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ACTION PLAN

Development of Comprehensive Environmental Pollution Abatement Action Plan for Critically Polluted Area - Korba

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COMPREHENSIVE ENVIRONMENTAL POLLUTION ABATEMENT ACTION PLAN FOR CRITICALLY POLLUTED AREA KORBA

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1. INTRODUCTION

1.1 Background.

- CPCB had earlier declared Korba as one of the 24 critically polluted areas.
- A Review Committee under the Chairpersonship of Chairman, CPCB and senior officers from CPCB and CECB as members was constituted to periodically review the pollution level and abatement measures.
- A joint meeting of CPCB and CECB along-with the representatives of the major industries of Korba region was held on 2nd-3rd July, 2008 to review the action plan for abatement measures.
- Further review meeting of CPCB and CECB along-with the representatives of the major industries of Korba region was held on 10th February, 2010 to review the action plan for abatement measures.

1.2 Location.

- Korba is located at 82^0 42' 30" E longitude and 22^0 21' N latitude in the eastern part of Chhattisgarh State. It is on the left bank of the Hasdeo River which is a major tributary of Mahanadi River. Ahiran is another river in the area that joins Hasdeo River.
- It is about 238 kilometers by road from capital city Raipur. Coal is the major natural resource available in this region. Major power generating units of the state have come up in Korba owing to huge reserves of coal.
- Korba is popularly known as power hub of India.

1.3 Digitized Map with Demarcation of Geographical Boundaries and Impact Zones.

- The industrial activities within 15 km radius from Korba town may be considered as critically polluted. Map showing location of industries has been shown at figure-1 of page 41.
- The digitized map shows townships of NTPC, CSEB (East), CSEB (West), BALCO and Small Industrial Area Korba.
- The digitized map at figure-2 of page 42 also shows prominent features like Hasdeo River and Barrage, Various Ash Dyke of Power Plants, Belgiri Nallah, Dengur Nallah and Township of Korba.

1.4 CEPI Score (Air, Water, Land and Total).

Table-1

Air	Water	Land	Total
67	57	72.50	83

With a CEPI index 83, Korba is placed at no. 05 in the list of critically polluted industrial areas/clusters in descending order.

1.5 Total Population and sensitive receptors.

- Presently the population of Korba is around 03 Lacs.
- A government hospital comprising of 100 beds, 03 colleges, 15 schools, 01 district court are situated in the township.
- Ministry of Environment & Forests, Government of India, New Delhi (MoEF), vide their office memorandum dtd. 15/03/2010, demarcated boundary for the industrial area for the purpose of Critically Polluted Areas and accordingly critical area in Korba comprises of:
  (a) Industrial areas and their townships of NTPC, BALCO, CSEB (East) & CSEB (West)
  (b) Korba Town

1.6 Eco-geological features.

1.6.1 Major Water Body – Hasdeo River
1.6.2 Ecological sensitive areas – Nil
1.6.3 Buildings or Monuments of Historical/archaeological/religious importance – Nil

1.7 Industry classification and distribution.

Table-2

			Large	Medium	Small
1.7.1	Highly Polluting industries	-	07	01	Nil
1.7.2	Red category industries	-	07	01	04
1.7.3	Orange and Green category industries	-	Nil	Nil	Nil
1.7.4	Grossly Polluting industries / Mines	-	04	Nil	Nil

MAJOR INDUSTRIES IN KORBA
(Situated Within the Critical Area)

1- M/s N.T.P.C. Ltd., Korba Super Thermal Power Station, Jamnipali, Korba (3x200=600 MW+3x500 = 1500 MW - Total 2100 MW)

2- M/s Chhattisgarh State Electricity Board (CSEB),
Hasdeo Thermal Power Station, Korba (West), Korba (4x210 = 840 MW)

3- M/s Chhattisgarh State Electricity Board (CSEB),
Korba Thermal Power Station, Korba (East), Korba
(4x50=200 MW+2x120 =240 MW = Total 440 MW)

4- M/s Chhattisgarh State Electricity Board (CSEB),
Dr. Shyama Prasad Mukherjee Thermal Power Plant, Korba (East), Korba (2x250=500 MW)

5- M/s Bharat Aluminium Co. Ltd., Balco Nagar, Korba
(Aluminium Smelter Plant [Alumina-3,30,000 TPA & Hot Metal (Fabrication)-3,70,000 TPA])

6- M/s Bharat Aluminium Co. Ltd., Balco Nagar, Korba (CPP-2)
(4 x 135 = 540 MW)

7- M/s Bharat Aluminum Company Limited (CPP-1)
Balco Captive Power Plant, Jamnipali, Korba
(4 x 65.5 = 270 MW)

8- M/s Gevra Open Cast Mines, SECL, Korba (35 MTPA)

9- M/s Dipka Open Cast Mines, SECL, Korba (25 MTPA)

10- M/s Kusmunda Open Cast Mines, SECL, Korba (10 MTPA)

11- M/s Lanco Amarkantak Power Private Limited, Village-Pathadi, Tehsil-Korba, Korba (2x300 MW TPP)

EXPANSION UNITS UNDER CONSTRUCTION, WHICH HAVE BEEN GRANTED ENVIRONMENTAL CLEARANCE BEFORE GOVERNMENT OF INDIA NOTIFICATION DATED 13/01/2010
(Situated Within the Critical Area)

1- M/s N.T.P.C. Ltd., Korba Super Thermal Power Station, Jamnipali, Korba (1x500=500 MW)

2- M/s Chhattisgarh State Electricity Board,
Hasdeo Thermal Power Station, Korba (West), Korba (1x500 = 500 MW)

3- M/s Bharat Aluminium Co. Ltd., Balco Nagar, Korba (4x300 = 1200 MW)

4- M/s Bharat Aluminium Co. Ltd., Balco Nagar, Korba (1x300 = 300 MW)

5- M/s Bharat Aluminium Co. Ltd., Balco Nagar, Korba (Alumina Smelter-5.5 LTPA)

6- M/s Lanco Amarkantak Power Private Limited, Village-Pathadi, Tehsil-Korba, Korba (660 MW + 660 MW TPP)

7- M/s Indo Sponge Power & Steel Private Limited, Rajgamar Road, Korba (Sponge Iron-100 TPD)

8- M/s Himadri Chemicals Industries, Jaghara, Korba (Liquid Coal Tar Pitch-30,000 TPD)

9- SSI Industries located in the industrail area Korba are mainly-
   (i) M/s Shiva Industries
   (ii) M/s Star Ferro Alloys
   (iii) M/s R.R. Ferro Alloys
   (iv) M/s Bhajanka Ferro Alloys
   (v) M/s Vinay Industries
   (vi) M/s Jaiswal Oxides.

