Common effluent treatment plant for a group of chemical units	Perfect Enviro Control Systems (PECS)	Sarigam, Ankleshwar, Gujarat	0.411	0.099	0.102

List of Common Effluent Treatment Plants Financed by the Bank**Attachment III**

Page 2 of 3

Subloan No.	Project	Name	Location	Project Costs		
				Total Project Cost	Subloan Size	Credit
				(million US\$)		
C-IDBI-15	Common effluent treatment plant for dyeing & bleaching industrial units	Amravathi Pollutech Limited (APL)	Andankoil, Karur, Tamil Nadu	0.776	0.303	0.160
C-IDBI-17	Common effluent treatment plant for dyeing & bleaching industrial units	Karur Andankoil Pollution Control Ltd. (KAPCL)	Andankoil, Karur, Tamil Nadu	0.725	0.260	0.160
C-IDBI-18	Common effluent treatment plant for tanneries	Visharam Tanners Enviro Control System (P) Ltd.	Melvisharam, North Arcot District, Tamil Nadu	1.284	0.709	0.159
C-IDBI-19	Common effluent treatment plant for tanneries	Perumalpet Effluent Treatment Pvt. Ltd.	Perumalpet, Vaniyambadi Distr., Tamil Nadu	1.950	1.250	0.160
C-IDBI-21	Common effluent treatment plant for chemical industries	Taloja CETP Co-op Society Limited	Taloja, District Raigad, Mahatashtra	1.196	0.670	0.144
C-IDBI-22	Common effluent treatment plant for chemical industries	Mathura Audhyogik Chetra 'A' Pradushan Nivaran Co. Ltd.	Mathura Industrial Estate, Uttar Pradesh	0.540	0.144	0.135
C-IDBI-23	Common effluent treatment plant for chemical industries	Acma CETP Co-op Society Ltd.	Ambemath, District Thane, Maharashtra	0.115	0.029	0.029
C-IDBI-24	Common effluent treatment plant for chemical and textile industries	Dombivli Common Effluent Treatment Plant Ltd.	Dombivli Industrial Estate, District Thane, Maharashtra	0.574	0.172	0.144
C-IDBI-25	Common effluent treatment plant for dyeing & bleaching industrial units	Karur Taluk Dyeing and Bleaching Effluent Treatment Plant Company Ltd. (KTETP)	Ramakrishnapuram, Karur, Tamil Nadu	0.549	0.165	0.137
C-IDBI-26	Common effluent treatment plant for dyeing & bleaching industrial units	Karur Vanchi Dyeing Enviro Tech Ltd. (KVDETL)	Light House Sector, Karur, Tamil Nadu	0.483	0.145	0.121

List of Common Effluent Treatment Plants Financed by the BankAttachment III
Page 3 of 3

Subloan No.	Project	Name	Location	Project Costs		
				Total Project Cost	Subloan Size	Credit
C-IDBI-28	Common effluent treatment plant for various industrial units (dyes and chemicals)	Enviro Technology Ltd.	Ankleshwar, Gujarat	1.540	0.890	0.140
C-IDBI-29	Common effluent treatment plant for leather processing	Melvisharam Tanneries Effluent Treatment Company (P) Limited (MTETCPL)	Melpudupet, Tamil Nadu	0.384	0.115	0.096
C-IDBI-30	Common effluent treatment plant for leather processing	Melvisharam Tanneries Effluent Treatment Company (P) Limited (MTETCPL)	Chettithangal, Tamil Nadu	0.351	0.105	0.088
C-IDBI-31	Common effluent treatment plant for leather processing	Talco Dindigul Tanners Enviro Control Systems Pvt. Ltd. (DINTEC)	Dindigul, Tamil Nadu	1.410	0.514	0.169
C-IDBI-32 T-IDBI-01	Common effluent treatment plant for industries manufacturing dyes and dye intermediates and related activities	Green Environment Services Co-operative Society Ltd. (GESCO)	Vatva, Gujarat	7.250	1.300	0.280
Total		27 CETPs		35.1	15.6	3.7

A - ICICI Limited - Individual Investments Sub-Projects

Sub-Project No.	Name of Company	Type of Project	Loan Approved US\$	Loan Disbursement US\$	Total Cost US\$
ICICI-B-001	Ballarpur Industries Limited		1,530,000	1,077,000	16,000,000
ICICI-B-002	Malladi Drugs & Pharma Limited		290,000	237,000	480,000
ICICI-B-003	Hukumchand Jute Ind. Ltd.		1,030,000	863,000	7,420,000
ICICI-B-004	Bayer India Ltd.	Replaced existing plant with more modern and less polluting and high capacity plant.	660,000	687,000	1,610,000
ICICI-B-005	Century Text. & Ind. Ltd.	Replaced existing plant with more modern and less polluting plant.	2,230,000	2,548,000	10,170,000
ICICI-B-006	Nath Pulp & Paper Ltd.		1,830,000	1,440,000	5,400,000
ICICI-B-007	Atul Products Ltd.	Replaced existing plant with more modern and less polluting plant.	1,338,000	707,000	6,920,000
ICICI-B-008	Atic Ind. Ltd.	Provide pollution control to an existing plant	2,280,000	1,414,000	3,710,000
ICICI-B-009	IPCA Labs. Ltd.	To provide pollution control facilities in the existing industrial plant and replaced an exiting process with more modern and less polluting process.	145,000	141,000	270,000
ICICI-B-010	Indian Aluminium Company Ltd.		3,370,000	2,022,000	4,520,000
ICICI-B-011	Gujarat Alkalies & Chem. Ltd.		4,710,000	3,830,000	63,200,000
ICICI-B-012	Hindalco Ind. Ltd.	To provide pollution control facilities in the existing industrial plant.	5,000,000	4,675,000	28,410,000
ICICI-B-013	Alufluoride Pvt. Ltd.		820,000	740,000	5,750,000
ICICI-B-014	Gokak Patel Volkart		164,000	111,000	236,000
ICICI-B-015	Sudarshan Chemical Industries Limited	To provide finance for pollution control facilities of a new industrial plant.	670,000	640,000	900,000
ICICI-B-016	Kap Chem Ltd.	Provide pollution control facilities to the existing industrial plant.	680,000	412,000	1,200,000
ICICI-B-017	Rohit Pulp & Paper Ltd.	Cancelled			
ICICI-B-018	Finolex Ind. Ltd.		2,430,000	1,557,000	6,500,000
ICICI-B-019	NRC Limited (formerly National Rayon Corpn.)	Replaced an exiting industrial plant with more modern and less polluting plant.	2,000,000	1,999,000	40,800,000
ICICI-B-020	Madras Fertilisers Ltd.	To provide pollution control to the existing industrial plant.	2,100,000	819,000	8,010,000

