

CONFIDENTIAL

INDIA

**NTPC POWER GENERATION PROJECT
(Loan 3632-IN)**

**MANAGEMENT RESPONSE TO THE INSPECTION PANEL:
UPDATE OF THE ACTION PROGRAM**

September 2, 1997

**INDIA COUNTRY TEAM
SOUTH ASIA REGION OFFICE**

ABBREVIATIONS AND ACRONYMS

ADB	=	Asian Development Bank
CBO	=	Community-Based Organizations
CPCB	=	Central Pollution control Board
DEA	=	Department of Economic Affairs, Ministry of Finance, Government of India
DFID	=	British Department for International Development
DRDA	=	District Rural Development Agency
EAP	=	Environmental Action Plan
EDI	=	Economic Development Institute
ESP	=	Electrostatic Precipitators
FINNIDA	=	Finish International Development Agency
GOI	=	Government of India
LNG	=	Liquefied Natural Gas
MOEF	=	Ministry of Environment and Forests
NTPC	=	National Thermal Power Corporation
OD	=	Operational Directive
R&R	=	Resettlement and Rehabilitation
RAPs	=	Resettlement Action Plan
ReAPs	=	Remedial Action Plan
VDAC	=	Village Development Advisory Council
SPCB	=	State Pollution Control Board
XIDAS	=	Xavier Institute of Development Action and Studies

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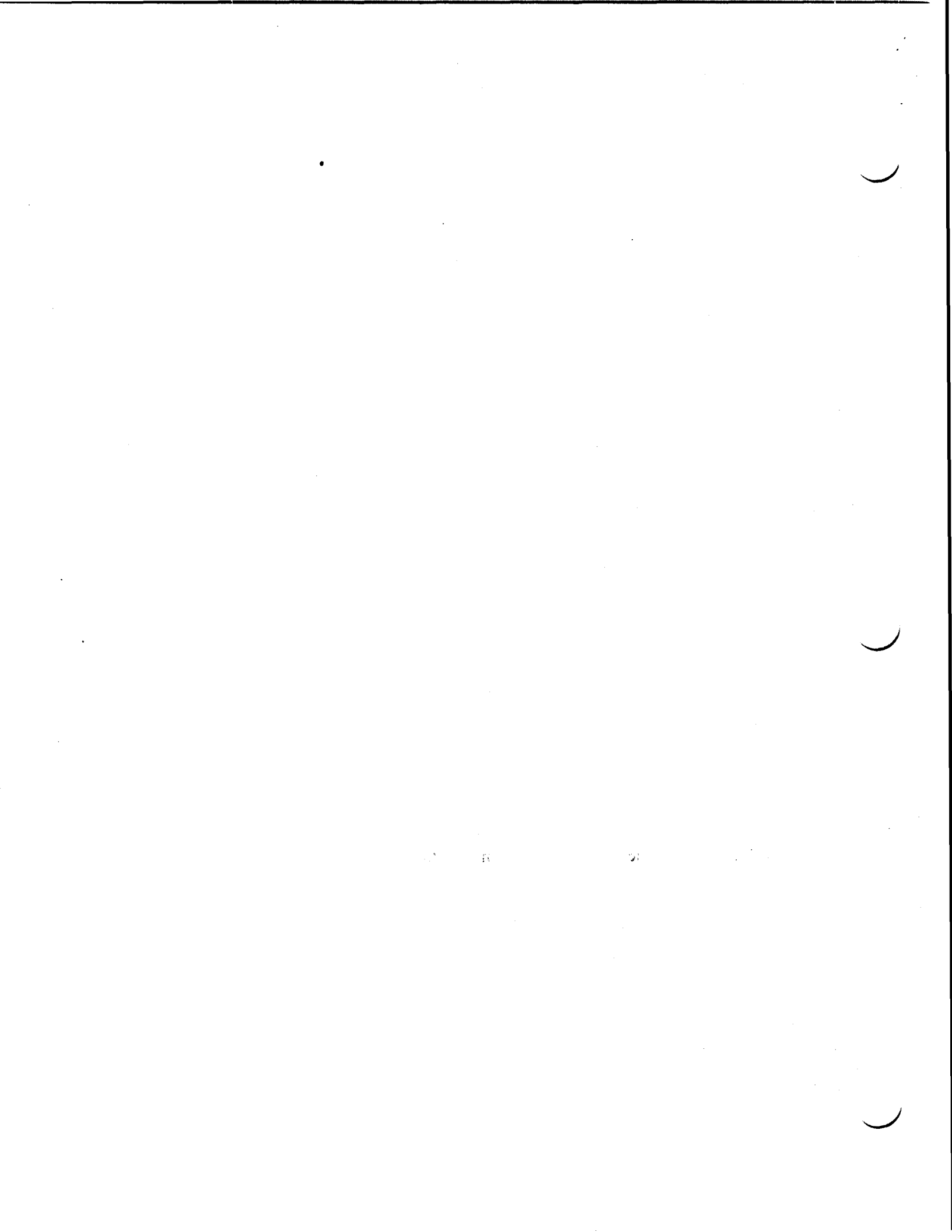
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NTPC POWER GENERATION PROJECT (Loan 3632-IN)