Note: - All the SSI units are complying with the standards prescribed by the Board. Regular monitoring is being carriedout by Regional Office, Korba.

2. WATER ENVIRONMENT

2.1 Present status of water environment.

- River Hasdeo is the main water body in Korba which receives industrial as well as domestic effluent.
- Regular water sampling work is being done at upstream and downstream of Hasdeo River.
- River water quality for the last three years is as follows: -

Table-3

Town	River	Sample Collection Points	Year	Quality of Parameters				
				pH (pH Unit)	Suspended Solids (mg/lit)	Disoloved Oxygen (mg/lit)	BOD (mg/lit)	COD (mg/lit)
Korba	Hasdeo	Near Hasdeo Barrage	2008	6.9-7.5	69-89	6.0-7.2	1.4-2.7	8-20
			2009	7.2-7.3	42-58	6.7-7.6	1.2-1.6	20-26
			2010	7.1-7.1	43-47	6.0-6.5	2.0-3.3	30-38
		Near Village Urga	2008	6.8-7.4	85-133	6.1-7.4	1.8-3.3	16-46
			2009	7.0-7.3	60-96	6.0-6.8	2.2-3.8	22-40
			2010	7.0-7.1	52-65	5.3-5.9	3.0-4.1	40-48

As shown above, there is improvement of parameters in the year 2010 as compared to previous year. Presently, river is of class – B as per IS-2296 i.e. water quality is fit for bathing only.

2.2 Sources of water pollution.

2.2.1 Industrial - Ash pond overflow water from coal based power plants.

2.2.2 Domestic - Colonial waste from township of the power units as well as Korba township.

2.2.3 Others - Nil.

2.2.4 Impact on surrounding area - The quality of the river water is affected due to disposal of ash pond overflow which joins river water.

2.3 Details of Water Polluting Industries in the area/cluster.

- There are presently 06 coal based power plants with total generation 4700 MW and a aluminum smelter unit situated in the critically problem zone at Korba.
- The main source of water pollution is the overflow of ash pond in all the power plants.

2.4 Effluent Disposal Methods - Recipient water bodies etc.

- Traditional treatment of ash slurry method is being used in the all the power plants having ash pond with discharge shaft.
- The ash slurry gets settled in the ash pond and decanted/supernatent water is either recycled or discharged into the near-by nallah.
- All the ash ponds are situated near the natural streams/river such as Dengur Nallah, Belgiri Nallah, Jharia Nallah which ultimately joins into the downstream of the Hasdeo river.
- NTPC, LANCO, CSEB expansion project power plants have total recirculation system for ash pond overflow water. BALCO (CPP-2) has established High Concentrated Slurry System for disposal of ash slurry.

2.5 Quantification of wastewater pollution load and relative contribution by different sources viz industrial/domestic.

- Total waste water generated from the critically polluted area is approximately 2,00,000 KLPD.
- The breakup of the industrial as well as domestic waste water generated from the industries is tabulated below: -

Table-4

S. No.	Name of Industry	Industrial Waste Water (KLPD)	Domestic Waste Water (KLPD)
01-	M/s N.T.P.C. Ltd.*	26,009	9,350
02-	M/s CSEB (West)	37,920	7,607
03-	M/s CSEB (East)	43,003	6,509
04-	M/s Dr. Shyama Prasad Mukherjee (CSEB)*	23,212	Nil
05-	M/s BCPP (CPP-1-270 MW)	33,133	1,027
06-	M/s BALCO (CPP-2-540 MW)	12,211	182

* Total re-circulation of over flow water from the ash pond of NTPC & Dr. Shyama Prasad Mukherjee power plants has been established.

2.6 Action Plan for compliance and control of pollution.

2.6.1 Infrastructure facilities.

(A) Existing-

- Total re-circulation scheme for ash pond over flow has been adopted by NTPC and CSEB expansion project, Korba.
- BALCO (CPP-1-540 MW) has established High Concentrated Slurry Disposal System (HCSD) for fly ash.

(B) Proposed-

- CSEB (E & W) are in the process of establishing High Concentrated Slurry Disposal System (HCSD) along-with dry ash collection system. The work is under progress.
- BALCO (CPP-1-270 MW) has been directed to submit preliminary feasibility report for the adoption of HCSD system within the period of three months.
- BALCO is in the process of establishment of STP for the colonial waste generated in their residential colony. Details are awaited.

2.6.2 Pollution control measures installed by Industries.

- Central Monitoring Basin has been provided by M/s NTPC Ltd., M/s CSEB (Expansion Project) and M/s BALCO Captive Power Plant (540 MW).
- Ash pond/ash dykes have been provided in all the power plants for traditional treatment of ash slurry.
- Total re-circulation scheme for ash pond over flow has been adopted by NTPC and CSEB expansion project, Korba.
- High Concentrated Slurry Disposal System has been provided in M/s BALCO Captive Power Plant (540 MW).

2.6.3 Technology Intervention.

2.6.3.1 Inventorisation of prominent industries with technology gaps.

- In comparison to old traditional system of slurry disposal for fly ash, the new technology i.e. High Concentrated Slurry Disposal System (HCSD) requires less volume of water to handle as well as lesser land area.
- CSEB (E & W) are in the process of establishment of High Concentrated Slurry Disposal System (HCSD) along-with dry ash collection system. The construction work is under progress.

2.6.3.2 Identification of low cost and advanced cleaner technology for pollution control.

- BALCO is in the process of establishment of STP for the waste generated in their residential colony.