A - ICICI Limited - Individual Investments Sub-Projects

Sub-Project No.	Name of Company	Type of Project	Loan Approved US\$	Loan Disbursement US\$	Total Cost US\$
ICICI-B-021	Thiru Arooran Sugars Ltd.		833,000	800,000	5,364,000
ICICI-B-022	Globe Organics Ltd.	Cancelled			
ICICI-B-023	Kothari Sugars & Chemicals Ltd.		580,000	558,000	4,000,000
ICICI-B-024	Rama Newsprint & Papers Ltd.		3,000,000	2,533,000	7,800,000
ICICI-B-025	IFB Agro Ind. Ltd.		170,000	158,000	450,000
ICICI-B-026	Sterlite Industries (India) Ltd.	To provide finance for pollution control facilities of a new industrial plant.	3,000,000	2,524,000	21,600,000
ICICI-B-027	Grasim Ind. Ltd.	To provide pollution control facilities to existing industrial unit.	500,000	492,000	1,300,000
ICICI-B-028	Shreyans Ind. Ltd.	Cancelled			
ICICI-B-029	Rajashri Sugars Ltd.	Cancelled			
ICICI-B-030	Century Text. & Ind. Ltd.	To provide pollution control facilities to increased capacity of industrial unit and modification in process for pollution reduction.	968,000	808,000	1,300,000
ICICI-B-032	Aurangabad Paper Mills Ltd.	Cancelled			
ICICI-B-033	Lanco Ind. Ltd.		2,218,000	1,952,000	4,310,000
ICICI-B-034	Jaysynth Dyestuff (India) Ltd.	To provide pollution control facilities for the existing industrial plant.	750,000	660,000	1,010,000
ICICI-B-035	Indian Dyestuff Ltd.	Cancelled			
ICICI-B-036	Mysore Petrochemicals Ltd.		4,760,000	4,025,000	10,808,000
ICICI-B-037	SIV Ind. Ltd.		8,000,000	4,513,000	23,231,000
ICICI-B-038	Travancore Chemicals Ltd.	Cancelled			
ICICI-B-039	Tuticorin Alkali Chem. & Fert. Ltd.	Investment is on the existing industrial plant to reduce the liquid and solid wastes.	875,000	141,000	1,100,000
	Total		58,931,000		

A – IDBI Limited - Individual Investments Sub-Projects

Sub-Project No.	Name of Company	Type of Project	Loan Approved US\$	Loan Disbursement US\$
B-IDBI--001	Sandur Manganese & Iron Ores Ltd.	Stand Alone	430,000	363,058
B-IDBI--003	Mouldwell Polymers	Grassroot-Stand Alone	780,000	611,063
B-IDBI--004	Nath Pulp and paper mills	Modernization/diversification	1,255,000	1,039,292
B-IDBI--005	Polyolefins Lts.	Stand Alone	580,000	416,948
B-IDBI--006	Hukumchand jute	Stand Alone	1,560,000	1,099,805
B-IDBI--007	Rashtriya Chemicals and Fertilizers Ltd.	Stand Alone	6,910,000	6,688,376
B-IDBI--008	EID Parry	Stand Alone	1,010,000	997,507
B-IDBI--009	Emmellen Biotech Pharma Ltd.	Stand Alone	320,000	300,857
B-IDBI--010	Gujarat Alkalies & Chemicals Ltd.	Modernization/Stand Alone	4,710,000	4,551,817
B-IDBI--011	Atul Products Ltd.	Stand Alone	1,330,000	1,282,659
B-IDBI--012	Som Distilleries		960,000	783,234
B-IDBI--013	Colour Chem	Upgradation-Stand Alone	574,000	478,500
B-IDBI--014	Shree Vindhya Paper Mills Ltd.	Expansion cum modernization	4,800,000	4,060,631
B-IDBI--015	Tata Yodogawa Ltd.	Stand Alone	145,000	147,457
B-IDBI--016	Kopargaon Sahakari Sakhar Karkhana	Stand Alone	633,000	558,893
B-IDBI--017	Grasim Industries	Modernization-Stand Alone	5,000,000	4,787,348
B-IDBI--018	Modi Alkalies & Chemicals Ltd.	Expansion	4,300,000	5,004,118
B-IDBI--019	Sagar Cements Ltd.	Stand Alone	372,000	351,636
B-IDBI--020	Jai Bhavani SSK Ltd.	Stand Alone	420,000	411,899
B-IDBI--021	Sandur Manganese & Iron Ores Ltd.		1,500,000	1,434,720
B-IDBI--023	Tilaknagar Distilleries & Industries Ltd.	Stand Alone	250,000	210,011
B-IDBI--026	Sumangla Steels	Stand Alone	280,000	284,607
B-IDBI--027	ACC	Stand Alone	3,000,000	1,690,819
B-IDBI--029	Raptakoss Brett	Stand Alone	130,000	104,000
B-IDBI--032	Ispat Alloys	Stand Alone	1,430,000	936,396
B-IDBI--033	Tamil Nadu Cements	Stand Alone	950,000	835,738
B-IDBI--034	Kakatia Cements Ltd.	Modernization-Stand Alone	190,000	191,144
B-IDBI--035	Shree Cement Ltd.	Stand Alone	1,366,000	1,192,152
B-IDBI--036	EID Parry, Nellikuppam	Expansion	438,000	0
B-IDBI--037/0	Simbhaoli Sugar Mills	Stand Alone	1,038,000	760,684
B-IDBI--038	Gujarat Heavy Chemicals Ltd.	Expansion	1,690,000	1,332,639
B-IDBI--039	Chemfab Alkalies	Modernization-Stand Alone	1,420,000	1,256,983

A – IDBI Limited - Individual Investments Sub-Projects

Sub-Project No.	Name of Company	Type of Project	Loan Approved US\$	Loan Disbursement US\$
B-IDBI--040	Vamshadara Paper Mills Ltd	Stand Alone	339,000	248,112
B-IDBI--042	Southern Petrochemicals Industries Ltd	Stand Alone	5,215,000	4,585,762
B-IDBI--043	Ispat Industries	Stand Alone	1,211,000	1,066,019
B-IDBI--045	Madras Fertilizer Ltd	Modernization/Expansion	3,390,000	1,512,248
	Total		59,926,000	

List of Demonstration Sub-projects

Sr. No.	Sub-Project No.	Proponents Name	WB Authorization (US \$)	Utilised/ (US \$)	Status
1	D-IDBI-001	EID Parry Ltd. (Neelikuppam Sugar Mills)	500,000	500,000	Completed
2	D-IDBI-002	Vasantdada Sugar Institute (Krishna Sakhar karkhana Sangli)	480,000	480,000	"
3	D-IDBI-003	Century Pulp & Paper Mills Ltd. Lalkua, Uttar Pradesh	190,000	190,000	"
4	D-IDBI-004	Gabriel India Ltd. Faridabad unit	180,000	180,000	"
5	D-IDBI-005	M/s Ashoka Pulp & Paper Loni, Delhi	63,000	46,667	Partly cancelled
6	D-IDBI-006	Western Paques India Ltd. (Harihahr Polyfibre unit of Grasim)	423,000	-	Cancelled
7	D-IDBI-007	Wockhardt Ltd. (Ankleshwar Unit)	260,000	260,000	Completed
8	D-IDBI-008	Department of Electronics (DOE), Govt. of India, Delhi Jal Board, New Delhi	500,000	N/A	Partly cancelled
9	D-IDBI-009	EID Parry Ltd. (Neem project)	460,000	460,000	Completed
10	D-IDBI-010	Pudmjee Pulp & Paper Ltd.	500,000	-	Cancelled
11	D-IDBI-011	Kothari Sugar & Chemicals Ltd. (authorized vide telex dated July 23, 1997)	200,000	-	Cancelled
12	D-IDBI-012	Dintex Dyechem Ltd.	280,000	224,000	Completed
	Total		4,036,000	2,340,667	

N/A: Not available yet.