MANAGEMENT RESPONSE TO THE INSPECTION PANEL: UPDATE OF THE ACTION PROGRAM

INTRODUCTION

1. On June 3, 1997, Management submitted to the Inspection Panel, a Response to the Request for Inspection on the India: *NTPC Power Generation Project (Loan 3632-IN)*. The Response included an Action Program which is designed to respond to the project-specific issues raised in the Request for Inspection, as well as to a number of broader environmental and social issues which necessarily would impact and affect the efficacy of project-specific solutions in the Singrauli area. The purpose of this Memorandum is to provide the Executive Directors with the detailed Project-Specific Action Program. An update on the implementation of the Broader Action Program is included as Annex 1.

2. Between June and August, a number of Bank missions visited the Singrauli area, including a mission led by the Country Director for India, now based in Delhi. For continuity, the mission included members of the 1995 Resettlement and Rehabilitation (R&R) mission whose report was referred to in the Panel's Report. Extensive consultation was also initiated with concerned corporations, government agencies, Non-Governmental Organizations (NGOs), and project-affected people and communities regarding the Panel Report and Recommendation. These discussions included the Cabinet Secretary of the Government of India (GOI) during his visit to Washington, and senior officials of the Ministry of Finance, Ministry of Environment and Forestry, Ministry of Coal, Ministry of Power, Governments of the states of Uttar Pradesh and Mahdy Pradesh, Local Authorities of the Singrauli region, Coal India Limited, NTPC officials at corporate headquarters, and plant managers in the Singrauli region and their R&R staff.

3. These field visits and consultations have enabled Management to further detail the Project-Specific Action Program outlined in the Management Response of June 3, 1997. These visits and consultations were not feasible within the limited time available to Management to prepare its initial response.

PROJECT-SPECIFIC ACTION PROGRAM

4. This Project-Specific Action Program comprises the following components:

- I. Actions to address current R&R problems
- II. Actions relating to the environmental aspects of the project
- III. Actions to address social and environmental problems of the Singrauli region
- IV. Proposed Extension of the Project (Loan 3632-IN)

I. Actions to Address Current R&R Problems

5. The identification of the factual source of the current problem as well as remedial actions must be led by NTPC, which is responsible for the implementation of the project, and without whose full commitment and ownership no remedial actions can succeed. In this regard, understandings have been reached with the senior most management of NTPC, as well as the local NTPC officials in the Singrauli region, that NTPC would undertake and support the actions described below:

A. Consultation and Impact Assessment

6. An independent development institute, with experience in social research and rural extension work will provide assistance related to two tasks:

- (a) Assess the status and problems of persons who are covered in R&R programs of the Project, and families who have been identified as not yet resettled and rehabilitated. In the Project financed by the Bank loan covered by Rehabilitation Action Plans (RAPs), an estimated 119 people remain to be resettled, rehabilitated or both. In projects not financed by the Bank loan, where Remedial Action Plans (ReAPs) apply, this number is estimated at 155 families.
- (b) Undertake an impact assessment of the implementation of the R&R programs which formed part of the project, identify problem areas, and advise on solutions.

7. **It has been agreed that the Xavier Institute of Development Action and Studies (XIDAS) of Jabalpur, Madhya Pradesh, will carry out these tasks. The Team for this work will be headed by Fr. (Dr.) M.vd Bogaert who has more than 30 years working experience in the tribal and rural areas of India. Fr. Bogaert has undertaken similar work with the Bank previously, and is highly respected in the country.** Terms of reference for work of XIDAS would be prepared by NTPC and Management by end-September in consultation with XIDAS. For its part, XIDAS will scope out the terms of reference and detailed work program following discussions with the affected population, concerned NGOs, and other stakeholders.

8. The two tasks will be carried out in parallel, with urgent attention to finding practical solutions to immediate problems facing those who have not yet received their full entitlements under RAPs or ReAPs of the Project. The findings from this work will be used as inputs into modification of the existing RAPs and ReAPs. The two tasks are detailed in the following paragraphs.