2.6.4 **Infrastructure Renewal.**

2.6.4.1 Details of existing infrastructural facilities.

- As mentioned at 2.6.1 (A).

2.6.4.2 Need of up gradation of existing facilities.

- In order to reduce pollution load in near by water bodies and to ensure optimum use of land, it is necessary to adopt High Concentrated Slurry Disposal System (HCSD). The requirement of water consumption is considerably low as compared to old traditional system of ash slurry disposal.

2.6.4.3 De-silting of water tanks, drains, rivulets etc.

- Ash dyke overflow of CSEB (E) is being discharged into the Dengur Nallah. Seepage water from abandoned red mud ponds also gets discharged into Belgiri Nallah. This two water bodies traverses 07 km to join finally into Hasdeo River. Therefore, de-silting of both the above Nallahs is needed to enhance its water holding capacity.

2.6.4.4 Construction of lined drains/connections.

- Risda, Podimar (Phase-I & II) ash pond of CSEB (E) and Parsabhata ash pond of BALCO are situated on the bank of Dengur Nallah and Belgiri Nallah respectively. To avoid any environmental hazard due to accidental collapse/sliding of ash pond embankment, particularly during monsoon, construction of lined/stone pitching of Belgiri Nallah and Dengur Nallah is required in the stretch which is adjacent to the said ash ponds.

2.6.4.5 Treatment and management of contaminated surface water bodies.

- Construction of small anicut in the downstream of Hasdeo River at a distance of 04 km from the confluence of Dengur Nallah and Hasdeo river is required to provide adequate settling time for settlables.
- Construction of small anicuts/check dams on Dengur Nallah is also required to provide adequate settling time.

2.6.4.6 Rejuvenation/Management Plan for important eco-geological features.

- Presently not required.

2.6.4.7 Carrying of effluent from industrial units locate in non-industrial locations to CETP facilities by lined drains/pipelines only and prevention of their disposal into city sewerage/surface drains.

- Establishment of CETP is presently not required.

2.6.4.8 Installation of Gen sets at CETPs.

- Not applicable.

2.6.5 **Managerial and Financial aspects.**

2.6.5.1 Cost and time estimates.

- Cost estimate of the various components included is tabulated as below: -

Table-5

S. No.	Components	Approx. Estimate Cost	Time Estimate
01-	Sewage Treatment Plant for Domestic Waste Water.	Rs. 04 Crores (@ Rs. 1,000 per cubic meter of effluent)	24 months from the date of sanction.
02-	Development of Infrastructure Facility		
	(a) Interception and diversion of sewage.	Rs. 02 Crores (Lump Sum)	18 months from the date of sanction.
03-	Cleaning/de-silting of Dengur Nallah.	Rs. 05 Crores (Lump Sum)	18 months from the date of sanction.
04-	Cleaning/de-silting of Belgiri Nallah.	Rs. 05 Crores (Lump Sum)	18 months from the date of sanction.
Total		**Rs. 16 Crores**	

2.6.5.2 Identified Private/Public sector potential investors & their contribution/obligation.

- Presently not available.

2.6.5.3 Government Budgetary support requirement.

- Presently no budget allocation available.

2.6.5.4 Hierarchical and structured managerial system for efficient implementation.

- Implementation of above mentioned activities except activities mentioned in item no. 1, 2, 3 & 4 at 2.6.5.1 and 2.6.4.5 are to be taken up by the industries individually. Accordingly, the industries themselves shall have to develop hierarchical and structured managerial system for efficient implementation.

2.6.6 **Self monitoring system in industries (ETPs etc.).**

- All the power plants and BALCO Aluminum Smelter Plant lying in Korba critical area have their own monitoring system for ETP.

2.6.7 **Data linkages to SPCB/CPCB (of monitoring devices).**

- All the power plants and BALCO Aluminum Smelter Plant situated in the Korba critical area have environmental cell along-with their own monitoring network. The data generated by the industries are not linked online with the Board. However, the monitoring reports are being submitted to the CECB regularly.
- Online monitoring system linked with websites of regional offices and head office of CECB are proposed to be included in the plan. Target date – 31/03/2011.
- M/s NTPC has already established 04 nos. of CAAQMS at Jamnipali, Korba. Also, procurement of 02 nos. of CAAQMS by M/s Lanco is under progress.
- M/s BALCO has provided 01 no. of CAAQMS at Siltara, Phase-II, Raipur which is in operation.
- M/s SECL (Gevra, Dipka & Kusmunda Mine Area) is in the process of procurement of CAAQMS at Korba.

3. AIR ENVIRONMENT

3.1 Present status of Air environment.

3.1.1 Critical location for air quality monitoring.

- Three nos. of monitoring stations have been selected by the Board in consultation with CPCB, New Delhi under NAMP programme.
- The main locations of monitoring stations are Pragati Nagar, Jamnipali, Korba, ITI, Rampur and Near Tehsil Office, Rampur.
- The air monitoring under NAMP programme is being carried out regularly since year 1995.

3.1.2 Present levels of pollutants in air.

- Air monitoring data under NAMP programme for the last three years are tabulated as below: -

Table-6

Town	Location	Year	Quality of Parameters			
			RSPM (mg/m3)	SPM (mg/m3)	Sulphur Di Oxide (mg/m3)	Nitrogen Di Oxide (mg/m3)
Korba	Pragati Nagar, Jamnipali	2008	89-114	189-237	11-14	18-23
		2009	64-141	140-292	10-15	18-24
		2010	81-113	173-238	10-14	18-22
	ITI, Rampur	2008	100-127	211-264	11-15	19-24
		2009	82-155	173-316	11-17	19-26
		2010	101-144	195-299	12-15	19-23
	Near Tehsil Office, Rampur	2008	92-120	188-249	11-15	19-23
		2009	70-155	156-320	11-16	18-25
		2010	105-132	212-279	11-15	19-23
Standard limit			**100**	**200**	**80**	**80**

3.2 Sources of Air Pollution.

- The main sources of industrial air pollution are Coal Based Power Plants and Smelter Plant.
- This area also comprises of large open cast mines of SECL i.e. Dipka, Gevra and Kusmunda. The main source of problem of fugitive emission in Korba are as below: -

1- Large scale transportation of coal.
2- Blowing of fly ash from ash pond specially during summer season.
3- Un-organized burning of coal in the areas i.e. Sitamani, Parsabhata and near by areas by the dwellers.
4- Heavy vehicular traffic.