Additional Information to be Incorporated in Respective Final Completion Reports

Additional Information from MOEF/CPCB

1. How the water cess rates and allocation between central and state governments changed since 1991.
2. What changes in fiscal incentives took place since 1991 (table 2.1 of staff appraisal report) such as excise tax, accelerated depreciation and custom duties for pollution control equipment.
3. Changes in level of penalties for failure to comply with the water, air and environmental acts since 1991.
4. Information of the Steering committee (para 5.07 of SAR): Composition, responsibilities, periodicity of meetings and effectiveness.

Information on Financial Statements to be Requested from IDBI and ICICI

Annually, over the period 1990/91 to 1997/98:

Long-term Debt/Equity Ratio
 Long-term Debt Service Coverage Ratio

As defined under Sections 3.02, 3.03 and 3.04 of the Project Agreement (interest and principal payments refer only to those on the long-term debt, i.e debt with maturity over than one year).

Also: for the same period: the Return on Equity Ratio.

This information should be available in the annual external audit reports on IDBI and ICICI accounts sent to the Bank.

Additional Information from IDBI

1. Revised and Completed Report
2. for each subproject, provide total cost, World Bank financing, any additional IDBI loan, sponsors funds: as originally approved and actual, in Rs and US\$; date of approval and date of completion
3. Cost and financing tables for each component as shown in table below, including:

In Rupees: total cost, WB loans, world bank grants, Counterpart funds from IDBI, the central government, the state government and sponsors contributions.

In US\$: Idem indicating the exchange rate assumptions

Project Component	W.B	IDA/GOI	IDBI	Sponsors	State Gover.	Total
CETP's						
Individual Investments						
Demonstration Projects						
Technical Assistance						
Total						

3. for each component the phasing of expenditures in Rupees per year.

4. Pending questionnaires:

- Individual investments: B17, B32, B20, B23, B07, B27
- Demonstration Projects: 3 out of 7 (already received: ED Parry (2), WOCKHART, and Krishna SSK)
- CETP's: 14 out of 25 (10 already received: Ankleshwar, VAPI, Munlund-Valsad, Ranipet, Dindigul 2, Unnao, Tarapur, Vatva, Pallavaram, and Belapur).

Additional Information from ICICI

1. Completion Report

2. for each subproject, provide total cost, World Bank financing, any additional IDBI loan, sponsors funds: as originally approved and actual, in Rs and US\$; date of approval and date of completion

3. Cost and financing tables for each component as shown in table below, including:

In Rupees: total cost, WB loans, world bank grants, Counterpart funds from ICICI, and sponsors contributions.

In US\$: Idem indicating the exchange rate assumptions

Project Component	W.B	ICICI	Sponsors	Total
Individual Investments				
Technical Assistance				
Total				

3. for each component the phasing of expenditures in Rupees per year.
4. A complete list of projects indicating if they were self standing pollution control projects, part of a modernization/expansion project, or part of new projects.
5. Replies to the questionnaires for subprojects B21, B29, B20, B24, B28, and B37

Remaining Information from the Maharashtra Pollution Control Board (MPCB)

1. The Board has provided good indicators of output (consents and inspections) and status of legal action (directions issued, closures and restarts, public interest litigation and complains), however, they are cumulative and do not allow an assessment of trends. MPCB should provide yearly information for the same indicators.
2. Give information on total number of samples collected and analyzed separately for air, water and hazardous wastes for each year between 1992 and 1996.
3. Provide further breakdown of budget revenues by sources (consent fee, water cess, consent form fee, analyses, fines and penalties and grants from central government) for the years 1991/92 to 97/98.
4. Provide actual average monitoring for air and water quality in major rivers and industrial areas monitored regularly by MPCB for each year between 1992 and 1998.
5. Provide one annual report between 1990/91 and 1993/94

Remaining Information from the Gujarat Pollution Control Board (GPCB)

1. Provide asap the complete final report with information requested in the Bank questionnaire.
2. As part of above report provide yearly time series between 1991 and 1996 on consent, samples collected, and litigation such as those provided in the 1996/97 annual report and if possible provide the same data for 1997/98.

3. Provide breakdown of budget revenues by sources (consent fee, water cess, consent form fee, analyses, fines and penalties and grants from central and state governments) for the years 1991/92 to 97/98, and expenditures by main categories for the same periods.
4. Provide actual average monitoring for air and water quality in major rivers and industrial areas monitored regularly by GPCB for each year between 1992 and 1998.
5. Provide statistical information on number of industries monitored and number of industries in compliance for the highly polluting industries for each year between 1992 and 1998.
6. Provide annual reports for 1991/92 and 1994/95.

Remaining Information from the Tamil Nadu Pollution Control Board (TNPCB)

1. Provide breakdown of budget revenues by sources (consent fee, water cess, consent form fee, analyses, fines and penalties and grants from central and state governments) for the years 1991/92 to 97/98, and expenditures by main categories for the same periods.
2. Provide actual average monitoring for air and water quality in major rivers and industrial areas monitored regularly by TNPCB for each year between 1992 and 1998.
3. Provide statistical information on number of industries monitored and number of industries in compliance for the highly polluting industries for each year between 1992 and 1998.
6. Provide annual reports for 1991/92 or 1992/93.



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GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
पर्यावरण भवन, सी० जी० ओ० कॉम्प्लेक्स
PARYAVARAN BHAWAN, CGO COMPLEX
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15 September, 1999

Déar Mr. Ackermann,

Thank you for your letter dated 20 August 1999 enclosing the draft ICR for the World Bank aided Industrial Pollution Control Project.

At the outset it must be stated that the ICR should focus its comments on the project, its implementation and performance. The ICR should not enter into political questions. However, the draft ICR has commented about political will, and the like. The comments and the insinuations made are baseless. They have been made without standing. The ICR suffers from lack of perspective. It is based on wrong premise and flawed. The ICR should be redone.