9. **Task 1:** Using participatory methodologies such as Rapid Rural Appraisal and focus group discussions, XIDAS would undertake the following:

- (a) assess the current status of those project-affected people or project-affected families who have not yet received full assistance under the policies in the ReAPs or RAPs;
- (b) identify obstacles to successful implementation of the plans;
- (c) advise NTPC and Management on corrective action required;

- (d) liaise and consult with other relevant stakeholders in the area, in particular concerned NGOs, in an attempt to build consensus towards the proposed courses of action; and
- (e) advise NTPC on how to improve their information strategies and grievance mechanisms, and on how to ensure more meaningful participation in decision making by project-affected people and other key stakeholders.

10. XIDAS will provide inputs into improving Income-Generating Schemes on the basis of which NTPC would prepare a more effective program through the assistance of local NGOs, Community-Based Organizations, especially of women and youth, and the local business communities. NTPC will explore the possibility of contracting to NGOs, a business group or consulting company, the implementation of the income-generating program. Management would assist and advise NTPC on this program.

11. **Task 2:** XIDAS will also carry out an Impact Assessment Study of the R&R which formed part of the Project. The objective of this impact assessment will be to assess the extent to which the project has been successful in resettling and rehabilitating project-affected people/project-affected families. The study will recommend remedial action in accordance with the R&R policy to be considered by NTPC in consultation with the Bank and other stakeholders, and will be an input into the modification of the ReAPs and RAPs.

12. On the basis of these consultations, the findings of the Impact Assessment Study, as well as the judgment of the High Court of Jabalpur regarding the petition of certain villagers in Vindhyaachal delivered on April 11, 1996 (and upheld by the Supreme Court of India on January 31, 1997), NTPC will undertake to modify the RAPs and the ReAPs to ensure that they represent realistic and implementable plans.

B. Monitoring, Supervision and Evaluation

13. In order to move the focus from isolated reviews, studies and remedial action on an ad-hoc basis, to a more systematic approach of ongoing feedback and adjustment as a learning process, an approach based on three levels of monitoring is envisaged:

- (a) strengthening of NTPC's internal monitoring and analytical capacity related to environmental and social impacts. Consideration will be given to recruitment of specialists who can assist NTPC in building up this capacity. Management will provide technical assistance and training towards this purpose (see Section III below);
- (b) improving the Bank's Supervision. Supervision will be done on the basis of key indicators and benchmarks agreed upon. Consideration will also be given to focused external evaluations on key issues;
- (c) **establishment of an independent body to act as monitoring panel, consisting of eminent persons in India, representatives of NGOs, supreme court advocates, retired justices, and individuals with professional backgrounds in R&R. Their role would be to systematically and regularly review and advise on implementation of the R&R program. They will be fully independent, with the right to investigate any elements of the R&R action plans they deem appropriate.**

C. Strengthening of the Bank's Delhi Office

14. In the Management Response of June 3, 1997 (para. 20), Management noted that "since 1995, most of the supervision responsibility for R&R under the project was delegated to the Social Development Unit (SDU) in the Resident Mission in Delhi. Notwithstanding these adjustments on the part of the Bank, supervision has not been fully effective in resolving the difficulties in implementation". Management has already initiated action to further strengthen the capacity of the SDU and its role in the supervision of the R&R and other environmental components of the Project.

15. As part of the South Asia Regional Renewal Program, the Country Director for India has been located in Delhi, effective July 1, 1997. In addition, the SDU of the Delhi office will be strengthened by the assignment of an experienced R&R specialist to head of the SDU effective September 15, 1997, and the recruitment of additional Indian specialists. The Head of SDU will have full authority in assessing implementation of the R&R, as well as the other environmental components of the Project and advising Management on actions that may be necessary in light of the implementation of this component.

D. Training of NTPC Staff

16. The need for an enhanced program of R&R training for staff is recognized by NTPC. A particular priority will be the strengthening of NTPC's monitoring and analytical capacity. In addition, training programs for R&R staff on social skills, including communications with project-affected people, participatory methodologies and strategies for restoration of livelihood would also be undertaken. EDI is prepared to assist in the development of a custom-made program for NTPC to include:

- (a) inviting a few, selected senior NTPC managers to a February 1998 Workshop on Economic Liberalization, Private Sector Land Acquisition and Resettlement and Rehabilitation, which is being co-sponsored by EDI and the Confederation of Indian Industry;
- (b) structured study tours including visits to business organizations with successful experience in working closely with affected communities, developing community outreach programs, and establishing and maintaining high standards in relationships with local community organizations and people;
- (c) a continuation of EDI Policy, Practitioner and Computer Workshops; and
- (d) workshops on Corporate Responsibility and Change Management with the involvement of the Prince of Wales Charitable Trust that has already developed the relevant training materials.