3.3 Air Polluting Industries in the area/cluster.

- The main air polluting industries situated in the Korba critical area/ industrial cluster are M/s NTPC, CSEB (E & W), M/s BALCO (540 MW & 270 MW), M/s CSEB (Expansion Project 500 MW), M/s BALCO (Smelter Plant) and Dipka, Gevra and Kusmunda mines of SECL. List of industries is shown at 1.7.

3.4 Impact of activities of near by area on the CEPI Area.

- There are 02 Coal Based Power Plants having 600 MW capacity in operation in the near by area of the CEPI area. In addition to this 07 Coal Based Power Plants having 3770 MW capacity are proposed in the near by areas. List of proposed industries is shown at 1.7.

3.5 Quantification of the air pollution load and relative contribution by different sources.

- Total air pollution load generated from the critically polluted area is approximately 36 tonnes per day. This load has been estimated on the basis of maximum stack emissions observed in the recent past.
- The breakup of the industrial air pollution load generated are tabulated as below: -

Table-7

S. No.	Name of Industry	Estimated Industrial Air Pollution (TPD)
01-	M/s N.T.P.C. Ltd.	19.0
02-	M/s CSEB (West)	9.0
03-	M/s CSEB (East)	3.0
04-	M/s Dr. Shyama Prasad Mukherjee (CSEB)	1.0
05-	M/s BCPP (CPP-1 - 270 MW)	3.0
06-	M/s BALCO (CPP-2 - 540 MW)	1.0
	Total	**36.0**

3.6 Action Plan for compliance and control of pollution.

3.6.1 Infrastructure facilities.

(A) Existing-

- All the industries have developed ambient air quality network with High Volume Sampler and Stack Monitoring Instrument for monitoring of ambient as well as stack emission level.
- NTPC has already established four nos. of Continuous Ambient Air Monitoring Stations at Jamnipali, Korba.
- Opacity meters has been provided in all the power plants to monitor online dust emission from the stack.

(B) Proposed-

- Procurement of Continuous Ambient Air Monitoring Stations at M/s Lanco, CESB (E & W), Gevra and Dipka of SECL mines are in progress.

3.6.2 Pollution control measures installed by the individual sources of pollution.

(A) Existing-

- ESP's have been provided in all the power plants.
- Duel Flue Gas Conditioning System have been provided additionally to mitigate the excessive emission level.
- BALCO (CPP-1-540 MW) has upgraded one of its ESP's with Hybrid Bag Filter.
- CSEB (E & W) have also introduced Sulphur Smelter for SO_3 along-with Ammonia Fogging System to reduce the resistivity of fly ash.

(B) Proposed-

- Augmentation and retrofitting of ESP's in old power plants of M/s CSEB (E & W) and M/s BCPP are in progress. Target date-31/03/2011.
- Augmentation and retrofitting of ESP's in old power plants of M/s NTPC is also in progress. Target date-31/12/2012.
- Installation of Hybrid Bag Filters in unit no.-01 of 540 MW of Balco has been completed. Work for installation of Hybrid Bag Filter in unit no.-02 is in progress. Target date-31/03/2011.
- Installation of Hybrid Bag Filters in unit no.-03 & 04 of 540 MW of Balco is in progress. Target date-31/12/2011.

3.6.3 Technology Intervention

3.6.3.1 Inventorisation of prominent industries with technological gaps.

- Earlier emission level introduced by the Board was in the range of 150-250 Mg/Nm^3. Accordingly, pollution control equipments were designed and established in the old power plants.

- Due to non availability of adequate space for installation of additional fields of ESP, it was difficult to meet the prescribed standards of the Board by these old power plants.
- Poor quality of coal having more than 45% ash content is being used by all the power plants. This high ash content coal resulted in malfunctioning and frequent tripping of the existing pollution control devices.
- Feasibility of Captive Beneficiation plant within the plant premises may be explored and installed accordingly, instead of usage of high ash content coals in power plants. Proposal is being prepared by SECL.

3.6.3.2 Identification of low cost and advanced cleaner technology for air pollution control.

- With the advent of advanced technology, CECB revised the stack emission standards to 50 Mg/Nm^3 looking into the clusters of power plants being established.
- In order to meet the prevailing norms of the Board, all power plants have introduced Duel Flue Gas Conditioning System and BALCO has upgraded one of its ESP's with Hybrid Bag Filters.

3.6.3.3 Introduction and switch over to cleaner fuel/washed coal.

- Use of Clean/Washed Coal in the upcoming power plants in the near by areas shall be mandated to reduce the air pollution load.

3.6.4 Need of infrastructure Renovation.

3.6.4.1 Development of roads.

- Approach roads to these power plants are presently in bad shape resulting into heavy fugitive emissions due to large number of coal transportation and heavy traffic density.
- Repairing and widening of the RCC roads for the total length of 20 km approach road from pit head to various power heads are proposed in the development of infrastructure facilities.

3.6.5 Impact on CEPI score after installation/commissioning of full fledged air pollution control system.

- With the up-gradation of all existing pollution control system in the industries of Korba problem area, it is expected that the CEPI score will be considerably reduced.