As far as performance of the project is concerned, it is generally recognized that it got off to a late start. 90 percent of the work could be done only in the last three years. The reasons are quite identifiable. The project was the first of its kind in the field of environment, inter-disciplinary, and involving multiplicity of implementing agencies at both Centre and State level. Also, the industry did display initial reticence for investment in pollution control measures accompanied by reluctance to approach DFIs. Land availability was a problem. There were procedural delays in release of Central/State financial subsidies. The problems, however, were gradually surmounted. Experience gained in the Industrial Pollution Control Project is holding us in good stance as we make further progress in the Industrial Pollution Prevention Project.

As far as project execution is concerned, by and large this has been satisfactory. Though, in the area of equipment procurement, we had been concerned about delays in finalization of tenders and consequent lags in placement of orders. The Bank was alive to this problem. In discussions, it had also been agreed that equipment for which orders had been placed before 31 March 1999 would be eligible for reimbursement, even if delivered subsequently. This accommodation by the Bank was in recognition of MoEF's assurance to the Bank that all possible measures would be taken to ensure the delivery of the equipment before settlement of accounts. The MoEF met its assurance.

As far as training is concerned, 145 training programmes have been conducted for SPCB personnel. 22 laboratories in Maharashtra, UP and Tamil Nadu have been given assistance for laboratory facilities. 12 Demonstration projects and 12 technical studies were approved in order to support various technologies for control and prevention of pollution. 88 CETPs were approved under the project in 12 States covering a spectrum of industries. It is widely accepted that the take off and success of CETPs is on account of the World Bank

project. This dimension of pollution control, i.e., of treating effluents collectively, and its institutionalisation through industrial associations has come to be established because of the impetus given to CETPs by the World Bank project.

The project has assisted positively the national effort to control pollution. The investments made in the Project would result in environmental benefits. The level of compliance by polluting industries has shown significant improvement. The small-scale industrial sector has benefited substantially because of CETPs. The SPCBs have also gained by way of trained manpower, equipment and other infrastructure, and enhanced capability for enforcement and monitoring. Demonstration projects in waste minimization and resource recovery have been successful and are replicable. Technical assistance studies have contributed to the identification and implementation of solutions to environmental problems. Such initiatives have encouraged shift from concentration based standards to load based standards which will result in waste minimization.

The MoEF coordinated and implemented the project well. In sum, its performance was quite good. The experience has been very useful and will hold us in good stead in the context of future projects. The project had called for coordination with both Central and State level agencies, as well as DFIs and procurement agencies. There were delays earlier but the bottlenecks were cleared, and ultimately the physical targets have been met. As far as the performance of the Bank is concerned, we got good support. The Bank was responsive and interactions were productive. However, of late, the Bank's approach became much less understanding. It is our view that environmental projects like these, which are substantially promotional also, with a multiplicity of agencies and institutions involved, should not be subjected to the rigidity of deadlines accompanying the more commercially oriented projects.

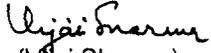
The project would be sustainable in the long run. A number of policy and legislative initiatives have been taken for protecting the environment and for controlling pollution. In this regard, it must also be mentioned that the comments in the draft ICR about policy decisions and court mandates draw from superficial assessment of the related processes involved.

We have also undertaken sector-specific monitoring of industrial pollution. The sustainability of the project will be given momentum by the monitoring and enforcement capabilities of SPCBs which the project itself has substantially strengthened. We have also taken steps to augment the resources of the SPCBs. There has been marked improvement in enforcement and compliance.

This is to request you to take our views into account so that the ICR is redone. We shall be looking forward to your next visit to India.

With regards,

Yours sincerely,


(Vijai Sharma)

Mr. Richard Ackermann
Sector Director, Environment
South Asia Region
The World Bank
Washington-DC, USA (Fax: (202) 522 1664)



भारतीय औद्योगिक विकास बैंक

Annex C

आई डी बी आई टॉवर, कफ़े पारेड, मुंबई-400 005.

INDUSTRIAL DEVELOPMENT BANK OF INDIA

IDBI TOWER, CUFFE PARADE, MUMBAI - 400 005.

FAX MESSAGE

FOR : Mr. Richard Ackermann,, Sector Director, Environment, South Asia Region – The World Bank

Fax No.

FROM : Mr. S.Muhnot, GM, IFU, IDBI, IDBI, Mumbai

DATE : September 16, 1999

No. of pages : 4(Including this page)

OUR FAX NO. : 0091-22-2181155 TELEPHONE NO. 0091-22-2183920

The information contained in this transmission is confidential. It may also be legally privileged. It is intended only for the addressee(s) stated above. If you are not an addressee, you should not disclose, copy, circulate or in any other way use the information contained in this transmission. Such unauthorised use may be unlawful. If you have received this transmission in error, please telephone us immediately so that we can arrange for its return.

Please refer your letter of August 20,1999 enclosing the draft implementation completion report on IPCP-3334/2252. Our comments on the report are as under:

1. **Delay in project implementation for CETPs (Para 13)** – As observed in the ICR, there have been several factors which affected the slowdown in the implementation of CETPs, primarily due to the concept itself being new and the requirement of several small companies to get together and set up a CETP with attendant problems of quality of effluent inflow charging for effluent treatment and professional management of such CETPs which were relatively larger than the individual small and medium scale units. This was further complicated by procedural problems. However, IDBI 's role did not cause delay in implementation of CETPs since (a) many borrowers wanted to avail only the grant facility and were not interested in taking up any loan whatsoever from any institution so as not to increase the recurring cost of CETPs and consequent collection from

..2/-

its members. Their ^{un-}willingness to borrow from IDBI was, thus, not due to any operational difficulties with IDBI. (b) disbursements by IDBI could be effected only after financial closure of the project and receipt of corresponding state and central subsidies to the CETPs. You would appreciate that without such subsidy being available to the project (being critical as viability was based on such subsidised funding), the disbursements could not be effected. This constrained the performance of IDBI as IDBI had to operate in the general environment comprising problems relating to adaptation of a new concept viz. CETP in the absence of a strong regulatory / enforcement system for pollution control and intense competition among SSIs and other industries, specially after opening up of the Indian economy.

To address the operational and organisational problems of CETPs, it is suggested that WB could establish a core consulting group to provide consultancy services to all the CETPs at affordable cost.

2. **Assistance under individual investments component to regular blue chip clients by DFIs: (Para 14)** – The DFIs have maintained a broad base of corporates for the individual investments covering a wide range of industries. It may ~~also~~ be seen from the project proponent's list that several corporates had approached IDBI for the first time which indicates that they were not the regular clients. It may also be observed that quite a few such companies are presently in default to the financial institutions as they were not the blue chip clients in the first place.
3. **Inability of IDBI to identify eligible sponsors for demonstration sub-projects:** As per the financial system operating in India, national level DFIs have been given the role of providing finance to medium and large projects (i.e. projects having a project cost of over Rs.5 crore), while the needs of small and medium sector is taken care of by Small Industries

Development Bank of India (SIDBI), a subsidiary of IDBI , commercial banks and state level financial institutions. In view of this , IDBI is in touch only with medium and large borrowers and so it was not possible to identify sub-project sponsors till the limit on industrial size was removed.