II. Action to Address Environmental Aspects

17. In order to reinforce field-based supervision of the environmental aspects of the project, a team of environmental specialists was assembled in the New Delhi Office of the Bank. After initial discussions with NTPC commencing on August 6, the Team was deployed to the field to prepare a comprehensive Update of the Environmental Action Plan (EAP). The Update has three phases:

- (a) Phase I (August 6 - 22) has been completed. This involved the visit of a team to the Singrauli area to review the implementation of EAP programs and other environmental issues at the Vindhyachal, Singrauli and Rihand NTPC power stations.
- (b) Phase II began on August 19 and will conclude on August 30. Field-based consultants will visit Korba, Ramagundam and Farakka power stations and will prepare a comprehensive report; and
- (c) Phase III will start in September. Headquarters and field-based staff will visit a number of the other NTPC stations and complete the comprehensive review of the EAP. The Bank team will seek agreement with NTPC on a specific set of time bound actions arising from the recommendations of the above field reports on the power stations covered under the EAP.

18. With regard to the ash disposal issue, the mission in July-August reviewed the situation and concluded as follows: all three stations (Vindhyachal, Singrauli, and Rihand) together currently produce a total of about 5.2 million tones of ash per year. Except for a small quantity of ash which is reused (the average ash utilization in India is not more than 2 to 3 percent, the situation in the Singrauli area is similar), most of the ash in the form of slurry is conveyed by long pipelines running into several kms for final disposal in large ponds. Two issues have been raised: (i) contamination of soil and crops and (ii) reducing or even eliminating the need for land acquisition through back filling and improved ash management.

19. Contamination of soil and crops from frequent leakages of ash slurry and protests from local farmers were reported in Vindhyachal. Site visits confirm that leakages are either due to mechanical failure of couplings or deliberate breakage of couplings by farmers for irrigation purposes. NTPC is addressing this issue through a series of measures which include: (i) routine inspection of pipelines, replacement of couplings with welded joints where necessary, and replacement of pipes at regular intervals; (ii) a recently started four year project at Vindhyachal costing about \$ 10 million to reroute its pipes. The new route is shorter by 1.5 km, and is mostly within NTPC premises and is away from the agricultural fields; (iii) installation of ash slurry recycling plants for new ashponds. For Vindhyachal II and Rihand II they were planned to be built as part of the EAP, but implementation has been delayed because of the R&R problems; and (iv) proposed establishment of regular communication with the farmers to disseminate information on long term adverse impacts of using ash slurry for irrigation and seek their participation in timely detection and repair of leaks.

20. Backfilling of ash in existing open cast mines in the Singrauli area was not found feasible by Northern Coalfields Ltd. A study sponsored by USAID (1996) on proposed development and demonstration projects to enhance large volume uses of coal combustion by-products as a structural fill in India, concluded that most of the mines in this region are relatively young with limited reclamation activities, and swell factor for overburden requires space beyond what is currently available. Management plans, however, to continue to pursue the backfilling option with an Northern Coalfields Limited and Coal India Limited. Therefore, a study to identify potential mines for backfilling and develop environmentally acceptable and sustainable options for ash disposal will be carried out in the context of the ongoing Bank-assisted Coal Sector Environmental and Social Mitigation Project.

21. Other possibilities for ash utilization have been explored. In 1996, Rihand used about 73 percent of ash generated for filling up low lying areas, ash dyke raising, road construction, supply to cement/asbestos industries. This is however a one time event. NTPC and Regional Research Laboratory, Bhopal have successfully carried out experiments to use ash for enhancing crop yields at Rihand. A

study on possible long term impacts on soil productivity and heavy metal contamination is underway, but the potential for ash utilization in agriculture is expected to be rather limited. Ash is also being used in limited quantities for house construction material. In addition, the forthcoming Bank mission in September will seek agreement with NTPC on the implementation of the recommendations of the recently concluded Bank-sponsored study on "*Ash Management Disposal and Utilization*" containing guidelines for ash management, evaluation criteria and analysis of ash management alternatives (Annex 1, para. 12(a)).