3.6.6 Managerial and Financial aspects

3.6.6.1 Cost and time estimates.

- Cost estimate of the various components included is tabulated as below: -

Table-8

S. No.	Components	Approx. Estimate Cost	Time Estimate
01-	Development of Infrastructure Facility		
	Repairing and widening of the RCC roads for the total length 20 km.	Rs. 25 Crores (Lump Sum)	12 months from the date of sanction.
02-	Plantation	Rs. 05 Crores (Lump Sum)	Following monsoon season after the date of sanction.
03-	Setting up of CAAQMS with weather station monitoring instruments at Industrial Clusters, Korba.	Rs. 05 Crores (Lump Sum)	12 months from the date of sanction.
04-	Development of online facility for data linkage of CECB with the industries.	Rs. 01 Crore (Lump Sum)	12 months from the date of sanction.
Total		**Rs. 36 Crores**	

3.6.6.2 Identified Private/Public sector potential investors & their contribution/obligation.

- M/s BALCO is conducting study on carrying capacity of Korba region covering 25 km radius with epicenter as Balco unit.
- Target date of completion of carrying capacity study is 31/12/2011.

3.6.6.3 Government Budgetary support requirement.

- Presently no budget allocation available.

3.6.6.4 Hierarchical and structured managerial system for efficient implementation.

- Implementation of above mentioned activities except activities mentioned in item no. 1, 2, 3, 4 & 5 at 3.6.6.1 is to be taken up by the industries individually. Accordingly, the industries themselves shall have to develop hierarchical and structured managerial system for efficient implementation.

3.6.7 Self monitoring system in industries (Stacks, APCDs)

- All the industries have environment management cell with their own laboratory and monitoring system.

3.6.8 Data linkages to SPCB/CPCB (of monitoring devices)

- All the industries situated in Korba critical area have their monitoring network. The data generated by the industries are not linked online with the Board. However, all the data developed by the industries are produced before CECB regularly.
- Development of online facility for data linkage of CECB with the industries is proposed. Target date-31/12/2011.

4. LAND ENVIRONMENT

4.1 Soil contamination.

4.1.1 Present status of land environment supported with minimum one year analytical data.

- The general nature of the land of Korba region is barren. Single crop pattern exists in some patches of the land.

4.1.2 Critical locations for land/soil pollution assessment.

- Critical locations of fly ash disposal of various power plants lying in Korba problem area are tabulated as below: -

Table-9

S. No.	Name of the Power Plant	Fly ash generation (TPD)	Location and Distance of ash pond from the plant	Area of the ash pond (ha)
01-	M/s NTPC Ltd.	20,000	Dhanras Approx. 14 km	176
02-	M/s CSEB (West)	8,000	Dagniakhar Approx. 07 km	81.2
			Lotlota Approx. 09 km	88.5
03-	M/s CSEB (East)	4,200	Padimar (Phase-I) Approx. 09 km	20
			Padimar (Phase-II) Approx. 09 km	58.3
04-	M/s BALCO (CPP-1)	2,600	Dagniakhar (Lagoon-I) Approx. 06 km	20.2
			Dagniakhar (Lagoon-II) Approx. 06 km	24.2
			Balgikhar Approx. 5.5 km	26.7
05-	M/s BALCO (CPP-2)	5,100	Parsabhata Approx. 03 km	32.4
06-	M/s CSEB (expansion)	4,800	Pandripani Approx. 09 km	66.1
Total		**44,700**		

4.1.3 Present levels of pollutants in land/soil and ground water.

- A detailed study is required to ascertain the presence of heavy metals in ground water sources in the nearer vicinity of the ash ponds as well as abandoned red mud ponds.

4.1.4 Predominant sources contributing to or posing danger of pollution of land and ground water such as hazardous/toxic wastes or chemicals dumps/storage etc.

- As mentioned at 4.1.2.

4.1.5 Sources of Soil Contamination.

- As mentioned at 4.1.2.

4.1.6 Types of existing pollution.

- As mentioned at 4.1.3.

4.1.7 Remedies for abatement, treatment and restoration of normal soil quality.

- M/s CSEB (E) has declared Risda ash pond as abandoned. Soil blanketing work has been done with green cover.
- M/s NTPC has declared Charpara ash pond as abandoned. Soil blanketing work has been done with green cover.
- M/s BALCO has undertaken renovation work of catch pits and seepage channel. Separate pumps have been installed for recollection of seepage water from catch pit to pond. Industry has converted abandoned red mud ponds into the ash ponds for 540 MW power plant.

4.2 Ground water contamination.

4.2.1 Present status/quality of ground water.

- Critical locations of ground water monitoring stations and the present status/quality of ground water are tabulated as below: -

Table-10

S.No.	Parameters	Location of tube well sampling points		
		Near Dhanras NTPC	Near Charpara NTPC	Near CSEB Risda ash pond
01-	pH	7.3	7.2	7.2
02-	SS	9.0	6.0	11.0
03-	DO	6.5	6.6	5.4
04-	DS	18.0	13.0	18.0
05-	BOD	1.2	1.6	2.0
06-	COD	11.0	14.0	16.0
07-	T. Hardness	110.0	135.0	120.0
08-	Cyanide	-	-	ND
09-	Fluoride	-	-	0.2
10-	Arsenic	-	-	ND
11-	Cadmium	-	-	ND
12-	Iron	-	-	0.14

4.2.2 Source Identification.

- As mentioned at 4.1.2.

4.2.3 Ground water quality monitoring program.

- A detailed study is required to ascertain the presence of heavy metals in ground water sources in the nearer vicinity of the ash ponds as well as abandoned red mud ponds. However, industries are submitting their under ground water quality monitoring report to the Board regularly.

4.2.4 Action Plan for control of pollution including cost/time aspects.

- A detailed study to assess the actual status of contamination due to heavy metals in ground water is required to decide the further course of mitigative measures.

4.2.5 Treatment and management of contaminated ground water bodies, etc.

- As mentioned at 4.2.4.

4.2.6 Impact on CEPI score after abatement of pollution.

- With the proper and adequate collection of fly ash, disposal of fly ash through high concentration slurry system and through other beneficial use in cement plants, brick manufacturing and filling up of abandoned mines, the impact on land and ground water will be considerably reduced. This will lower down the CEPI score.