4. Lack of interest by IDBI to strengthen its environmental capabilities

: IDBI has been interested in strengthening its environmental capabilities and in this connection a few of its executives had participated with direct World Bank approval in programmes like cleaner production process and technology for textile industry and paper industry as also in the waste expo-97. However thereafter it was understood that MOEF would be managing the TA component. IDBI was in touch with MOEF for deputing some of its staff for training under MOEF's training programme scheduled for Pollution Control Board staff. However at the last moment the same could not materialise and IDBI was informally advised to formulate a separate training programme for its staff. A separate training programme was thereafter formulated by IDBI in the short period available to it , but the same could not be approved by WB in view of the guidelines for appointment of consultants having not been followed by IDBI, due to paucity of time. IDBI stands committed to training its staff on environmental aspects and requests WB to consider earmarking the lapsed Technical Assistance component directly to IDBI for upgrading environmental skills of its staff. This could be a separate component in itself to help IDBI appraise environmental aspects of large industrial and infra structural projects for which guidelines/ policy is proposed to be laid

...4/-

down under Environment and Social Report for IDBI being prepared by
ERM India Ltd. (under TA component of IPPP – 3779).

With best regards,



(S. Muhnot)



Suvalaxmi Chakraborty
Deputy General Manager

September 14, 1999

Mr. Richard Ackermann
Senior Director, Environment
South Asia Region
The World Bank
1818 H Street, NW
Washington DC 20433,
USA

Dear Mr. Ackermann,

Industrial Pollution Control Project (Ln/Cr. 3334/2252 -IN)
Draft Implementation Completion Report (ICR)

We refer your letter dated August 20, 1999 enclosing a copy of the draft ICR for our review and comments.

We are pleased to note that the review team recommended ICICI's overall performance as 'satisfactory' in terms of achieving the project objectives and outcome. We also note that the team has made certain observations regarding the implementation issues and the outcomes. We would like to clarify as under:

1. The review team has commented that "the DFIs have not used the opportunity of the project and the technical assistance grant funds allocated for strengthening their own environmental capabilities." and therefore, the "Performance of the DFIs was 'unsatisfactory' with respect to their failure to build-up their own environmental capabilities."

We wish to clarify that, many of the ICICI officers from the lending side have undergone training in industrial environmental management related issues in the past few years, at institutions like ASCI, Hyderabad, IIT-Mumbai and also abroad. It is likely that the funds utilised for the training, may have been made available through other resources. In fact, ICICI's technology group managing an USAID project had organised a training programme with a faculty from USA on 'Environmental due diligence for Bankers' for all the FIs (including ICICI) and banks which was highly appreciated. We are also in the process of formulating an Environmental and Social Policy to look into these issues while making investment decisions. We hope that with this, the review team may find that over the years ICICI has been developing environmental capabilities as desired under this project.



2. The review mission also observed that "neither DFI made any special marketing effort to reach clients beyond their best customers"

We would like to mention here that all the multilateral/bilateral lines of credit and the technology programmes are actively promoted by ICICI at various appropriate forums. The details of these programmes are also available on the ICICI Intranet for all ICICI officers to access whenever the need arises for the same. As you might be aware of, ICICI has always been in touch with a variety of clients who cover the market. We have been trying our best to make special marketing efforts to them.

3. Another observation we would like to clarify is "most sub-loans for individual sub-projects were made to DFIs best customers"

In this case we submit that the investment decisions are based on many factors and one of the major criteria is the ability of the borrower to repay the assistance. Needless to say, that all our investment decisions have been based on the eligibility criteria for the concerned credit line and the ability of the borrower to implement the project successfully, ensure positive impact on the environment and repay the assistance. However, a review of the credit rating of the assisted sub-projects would show a distribution of IBRD funds to our best to moderate range of clients.

We have also submitted Independent Assessment Report on April 21, 1999 that addresses key project issues, a copy of which is re-enclosed.

We now look forward to receiving the final ICR incorporating our views.

Thanking you,

Yours sincerely,

A handwritten signature in black ink that reads "S. Chakraborty". The signature is written in a cursive style with a large, looped 'S'.

Suvalaxmi Chakraborty

Policy Statement for the Abatement of Pollution

Policy Statement Directions and Objectives	Status
<p>The objective is to integrate environmental considerations into decision making at all levels. To achieve this, steps have to be taken to:</p> <ul style="list-style-type: none"> • Prevent pollution at source; • Encourage, develop and apply the best available practical technical solutions; • Ensure that the polluter pays for the pollution and control arrangements; • Focus protection on heavily polluted areas and river stretches; and • Involve the public in decision making. 	
<p><i>Critically Polluted Areas.</i></p>	
<p>Strategies will be developed for areas with high pollution loads where the cumulative effect of the various types of pollutants would be taken into account including pollution of ground water.</p>	<ul style="list-style-type: none"> • 17 categories of highly polluting industries identified and persuaded to install requisite pollution control systems—Notification sent to them in February 1992 requiring them to meet standards by December 1993. • All units generating above specified limits of 18 categories of waste required to obtain authorization. • Central Action Plans drawn up for 22 critically polluted areas selected in consultation with State Boards. • River basin-wise surveys conducted to identify the pollution stretches and their sources. Based on these surveys, the Ganga River Action Plan and subsequently the National River Action Plan were launched.
<p><i>Assistance for Adoption of Clean Technologies by Small Scale Industries.</i></p>	
<ul style="list-style-type: none"> • The Government is implementing a scheme for providing assistance for promoting combined facilities for treatment of effluents and solid wastes generated in clusters of small scale units. • Assistance will be provided to small-scale units, particularly those located in rural areas, to aid the implementation of pollution control measures by promoting development and adoption of cleaner technologies. 	<ul style="list-style-type: none"> • 87 Common Effluent Treatment Plants approved by MOEF country-wide, including 53 completed or nearing completion. • Cleaner Technology Clearing House being established, with NEERI as nodal agency. • National Productivity Council (NPC)/UNDP "Project DESIRE" implemented to demonstrate the concept of waste minimization in small-scale industry in three sectors.