III. Actions to Address Broader Social and Environmental Problems of the Singrauli Region

22. Until 1960, Singrauli was an isolated and economically backward rural area on the borders of the states of Uttar Pradesh and Madhya Pradesh. In 1960, the process of transformation of the area into a power, coal mining and heavy industrial base began with the construction of the Rihand Reservoir. Along with this transformation, a veritable industry of "resettlement" has developed. (see Appendix 4 of the Management Response).

23. Today the Region suffers from the results of decades of uncoordinated and poorly managed heavy industrial developments, creating serious environmental problems and a large population of displaced people. There has been involuntary resettlement of about 100,000 people in the past three decades, some of whom have moved more than once as initial relocation sites have been taken over for further industrial development, township schemes, or waste disposal.

24. The total population of about 800,000 people today comprises: (a) a small group of skilled and semiskilled workers from outside the region attracted by the new industries and enjoying wage employment and a comparatively higher standard of living; (b) the large group of displaced people and their families who have received different levels of compensation and assistance towards rehabilitation, the latest being the project-affected people of the Bank-project; and (c) the large majority of the local population who remain in the rural communities. A recent study indicates that the last group represents the lowest income group and that nearly half of the local population is currently below the poverty line. Because of the sharp income differentials, social tensions exist not only among these three groups, but particularly among the different generations of displaced people who have received different levels of rehabilitation support. At the same time, the capacities of the local authorities and community remain limited, and in any event, they considered the displaced population a low priority as they do not regard this group as the neediest in the community.

25. The need for addressing the complex problems of the Singrauli region has been recognized for some time. Since 1990, a number of studies by international and Indian consultants have been completed, financed by NTPC, the Bank and other donors, the most recent being "*Singrauli Development and Environmental Strategy*" by GHK/MRM International Consultants in association with Hunting Technical Services Limited, and TATA Economic Consultancy Sciences, TATA Consulting Engineers, and TATA Institute of Social Sciences.

26. Over the past months as part of our Action Program (para. 4(a) of Action Program in Management Response), Management has initiated a dialogue with the Government of India and the Governments of Uttar Pradesh and Madhya Pradesh, with the object of starting work on a regional program of sustainable development for the Sidhi District of Madhya Pradesh and Sonebadhra District of the Uttar Pradesh which comprise the Singrauli region. Such a program would address the wider economic, social and environmental problems of the region.

27. Following discussions with Management in Washington, a decision was made by the Union Cabinet Secretary in January 1997 to study the possibilities for such action. To this end, a committee was set up to enable integrated management of development efforts in the entire Singrauli region. This committee is chaired by the Chief Secretary, Madhya Pradesh, with representatives of Uttar Pradesh, NTPC and Coal India Limited. Subsequently, a meeting chaired by the Additional Secretary, Department of Economic Affairs, Ministry of Finance was held with high level representatives of the Uttar Pradesh and Madhya Pradesh governments, Ministries of Coal, Power, and Environment and Forest, NTPC, Coal India and the Bank. During this meeting it was agreed that specific proposals would be drawn up by both state governments.

28. These proposals are expected to be presented to the Bank before the end of September. It is not possible, therefore to be precise about their content at this time. However, the proposals expected from Uttar Pradesh and Madhya Pradesh in September will draw heavily on the recommendations of the *Singrauli Development and Environmental Strategy*. The priority action program outlined in this strategy includes investment in: roads and bridges; stormwater drainage; solid waste management; water supply and sanitation; slum upgrading (housing); transportation facilities; market development; small industrial sites; resettlement colony development; rural electrification; and institutional support. Active consultation and community participation will be essential to the successful design and implementation of these programs.

29. Management has agreed to GOI's request that IDA consider financing such a program, but the timing depends heavily on the quality of the preparation and the commitment of the state and local authorities, and participation of stakeholders. The immediate challenges in preparing such a project are: (a) defining a suitable management structure for a project spanning two states; (b) defining how to strengthen local institutions; and (c) agreeing on how to improve the local revenue base to help ensure sustainability. If these challenges can be met, the project would most likely take the form of demand-driven fund, in which investment grants and loans would be extended to public institutions, NGOs and community groups, on an agreed formula of matching financial contributions, and allowing for extensive participation in planning and execution by local NGOs and beneficiary groups. Given the complex socioeconomic situations in the Region and the weak capacities of the local authorities and institutions, the proposed project would undoubtedly be of high risks but seems the appropriate response to the most critical problems of the Singrauli region.

IV. Proposed Extension of Project (Loan 3632-IN)

30. The NTPC Power Generation Project (Loan 3632-IN) was the first of a series of loans envisaged to finance time slices of NTPC investment needs, and it is scheduled to close on September 30, 1997. At that time, total disbursement is expected to be about US\$170 million, with an undisbursed balance of US\$230 million. The Government of India and NTPC have requested an extension of this loan for eighteen months, i.e., to March 31, 1999.