4.3 Solid waste generation and management.

As stated, the fly ash is the main solid waste generated in huge quantity in Korba from various power plants. Besides, other wastes generated in Korba area are detailed as below: -

4.3.1 Waste classification and Quantification.

4.3.1.1 Hazardous Waste

- The hazardous waste generated in Korba are classified and tabulated along-with their category and quantity as below: -

Table-11

S. No.	Hazardous Waste	Category	Quantity
01-	Land Fillable Wastes	11.2	6000 TPA
02-	Recyclable Wastes	5.1	900 KLPA
03-	Incinerable Wastes	33.3	10 TPA

- Secured Land Fill has been developed by BALCO for safe storage of spent pot lining. BALCO is also exploring the possibility for use of spent pot lining material as an alternative fuel as per MoEF directives. The industry is also exploring the possibility of its co-processing in cement kilns.
- Incinerable wastes are sold to registered recyclers.

4.3.1.2 Bio-Medical Waste.

- Total quantity of bio-medical wastes generated in Korba is around 50 kg/day and being disposed off by Deep Burial Method as per CPCB guidelines.
- A common facility at Burbuspur, Korba-Champa road, which is at a distance of 15 km from Korba township is being developed for Collection, Segregation, Transportation, Treatment and Disposal of bio-medical waste.
- A grant of amount of Rs. 03 crores may be provided for implementation of BMW as per its rule.

4.3.1.3 Electronic Waste.

- No survey has been conducted to account for electronic waste in Korba region. Inventorization of e-waste is being done. Target date of completion is 31/03/2011.

4.3.1.4 Municipal solid waste/Domestic waste/Sludges from ETPs/CETs/STPs and other industrial sources.

- Total quantity of municipal solid wastes/garbage generated in Korba is around 85 tonne/day and being disposed off by bio-composting/vermiculture method.
- A land fill facility at Burbuspur, Korba-Champa road, which is at a distance of 15 km from Korba township is being developed as per MSW rules for Collection, Transportation and Disposal of municipal solid waste by Nagar Nigam, Korba. Current status - Operational. Area of the land fill site is about 20.08 acres. The capacity of land fill area is around 100 TPD.

4.3.1.5 Plastic Waste.

- There is no virgin or recyclable plastic manufacturing unit in Korba. Plastic used in Korba region is made available by the traders.
- No survey has been conducted to account for plastic waste in Korba region.

4.3.1.6 Quantification of wastes and relative contribution from different sources.

- As mentioned above.

4.3.2 Identification of waste minimization and waste exchange options.

- In order to minimize waste, BALCO is exploring the possibility for use of spent pot lining material as an alternative fuel as per MoEF directives.
- Battery waste generated in Korba from industries, mines and household is collected and available lead is being recovered by a registered recycler.

4.3.3 Reduction/Reuse/Recovery/Recycle options in the co-processing of wastes.

- Industry wise utilization of fly ash is tabulated as below: -

Table-12

S. No.	Name of the Power Plant	Fly ash generation (TPD)	Fly ash disposal	Utilization (%)
01-	M/s NTPC Ltd.	20,000	Dhanras ash pond (176 ha)	71
02-	M/s CSEB (West)	8,000	1. Daganiyakhar ash pond (81.2 ha) 2. Lotlota ash pond (88.5 ha)	1.63
03-	M/s CSEB (East)	4,200	1. Pandimar ash pond-I (20 ha) 2. Pandimar ash pond-II (58.3 ha)	72
04-	M/s BALCO (CPP-1)	2,600	1. Daganiyakhar ash pond Lagoon-1 (20.2 ha) 2. Daganiyakhar ash pond Lagoon-2 (24.2 ha) 3. Balgikhar ash pond (26.7 ha)	44.66
05-	M/s BALCO (CPP-2)	5,100	Redmud pond no. 2 & 4 (32.4 ha)	46.55
06-	M/s CSEB (expansion)	4,800	Pandripani ash pond (66.1 ha)	-

4.3.4 Infrastructure facilities.

4.3.4.1 Existing TSDF/Incineration facilities including capacities.

- There is no TSDF facility in Korba region. However, common land fill site has been developed by Nagar Nigam, Korba at Burbuspur.

4.3.4.2 Present status/performance and need of up gradation of existing facilities including enhancement of capacities.

- Up-gradation of the existing land fill site developed by Nagar Nigam is required as per the schedule prescribed under MSW rule.

4.3.4.3 Treatment and management of contaminated waste disposal sites, etc.

- Bio-composting/vermi composting method of treatment is being adopted by Nagar Nigam at their land fill site for disposal of MSW.

4.3.4.4 Impact on CEPI score after proper management of Solid Wastes.

- With the proper management of solid waste generated in Korba problem area, impact on CEPI score will be considerably reduced.

5. PPP MODEL

5.1 Identification of project proposals (for both the option i.e. technology intervention and infrastructure renewal) for implementation under the PPP mode under the Action Plan.

- M/s BALCO is conducting study on carrying capacity of Korba region covering 25 km radius with epicenter as Balco unit.

5.2 Identification of stakeholders/agencies to be involved and to evolve financial and managerial mechanisms for implementation of PPP projects.

- M/s NTPC, BALCO, LANCO and SECL may be identified as an agency for financial support for implementation of PPP projects.

6. OTHER INFRASTRUCTURAL RENEWAL MEASURES

6.1 Green Belts.

- Approx. 6,88,000 no. of plant samplings has been planted during the year 2009. About 60 Lacs plantation has been done in and around Korba till date.
- As proposed in item no. 3 of 3.6.6.1, provision of Rs. 05 Crores has been kept for expansion of green belt in Korba and near by areas.

6.2 Development of Industrial Estate.

- No new industrial estate is proposed in Korba critical area.

6.3 Development/shifting of industries located in the non industrial areas to the existing/new industrial estates.

- No development/shifting of industries located in non industrial area is proposed in Korba critical area.

7. SPECIFIC SCHEMES

7.1 GIS-GPS system for pollution sources monitoring.

- At present, there is no GIS-GPS system for monitoring of pollution sources. There is a need to implement this system in Korba area. Implementation of GIS-GPS system is proposed to be done. Target date – 31/12/2011.

7.2 Hydro-geological fracturing for water bodies rejuvenation.

- No survey has been conducted to account for hydro-geological fracturing for water bodies rejuvenation in Korba region.