Policy Statement Directions and Objectives	Status
	<ul style="list-style-type: none"> Waste Minimization Circles (WMC) being successfully established in various sub-sectors. 37 in 1998. Training programs for participants organized by NPC.
<i>Standards.</i>	
<ul style="list-style-type: none"> Norms will be revised to lay down mass-based standards, which will set specific limits to encourage the minimization of waste, promote recycling and reuse of materials, as well as conservation of natural resources, particularly water. Regulations for liability and compensation for damages will supplement standards, to promote greater care and caution. 	<ul style="list-style-type: none"> Load-based national standards have been developed for 11 industry categories (pollutant specific standards) and wastewater quantity limits have been prescribed for 13 industry categories. Public Liability Insurance Act enacted in 1992 specify minimum coverage for those owning or having control over handling of hazardous substances.
<i>Fiscal Measures.</i>	
<ul style="list-style-type: none"> The items for which excise and customs rebate are allowed will be reviewed. Economic instruments will be investigated to encourage the shift from curative to preventive measures, internalize the cost of pollution and conserve resources, particularly water. A direct economic signal is offered by an effluent charge based on the nature and volume of releases to the environment. The level will be based on the cost of treatment and the flow discharged, in order to provide an incentive to set-up treatment plants. The scope of the charges will also be extended to emissions and solid waste. To deal with the range of pollution problems a mix of regulatory and economic measures will be adopted. 	<ul style="list-style-type: none"> Since 1991, the following additional fiscal incentives were implemented: (a) 35% investment allowance on devices and systems for pollution control and environmental protection; (b) exemption of capital gains tax when shifting away from congested urban areas; (c) excise and duty exemptions on utilization of fly-ash, photogypsum and connected products; (d) excise exemption on building materials using them; (e) customs duty exemption on imports of capital goods required for the production of building materials using fly-ash and photogypsum. Task force formed in March 1995 to examine the feasibility of different types of economic instruments for industrial pollution abatement and develop a plan of action for their selective introduction. The task force submitted its report to MoEF in March 1997 (this study was the subject of a covenant under the Pollution Prevention Project). So far, no new economic instrument has been introduced and tested.

Policy Statement Directions and Objectives	Status
Integration.	
<ul style="list-style-type: none"> • Sectoral Ministries, State Governments, local bodies and agencies responsible for planning and implementation of development projects will be required to integrate environmental concerns more effectively in all policy areas. • An integrated overview and organizational structure for decentralized environmental impact assessments and law enforcement based on cooperation with local authorities will be sought. • A long-term policy for pesticides use, including the introduction of environmentally acceptable pesticides, and integrated pest management together with the phasing out of the proven harmful toxic and persistent ones, would be formulated and infrastructure developed for its effective implementation. • Forests and natural vegetation should be restored and protected and green belts raised in urban and industrial areas. • Annual Administration Reports of the Ministries will include a chapter on actions taken to follow up the policy statement and other environmental initiatives they have taken. 	<ul style="list-style-type: none"> • 1994 Notification on EIA specifies compulsory steps in site selection, and choice of appropriate technology and control measures. Clearance from CPCB must be obtained for projects costing more than 50 Crores. • 1997 Notifications require public hearings for projects requiring clearance from Central Government. • Preparation of Zoning Atlases for siting of industries initiated.
Environmental Audit.	
<p>Annual statements will help industries and local bodies in identifying and focusing attention on areas of concern, practices that need to be changed and plans to deal with adverse effects. This will be extended to an environmental audit. The measures will provide better information to the public.</p>	<p>1993 Notification makes submission of Environmental Statements compulsory by all industrial units by the end of the year. Since 1995, all units in 17 categories of industries must submit annual environmental statements.</p>
Environmental Statistics.	
<p>The collection of environmental, economic and health data will be done to determine the status and to develop a concise set of environmental indicators for monitoring the effects of pollution.</p>	<p>Network of Water (480) and Air (290) quality monitoring stations established. Water Quality Atlas of India prepared.</p>

Policy Statement Directions and Objectives	Status
<i>Public Partnership</i>	
<ul style="list-style-type: none"> • A high Government priority will be to educate citizens about environmental risks, the economic and health dangers of resource degradation and the real cost of natural resources. • Public interest litigations against polluting units will be encouraged and supported. • A system of certification of goods that are “environmentally friendly” will be set-up; • Special legal institutions will be set up to provide compensation to individuals for environmental damage and interim relief. • Greater emphasis will be placed on promotion of environmental awareness, undertaking and competence in schools, colleges and training institutions; professional and NGO bodies will be encouraged to be more active; social action by voluntary organizations and individuals will be promoted. 	<ul style="list-style-type: none"> • Substantial increase in public interest litigations. • Criteria for eco-labelling for different categories of environment friendly products developed.

Implementation of Main Recommendations of SPCBs Reorganization Study

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
Policy				
<p>Along with industrial pollution control, give emphasis to automobile and municipal sewage pollution.</p>	<p><u>1993</u>: vehicle emission: Function delegated to Regional Transport Officer, who issues pollution clearance certificates.</p> <p>Municipalities: monitoring of municipal waste water is the responsibility of the Municipal Water Supply and Sewerage Board.</p> <p><u>1998</u>: Board pursuing local authorities in urban areas to provide treatment, but enforcement difficult due to lack of funds.</p>	<p><u>1993</u>: vehicle emission: Function delegated to Regional Transport Officer, who issues pollution clearance certificates.</p> <p>Municipalities: Board does not monitor municipal discharges and only has advisory role.</p> <p><u>1999</u>: High Court has set up committee.</p>	<p><u>1993</u>: vehicle emission: Board authorized to issue certificates of compliance, but compliance of standards and control measures monitored by Transport Department. Board control emissions from vehicles only in 3 Vehicle Emission Monitoring (VEM) stations in Chennai.</p> <p>Municipalities: Municipalities must apply for consent, but only 3 have treatment plants. Enforcement difficult due to lack of funds.</p> <p><u>1999</u>: Vehicles: Between 1996 and 1998, Board established VEMs in five other locations.</p> <p>Municipalities: All municipalities directed to comply with Water Act. 6 have treatment plants and 5 other are under construction.</p>	<p><u>1993</u>: vehicle emission: Function delegated to Regional Transport Officer, who issues pollution clearance certificates.</p> <p>Municipalities: must apply for consent, but few have treatment plants and enforcement is difficult.</p> <p><u>1994</u>: Supreme Court orders 27 municipalities along Ganges River to establish sewage treatment plants.</p> <p><u>1999</u>: Vehicular emissions still responsibility of State Transport Department.</p> <p>Polluting municipalities being identified (by June 1999); installation of treatment plants by 2002-2005.</p>