31. In considering this request, and to address further the concerns raised in the Panel Report and Recommendation, Management will carry out a comprehensive review of the Project and of NTPC's corporate-wide operations and business plan (para. 3 of Management Response: Action Plan). For this review:

- (a) A R&R team will: (i) prepare the Terms of Reference for the impact assessment together with NTPC (para. 7 above); (ii) agree with NTPC to establish an Independent Monitoring Panel which would begin functioning by the end of September, 1997 (para. 13(c)); (iii) reach agreement with NTPC on a monitorable, time-bound action program over the following six months to address R&R problems, as summarized in Section I above.
- (b) An environmental team will complete the in-depth review of the Environmental Action Plan (EAP). The team will seek agreement with NTPC on a time-bound series of actions, to be derived from the recommendations of the field reports on the power stations covered under the EAP (para. 17).
- (c) A technical and financial team will review the implementation of the other components of the project as well as NTPC's overall financial performance and business development.

32. In addition, the state governments of Uttar Pradesh and Madhya Pradesh are expected to submit their proposals for a Singrauli Regional Development project to the Bank by the end of September. Management will hold further discussions with the relevant ministries of the Union government, with the two state governments concerned, with relevant public and private corporations, and with NGOs and community groups to agree on the objectives and concepts of the proposed project.

33. Subject to satisfactory completion of all the above, Management plans to extend the Project for a period of six months, i.e. until March 31, 1998. At that time, further extension of the Project, will be determined. Management's decision in this regard will depend, inter alia, on: satisfactory implementation of the R&R Action Program described in Section I; satisfactory progress on the Environmental Action Program to be agreed in September 1997; and progress in preparing the proposed Singrauli Regional Development Project.

INDIA

NTPC POWER GENERATION PROJECT
(Loan 3632-IN)

MANAGEMENT RESPONSE TO THE INSPECTION PANEL:
UPDATE OF THE ACTION PROGRAM

BROADER ACTION PROGRAM

1. The Broader Action Program which was outlined in Management's Response to the Inspection Panel dated June 3, 1997, includes seven specific activities. These activities encompass a number of on-going and planned studies, as well as components in projects under implementation. Together, these constitute a body of work and experience which will be directly relevant to the project-specific solutions being developed under the Action Program. Progress-to-date in implementing these is outlined below:

I. Complete by end August 1997, a review of the quality and implementation performance of Environmental Assessments for all environment Category "A" and "B" rated projects in the India portfolio.

2. This study which focuses on the quality and effectiveness of Environmental Assessments of Category "A" and "B" projects and Environmental Management Plans (EMPs) was initiated in November 1996, and carried out by the environmental specialist staff in the New Delhi Office with assistance from respective Task Managers and local consultants. It was completed in early August and the draft report has been circulated. The main recommendations are as follows:

- Sectorial and Regional Environmental Assessments should be employed more frequently;
- the analysis of alternatives and public participation and consultation, although a standard of OD 4.01 should be emphasized in the terms of reference of the consultants who will carry out requirement of the Environmental Assessments;
- standard Environmental Assessment Review criteria (as utilized by ADB and FINNIDA) should be developed in the Bank and shared with government and consultants to promote consistency, accuracy and quality;
- environmental performance indicators should be included in legal agreements more often and more explicitly; and
- the capacity of the field office should be strengthened in order to increase and improve field-based supervision and monitoring.

3. The Environment Department considered the analysis, findings, and recommendations of this study to be sufficiently significant not only for India but Bank-wide and has recommended wider dissemination. A Workshop is scheduled in the Bank in mid-September.

II. Complete a second review of all projects in the India portfolio with resettlement components.

4. Preparation of the review was initiated in June 1997. An anthropologist with wide experience in the South Asia Region has been selected as the Task Manager. More specific terms of reference and the approach for conducting the review have been prepared. The initial mission to India is scheduled for late September and will involve discussions with government, project agencies, project-affected people, NGOs, academic and research institutions, and community-based organizations.