7.3 In-situ remediation of sewage.

- Not done.

7.4 Utilization of MSW inert by gas based brick kilns.

- Not done.

7.5 Co-processing of wastes in cement industries.

- Trial run for the use of spent pot lining (which is a hazardous wastes generated from Aluminum Smelter) in the kilns of M/s Lafarge India Private Limited, Sonadih, District-Raipur cement plant as alternative fuel has been undertaken. Next course of action for its regular use is under consideration.

8. PUBLIC AWARENESS AND TRAINING PROGRAMMES

- There are 250 no. of schools being covered under eco clubs for carrying out environmental activities/programmes in Korba area.
- Chhattisgarh Environment Conservation Board organizes various awareness programmes in Korba area.
- Industries situated in Korba problem area are also involved in regular awareness campaign within and near by surrounding villages.

9. OVERALL IMPACT OF INSTALLATION/ COMMISSIONING OF POLLUTION CONTROL EQUIPMENTS/MEASURES ON THE CEPI SCORE

- With the up-gradation of all existing pollution control system and adoption of new technology such as High Concentrated Slurry Sytem, substitution of Old Smelter Plant by new Smelter based on Pre-baked technology etc. by the industries in Korba critical area, CEPI score will be considerably reduced.

10. ASSESSMENT OF TECHNO-ECONOMICAL FEASIBILITY OF POLLUTION CONTROL SYSTEM IN CLUSTERS OF SMALL/MEDIUM SCALE INDUSTRIES

- Not done.

11. EFFORTS SHALL BE MADE TO ENCOURAGE USE OF BIO-COMPOST AND BIO-FERTILIZER ALONGWITH THE CHEMICAL FERTILIZER IN THE STATE TO MINIMIZE THE UNUTILIZED CHEMICAL FERTILIZER RUN-OFF INTO THE NATURAL WATER RESOURCES FROM AGRICULTURE FIELDS

- Agreed.

12. SUMMARY OF PROPOSED ACTION POINTS

12.1 Short Term Action Points (upto 1 year, including continuous Activities)

Table-13

(A) By Industries-

S. No.	Action Points (including source & mitigation measures)	Responsible Stake Holders	Time Limit	Cost	Remarks
01-	Implementation of action plan for 100% use of fly ash.	1. M/s CSEB (E)	31/12/2010	-	Construction of silos for collection of dry fly ash is under progress.
		2. M/s CSEB (W)	31/12/2010		
		3. M/s CSEB (Expansion Project)	31/12/2010		
		4. M/s Lanco Amarkantak Power Ltd.	31/10/2010		
		5. M/s BALCO	31/12/2010		
		6. M/s NTPC	31/12/2010		
02-	Adoption of High Concentrated Slurry Disposal System.	1. M/s CSEB (E)	30/06/2011	-	-
		2. M/s CSEB (W)	30/06/2011		
03-	Setting up of CAAQMS in Korba City.	M/s Lanco Amarkantak Power Ltd.	30/10/2010	-	-
04-	Measures for reduction of fluoride consumption.	M/s BALCO	31/12/2010	-	Construction of new Smelter based on pre-baked technology is under progress. Aluminium Fluoride consumption shall not exceed 10 kg/T of Aluminium production as per the CREP guidelines.
05-	Utilization the SPL or sell/dispose used SPL to the actual users in approved processes on regular basis.	M/s BALCO	31/12/2010	-	Trial run for the use of spent pot lining (which is a hazardous wastes generated from Aluminum Smelter) in the kiln of near by cement plant as alternative fuel has been undertaken. Next course of action for its regular use is under consideration

06-	Widening & Repairing of the main roads in the coal mining region.	1. M/s Gevra Mines, SECL	31/07/2011	-	-
		2. M/s Dipka Mines, SECL	31/07/2011		
		3. Kusmunda Mines, SECL	31/07/2011		
07-	Construction of anicut in the down stream of Hasdeo River.	Water Resource Dept.	31/12/2011	-	-
08-	Construction of check dams in dengur nallah.	M/s CSEB (E)	31/12/2011	-	Three sand dams have already been constructed in the down stream of the nallah by M/s CSEB (E).

(B) By Govt. Authorities-

S. No.	Action Points (including source & mitigation measures)	Responsible Stake Holders	Time Limit	Cost	Remarks
01-	Repairing and widening of the RCC roads for the total length 20 km.	Public Works Department	01 year from the date of sanction.	Rs. 25 Crores (Lump Sum)	-
02-	Plantation	Forest Department	Following monsoon season after the date of sanction.	Rs. 05 Crores (Lump Sum)	-
03-	Setting up of CAAQMS with weather station monitoring instruments at Industrial Clusters, Korba.	Chhattisgarh Environment Conservation Board	01 year from the date of sanction.	Rs. 05 Crores (Lump Sum)	-
04-	Development of online facility for data linkage of CECB with the industries.	Chhattisgarh Environment Conservation Board	01 year from the date of sanction.	Rs. 01 Crore (Lump Sum)	-

12.2 Long Term Action Points (more than 1 year)

Table-14

(A) By Industries-

S. No.	Action Points (including source & mitigation measures)	Responsible Stake Holders	Time Limit	Cost	Remarks
01-	Augmentation of retrofitting the ESPs for meeting the particulate matter to 50 mg/Nm^3.	1. M/s NTPC Ltd.	30/09/2011	-	-
		2. M/s CSEB (E)	30/09/2011		
		3. M/s CSEB (W)	30/09/2011		
		4. M/s BALCO (540 MW Power Plant)	30/09/2011		
		5. M/s BALCO (270 MW Power Plant)	30/09/2011		
02-	Adoption of High Concentrated Slurry Disposal System.	M/s BALCO (270 MW Power Plant)	31/12/2011	-	-
03-	Installation of STP for treating the domestic wastewater from the colony.	M/s BALCO	31/12/2011	-	-
04-	Setting up of CAAQMS in Korba City.	1. M/s CSEB (E)	31/12/2011	-	-
		2. M/s CSEB (W)	31/12/2011		
		3. M/s Gevra Mines, SECL	31/12/2011		
		4. M/s Dipka Mines, SECL	31/12/2011		
		5. M/s Kusmunda Mines, SECL	31/12/2011		
05-	Setting up of Coal Washery at Korba.	M/s Kusmunda Mines, SECL	31/12/2011	-	-