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
Improve the economics of compliance through increased self-regulation, by requesting industries to prepare environmental audits and to report plant specific environmental parameters monthly; require new industries in the red category to install on-line pollution monitoring systems.		1997: Board finalizing procedures for compulsory audits for certain types of industries, by auditors recognized by the Board.	1998: all 17 category. Highly polluting industries have provided environmental statements. In 1999, 256 industries have been identified to provide statements.	
Promote time-bound voluntary compliance agreements, to reduce reliance on lengthy and expensive litigation.	1995: Power given to the Board to issue directions to non-compliers and demand Bank guarantees for up to 10% of cost of pollution control devices to be provided.	1999: Board has power to negotiate agreements with defaulters. Board does it with highly polluting industries, associated with 20% guarantee.	1999: time-bound agreements, with guarantees, are being used, while Board also continues to rely on closure orders, or orders to interrupt power supply, to ensure compliance.	
Progressively increase consent fees and cess to reflect damage costs and resource depletion. Meter cess.	Cess rates increased in 1992 (all India), but still far from reflecting damage costs and resource depletion.	Cess rates increased in 1992 (all India), but still far from reflecting damage costs and resource depletion.	Cess rates increased in 1992 (all India), but still far from reflecting damage costs and resource depletion. Rate of consent fees revised in 1996 to reflect polluting nature of industries. Increase in cess rate under consideration by GOI.	Cess rates increased in 1992 (all India), but still far from reflecting damage costs and resource depletion.
Introduce load-based standards in areas where industries are concentrated.	National Load based standards being monitored by State Board.	National Load based standards being monitored by State Board.	National Load based standards being monitored by State Board.	<u>Current Status?</u>
Prepare model EIAs by categories of industries and expand their scope to include environmental option assessments; issue NOCs in two stages to ensure that the pollution control systems are in place prior to start of operation.	1993: NOCs issued when board approached by industry. Consent for operation not issued unless measures	1993: Two-stage NOC triggering release of funds from financing institutions.	1993: no clear policy regarding NOCs. Issued only when needed by industry to obtain financing. Not controlled subsequently.	1993: NOC required for release of financing, electricity and water supply.

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
	<p>specified in consent implemented. One-stage NOC</p> <p><u>1994</u>: Central Government issues rules on compulsory EIA for a list of industries.</p> <p><u>1997</u>: Central government issues rules on public hearings on compulsory EIAs.</p> <p><u>1998</u>: State issues own rules on projects requiring EIAs and environmental management plans.</p>	<p><u>1994</u>: Central Government issues rules on compulsory EIA for a list of industries.</p> <p><u>1997</u>: Central government issues rules on public hearings on compulsory EIAs.</p> <p><u>1997</u>: 40 EIAs reviewed.</p>	<p><u>1994</u>: Central Government issues rules on compulsory EIA for a list of industries.</p> <p><u>1997</u>: Central government issues rules on public hearings on compulsory EIAs.</p> <p><u>1999</u>: EIAs required for 29 highly polluting categories of industries. Public hearings. 63 reviewed last year. One-stage NOC.</p>	<p><u>1994</u>: Central Government issues rules on compulsory EIA for a list of industries.</p> <p><u>1997</u>: Central government issues rules on public hearings on compulsory EIAs.</p>
Carry out detailed epidemiological studies linking environmental quality and disease burden.			<u>1999</u> : Epidemiological studies being conducted by Ramachandra Medical College, Chennai.	<u>1999</u> : Priority list of at least 5 critical areas by March 1999.
Strategy				
Identify critical areas and prepare Area Environmental Plans for them, including a detailed time-bound program for controlling pollution and ensuring compliance by priority industries; develop environmental zoning regulations; and establish specific load based standards.	<u>1995</u> : Policy for location of industries within river basins proposed, specifying minimum distances from rivers; detailed study on Thane Bellapur carrying capacity initiated, to further regulate industrial development in area.		<u>1999</u> : no new industry can locate within 1 km from water courses and 5 km from major rivers. Since 1997-98, with the assistance of CPCB, State Board also preparing Zoning Atlas for siting of industries, starting with Tiruvallur and	<u>1999</u> Zoning Atlas under preparation.

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
	<p>1998: cell being established for preparing zoning atlas. MPCB and MIDC developing an industrial location policy for siting of new industrial estates.</p>		<p>Kancheepuram Districts.</p>	
<p>Identification of polluting industries: Map industries based on quantity and quality of discharge, industrial concentration and sensitivity of ecosystem.</p>	<p>1993: polluting industries defined based on volume of discharge effluents.</p> <p>1995: industries reclassified under red, orange and green categories.</p>	<p>1993: Case by case analysis of quantity and quality of effluent.</p>	<p>1993: 17 most polluting industries identified; others grouped into red/green/orange. Categorization of industries into red, orange and green revised in 1994.</p> <p>1999: no change.</p>	<p>1993: 17 industries criteria, plus BOD discharge.</p>
Functions				
<p>Consents Award and renewal: Power of giving or renewing consents to non-red categories should be given to Regional Offices.</p>	<p>1994: duration of consents extended from 1, 2, and 3 years for red, orange and green categories to 2, 4 and 6 years; tiny non-polluting industries given perpetual consents without fee by sub-regional officers. Single consent system (water, air and hazardous waste introduced).</p> <p>1995: sub-regional officer authorized to</p>	<p>1993: Regional Office issues and renews consents to moderately polluting effluent releasing industries. Head office issues all air emission consents and highly polluting industries effluent consents. Consents valid for one year.</p> <p>1999: Consents valid 2, 4 and 6 years for red, orange and green industries, respectively.</p>	<p>1993 Award and renewal of consents sole responsibility of head office.</p> <p>Consents valid one year except green industries (two years).</p> <p>1998 Regional office grants consent to existing green and orange industries (head office for green site industries), and renews consent to orange and green</p>	<p>1993 Regional office issues consent to 48 categories of moderately polluting industries. Head office to all other.</p> <p>1999 Small non-polluting industries exempted from obtaining consent; one-time consent for other non-polluting industries; Duration of consent for moderately polluting industries extended to 3</p>

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
	<p>grant consents to small orange and green industries.</p> <p>1999: duration of consent extended to up to 5, 10 and 15 years for red, orange and green industries.</p>		<p>industries and small red industries.</p> <p>1999: Board delegates powers to Regional and District Offices for issue and renewal of consent for all orange and green industries.</p> <p>All consents valid one year.</p>	<p>years.</p>
<p>Delegation of industry review and review of inspection reports and sending out notices of violation should be delegated to regional and subregional offices; fequency of inspections should be specified.</p>	<p>1993:- sub-regional offices only responsible for site inspections and sampling. Regional offices responsible only for review and inspection of moderately and non-polluting industries.</p> <p>1999: Filing prosecution delegated to Regional Offices.</p>	<p>1993 Review and inspection delegated to sub-regional offices.</p> <p><u>Any further delegation since?</u></p>	<p>1993:- sub-regional offices only responsible for site inspections and sampling. Regional offices responsible only for review and inspection of moderately and non-polluting industries.</p> <p>1994-95: Board delegates powers to Regional Officers to issue Show Cause Notices to large and medium industries and the responsibility to personally inspect highly polluting industries. Board delegates powers to District Officers to issue Notices to small-scale industries. Board prescribes frequency of inspections according to size and categorization of industries.</p>	<p>1993:- sub-regional offices only responsible for site inspections and sampling. Regional offices responsible only for review and inspection of moderately and non-polluting industries.</p>