5. Three problem areas have been identified for closer attention during this review i.e. challenges of re-establishing livelihoods; options for income restoration when land-for-land and permanent jobs are unavailable; and the legal framework of entitlements for encroachers and squatters. A background study "*The Current Legal Status of Squatters and Encroachers as Determined by The Courts and Government Pronouncements in India*" prepared by two advocates of the Supreme Court of India was completed at the end of July 1997. The study was constructed around the issue of fundamental human rights, as defined by the Indian Constitution, with relevance to three particular Acts and a number of legal pronouncements under their provisions. The three Acts are: The Slum Areas (Improvement and Clearance) Act, 1956; the Urban Land (Ceiling and Regulation) Act, 1976; and the Public Premises (Eviction of Unauthorized Occupancy Act, 1971). The study found that the main principles which emerge from pronounced judgments are:

- the right to life includes the right to clothing, a decent environment and reasonable accommodations to live in, and the right to residence and settlement is inseparable from a meaningful right to life;
- the right to shelter includes adequate living space, a safe and decent structure, clean and decent surroundings, sufficient light, pure air and water, electricity, sanitation, and other civic amenities such as roads;
- fundamental rules of natural justice, such as the right to a hearing should be followed prior to the eviction of an unauthorized occupant, and the eviction of slum or pavement dwellers will lead to deprivation of their livelihood and consequently to deprivation of life;
- a Court may not, as a rule, direct that encroachers be provided with alternative accommodation from ejection, but each case has to be dealt with separately. The State is under constitutional obligation to provide means for settlement and residence for the poor; and to provide adequate means of livelihood to all citizens by distributing the material resources of the community for the common welfare.

6. These findings are important to the R&R situation in Singrauli. While they reflect the same principles embodied in OD 4.30: Involuntary Resettlement, it provides an even more acceptable basis for the managers of the ReAPs and RAPs under the NTPC Power Generation project. The findings of the study will be disseminated to the R&R Cells.

III. Complete by end March 1998, a Study of Environmental Issues and Strategies in the Power Sector in India.

7. This study, partially financed by a US\$2.0 million contribution from the British Department for International Development (DFID), has three sets of outputs: seven Special Studies; Case Studies of the States of Bihar and Andhra Pradesh; and the National Synthesis. The key output of the study is the development of a decision-making tool which will enable government officials and institutions in India to evaluate alternative options for power development by taking explicit account of the environmental impacts as well as financial and economic implications.

8. The current status of implementation of the Study is as follows:

Special Studies

- * *Demand-Side Management*: Completed in July 1997 by Environment Energy Economics, Consultants.
- * *Inter-Fuel Substitution*: Completed June 1997 by Tata Energy Research Institute.
- * *Renewable Energy Options*: Completed June 1997 by Environmental Resource Management (ERM), India.
- * *Ash Management Disposal and Utilization*: Completed October 1996 by Water and Earth Sciences Association Limited, Canada (para. 12(a)).
- * *Mitigation Options for Power Development*: Completed June 1997 by Coal Research Establishment, UK in association with Ghose, Bose and Associates, Calcutta.
- * *Welfare Effects of Policy Changes*: Completed July 1997 by Sardar Patel Institute of Social and Economic Research, Ahmedabad; and Environmental Resources Management.
- * *Market-Based Instruments*: Completed June 1997 by Dr. S. K Gupta, Delhi School of Economics.

9. Bank staff have conducted national and state level workshops on the State and Special studies in May and August 1997. The Andhra Pradesh and Bihar case studies are expected to be completed in November 1997 and the National Synthesis by March 1998. Preliminary conclusions of the case studies are that:

- without a carbon tax, domestic coal will remain the mainstay of power generation in Andhra Pradesh and Bihar for the next decade. This emerges even after: (i) considering a wide range of alternatives, including Demand Side Management (DSM), renewables, imported gas and LNG; (ii) making fuel choices on the basis of economic costs; and (iii) allowing for the effect of economic pricing on the demand for power;
- the dependence on coal is likely to be substantially affected only with a very high carbon tax, perhaps amounting to at least US\$ 25 per ton of CO₂. The global benefits of reducing CO₂ are

accompanied by clear local benefits, due to a drop in emissions of SO₂, NO_x particulates, and ash;

- the implementation of DSM measures in Andhra Pradesh, although not substantially reducing coal use, cut of emissions of CO₂, SO₂, NO_x, particulates, and ash by about 10 percent. DSM also reduces the economic cost of supply and is a "win-win" resource. For Bihar, the results of DSM are still not clear;
- there substantial environmental benefits of straightforward measures to rehabilitate power plant and the transmission and distribution system, because of the reductions in emissions which follow improvements in heat rates and lower transmission and distribution losses; and
- the incremental costs of meeting the more stringent environmental guidelines prepared by the World Bank may be less than 5 percent. In the case of particulates, the standards can be met with modest investments in ESPs and improvements in their operation. Given the low sulfur content of Indian coals, SO₂ emissions can be handled at relatively low cost, if plants are properly sited. Imported coal to the extent that it appears in the fuel choice later in the planning period, may require the installation of FGD.