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
Monitoring: most of the routine monitoring (sample collection and analysis) should be assigned to certified labs instead of SPCB labs-this would bring down the expenditures of the Boards and release time of technical people. SPCB labs should perform legal tests as well as random cross testing of private labs tests and surprise testing of industries.	<p>1993: System of 115 accredited labs. In existence, to perform tests paid by industry.</p> <p>1994: Board stops recognition, except recognized educational institutions labs.</p>	<p>1993: Board does not recognize private laboratories.</p> <p>1999: no change.</p>	<p>1993: Board does not recognize private laboratories.</p> <p>1999: no change.</p>	<p>1993: Board does not recognize private laboratories.</p> <p>1999: no change.</p>
Financial Management				
Improve internal resource generation (raising consent fees and analysis charges) to reduce dependence on state budget support.	Substantial progress made towards self-sufficiency, from 59% in 1990-91 to 92% in 1996-97.	Degree of self-sufficiency maintained at about 55% since 1989-90.	Substantial progress made towards self-sufficiency, from 48% in 1988-89 to 100% in 1997-98 (more recently, through increase in consent fees in 1996 and drives to ensure payment of arrears).	Substantial progress made towards self-sufficiency, from 77% on average over period 1988-91 to 100% in 1997-98.
Convert Boards into corporate entities with financial and administrative autonomy.	No change in legal status.	No change in legal status.	No change in legal status.	No change in legal status.
All-India advanced management and technical training programs should be organized for SPCB staff, while SPCB should provide for in-house basic training needs.	CPCB has provided extensive training under IPCP.	CPCB has provided extensive training under IPCP.	CPCB has provided extensive training under IPCP. In 1995, Board established Environmental Training Institute to train staff of board and personnel from industries, municipalities and NGOs in the field of environment and pollution control.	CPCB has provided extensive training under IPCP.

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
Organization Structure				
Establishment of Planning cell for preparation of strategic plan.	<u>1993</u> : no <u>1999</u> : Project planning cell established.	<u>1993</u> : no	<u>1993</u> : no <u>1998</u> : Planning and Development cell created under the joint chief environmental engineer.	<u>1993</u> : no
Establishment of cells to deal with NGOs and environmental awareness activities.	<u>1993</u> : no <u>1994</u> : NGO Cell established.	<u>1993</u> : no <u>1996</u> : setting up of Pollution Awareness and Assistance Center.	<u>1993</u> : no <u>1994-95</u> : Environmental Education and Training Section created. <u>1995-96</u> : NGO cell created under the Scientific Adviser. <u>1996</u> : Environmental Awareness and Assistance Cell created.	<u>1993</u> : no <u>1999</u> : Separate cell established to promote environmental awareness in the public.
Establish vigilance cell for checking samples.	<u>1993</u> : no vigilance cell.	<u>1993</u> : Board has a full time vigilance cell.	<u>1993</u> : no vigilance cell.	<u>1993</u> : no vigilance cell.
Establish a research cell which can undertake sponsored research and improve knowledge on biomonitoring, env. Negotiating, options assessment, risk analysis, GIS and clean technologies.	<u>1993</u> : no <u>1994</u> : Clean Technology Cell established.	<u>1993</u> : no <u>1997</u> : R&D cell established at head office.	<u>1993</u> : no <u>1998</u> : Applied R&D unit created in Chennai AEL; focusing on cleaner technologies Research fund established for research activities in the field of waste reduction, reuse or recycling, has so far sponsored 6 projects.	<u>1993</u> : no

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
Staffing				
Carry out manpower studies to identify surpluses in different offices at different locations; and ways to reduce manpower requirements through decentralization of issue and renewal of consents, elimination of duplication of work, increased use of computerized systems and consultants, and contracting out uneconomical services.	1999: Some additional staff positions created but mostly not filled, due to state government policy not to create new positions irrespective of funding. Board considers itself short of staff to handle new tasks (biomedical and hazardous waste management rules and public hearing procedures).	1995: High Court orders strengthening of Board staff by 169 (implemented). Presently no shortage of technical staff.	1995-96: computerization of Head Office, Regional Offices and 2 District Offices. 1999: government approval for new staff positions not required since board is self-sufficient.	
Increase compensation to attract skilled and talented professionals.			No change in rules and regulations.	
Train administrative staff in computers, graphics, GIS so that they can be converted to technical support staff.			Computer training in office applications given to staff.	
Reporting				
Prepare every year an environmental quality report indicating status, time series trends and changes in critical locations with serious problems.			Status reports and environmental quality reports provided in Annual Reports, periodicals and newsletters and newspaper publications (Chennai Air Quality).	
Prepare annual reports in a standard format				

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
Computerized Decision Support Systems				
Consent Information system providing break-up of categories and locations, and of industries functioning with or without consent.			<u>1999</u> : Board has developed computerized system for inventory of industry and issue and renewal of consent. Consent Information System in progress.	
Cess billing and compliance information system, with breakdown of industries by region, categories of industry, type of industrial waste, and discharge severity status; inspection agenda drawn accordingly.	<u>1993</u> : Cess administration system under implementation. <u>1994</u> : computerization completed.	<u>1993</u> : Computerized cess administration system.	<u>1993</u> : Regular monitoring of water consumption, used for estimating cess. <u>1998</u> : Computerized system developed at head office for assessing cess and compliance by industry.	
Finance: breakdown of revenues and expenditures by district.			<u>1993</u> : Pay bills and Bank statements, and budget and provident funds are computerized. <u>Current status</u> : no change.	
Treatment facilities: types and suitability of treatment facilities of industries; status of industries.			<u>1999</u> : Board developing various treatment options for industries.	
Hazardous waste: inventory of industries with hazardous wastes and materials, methods of	<u>1993</u> : computerized system		<u>1999</u> : Board has completed inventory of all sources	

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collection, disposal, transportation and control, priority areas for management.	with data on industries, type of waste, categorization of waste and disposal methods. Used for monitoring and selection of disposal sites.		generating hazardous waste in the state and evolved treatment methods.	
Materials Property Data Base			Current status: Not implemented.	
Personnel: staff strength for each function; employee file for each person; and Training Programs based on deficiencies.		1993: Computerized system for accounting of salaries and travel expenses. Current status?	Current status: Not implemented.	
Consultants data base, including track record of performance.			Current status. Not implemented.	
Environmental engineering data base, including information on different industries, their operation, methods of pollution control, reports on latest technology trends in environmental management.			Current status: Not implemented.	
Legal Information System: break-up of industries by compliance, details of case judgements which can be used as precedents; early warning system of non-complying and regularly defaulting industries.	1993: System for providing support for issuing notices to non-complying industries.		1993: Case details computerized and monthly status reports generated.	
Inspection Program: list of inspectors and their assigned industries, fortnightly agenda for each			Current status: Not implemented.	

Recommendation	Maharashtra	Gujarat	Tamil Nadu	Uttar Pradesh
inspector, list of priority areas, issues and instructions for effective monitoring.				
Pollution Control and Monitoring Equipment database, including list of brands of equipment, costs, availability and suitability for India.			Board has been updating data on pollution control and monitoring equipment, costs, availability and suitability.	