IV. Complete by end December 1998, a Clean-Coal Technology and Incentives and Options for Application Study.

10. The Ministry of Environment and Forests (MOEF) and DEA approved in June 1997, the financing of this study under the Environmental Management Capacity Building Technical Assistance Project. During discussions, it was agreed that the study would be on Coal Quality with the specific objectives of: (i) identifying and prioritizing technically feasible and economically and financially to improve coal quality through improved mining methods and increased coal preparation to reduce the negative environmental effects of coal use in India; and (ii) examining the conditions under which the identified measures can be implemented.

11. The study would be guided by a Steering Group headed by the Ministry of Environment and Forests, with participation of the Ministries of Power, Coal and Railways and agencies such as the State Electricity Boards, Coal India, NTPC and Indian Railways. From the Bank, the study will be managed by a Principal Mining Engineer. A Bank team visit to India to review progress in the implementation of the study is scheduled for early November 1997.

12. *Ash Management.* In addition to the above study, the Bank is supporting a larger agenda on coal and the environment in India. For example, ash management is a specific focus of NTPC's Environmental Action Plan (paras. 18-21 of Project-specific Action Program). Two other directly relevant studies are:

- (a) *Ash Management Disposal and Utilization Study* under the larger Environmental Issues in the Power Sector study (para. 8). This study was completed in October 1996 and covered ash pond management, ash disposal and ash utilization. It also developed guidance on engineering and operating practices and environmental mitigation strategies for ash management in coal fired power plants. The mitigation strategies are focused mainly on: the minimization of land use, reduction of fugitive dust, conservation of water, minimization of ground water pollution and enhancement of safety. The

recommendations of best practices were disseminated within the power sector in India; and

- (b) *Identification of Abandoned Open-Pit Mines which are Potentially Suitable for Ash Disposal* under the Coal Sector Environmental and Social Mitigation project. This study will cover all of Coal India's mines and will provide the following outputs: (i) a list of potential mines for ash disposal; (ii) limit conditions for ash disposal; (iii) physical conditions required for ash at supply point; (iv) preferred mode of transport from the power plant to the mine; (v) estimated operational costs for disposal inside the mine and alternative mine reclamation costs; and (vi) hydrological data at the mine site and possible effects of ash leachate on ground water quality.

V. Complete by mid-1999, a number of demonstration mining projects under the Environmental Management Capacity Building Technical Assistance Project

13. The objective of this component of the Environmental Management Capacity Building Technical Assistance Project is to finance best practice demonstration projects for specific mitigation measures such as land reclamation, closure of old abandoned mines, regeneration of ecology and so on. These demonstration projects will cover mining for all major and minor minerals other than coal which is covered under the coal Sector Environmental and social Mitigation Project (para. 12(b)).

14. The GOI constituted an Expert Committee on Mining in March 1997 to guide and monitor the implementation of this component. During a Bank review mission in June 1997, it was agreed that additional professional support would be required for implementation. The Center for Mining and Environment (CME), a Center of Excellence established by the Ministry of Environment and Forests and the Central Mining Research Institute (CMRI) established by the GOI's Department of Science have been selected to carry out this program. The CME will be responsible for the review of existing mining policies, standards and demonstration projects, while the CMRI will be responsible for institutional strengthening and training activities.

VI. Carry out over the next three months the intensive supervision of the components to strengthen the State Pollution Control Board in Uttar Pradesh and Madhya Pradesh under the Industrial Pollution Control and Industrial Pollution Prevention projects.

VII. Provide assistance to enhance the monitoring of hazardous waste generation in the Singrauli area to the Central Pollution Control Board under the proposed Hazardous Waste Management project.

15. Since the GOI and the States of Uttar Pradesh and Madhya Pradesh have agreed to proceed with the expeditious implementation of the Singrauli Development and Environmental Strategy (paras. 22-29 of Project-specific Action Program), with support from a new Bank/IDA-assisted free-standing project, Management has decided that the above actions would best be included in the proposed new project. This project would include not only investments for infrastructure and social development programs but provide technical assistance to appropriate agencies and institutions in the Singrauli area to enhance the monitoring and enforcement of environmental standards, regulations and laws. The area-specific focus of the proposed project would be complemented by the January 1997 approved IDA-assisted Environmental Management Capacity Building Technical Assistance Project which is providing assistance to the MOEF, CPCB and a range of national institutions with the explicit objective of enhancing monitoring, enforcement and compliance with environmental standards, regulations, and laws.