06-	Provision for supply of raw coal to the coal washeries through closed type belt conveyor and provision of rail corridor for up coming washeries.	1. M/s Gevra Mines, SECL	31/12/2012	-	-
		2. M/s Dipka Mines, SECL	31/12/2012		
07-	Extension of plantation on over burdens and proper reclamation of mines.	1. M/s Gevra Mines, SECL	31/12/2011	-	Area to be covered under plantation is to be identified by 31/12/2010 and the afforestation preferably with local species is to be completed before onset of monsoon i.e. 31/07/2011.
		2. M/s Dipka Mines, SECL	31/12/2011		
		3. Kusmunda Mines, SECL	31/12/2011		
08-	Back filling of abandoned mine of SECL at M/s Manikpur Open Cast Mines with the fly ash of power plants.	1. M/s SECL Korba Area	31/12/2011	-	M/s Manikpur Open Cast Mines of SECL is situated at distance of about 04 km from Korba township. The area of this inactive mine is about 1700 ha. This mine is not in operation since five years. This mine pit has huge volume which can accommodate fly ash of near by power plants for years. SECL management should declare the said mines as abandoned and submit of feasibility report within a period of six months for back filling with fly ash of near by power plants. This may prove long term & viable option for disposal of fly ash generated in Korba.

(B) By Govt. Authorities-

S. No.	Action Points (including source & mitigation measures)	Responsible Stake Holders	Time Limit	Cost	Remarks
01-	Sewage Treatment Plant for Domestic Waste Water.	Municipal Authority & CECB	31/12/2012	Rs. 04 Crores	-
02-	Interception and diversion of sewage.	Municipal Authority	31/12/2011	Rs. 02 Crores (Lump Sum)	-
03-	Cleaning/de-silting of Dengur Nallah.	Water Resources Department	30/09/2011	Rs. 05 Crores (Lump Sum)	-
04-	Cleaning/de-silting of Belgiri Nallah.	Water Resources Department	30/09/2011	Rs. 05 Crores (Lump Sum)	-

- Order for constitution of Local Committee comprising of stack holders, district administration along-with municipal corporation of Korba under Korba Action Plan is being issued shortly.

13. ADDITIONAL INFORMATION-

Improvements being done since the declaration of critically polluted area: -

1- Installation of additional bag filters with ESP in series has been completed in unit no. 01 & 02 of 540 MW power plant in M/s BALCO.
2- M/s CSEB (E & W) have placed order for installation of High Concentrated Slurry Disposal System. Presently, civil work is under progress.
3- Ash silo have been constructed in both the power plants (M/s CSEB-E & W).
4- Retro fitting work in ESP has been completed by M/s BCPP.
5- M/s BALCO & M/s Lanco have installed CAAQMS.
6- M/s BALCO has dis-mantled their old smelter unit to switch over to prebaked technology in order to minimize the fluoride emission level. The work of new smelter plant is under erection.

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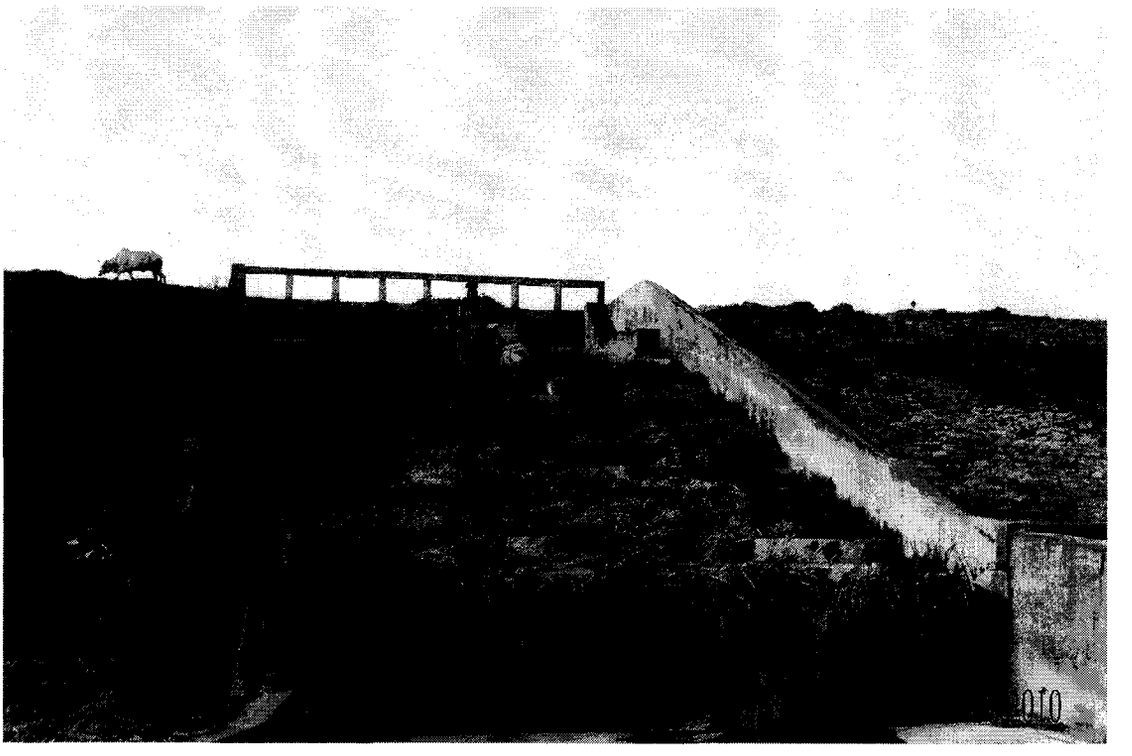

Photo-1 : Dhanras ash pond overflow point showing zero discharge status of M/s NTPC Ltd.

Photo-2 : Display of online monitoring system at main gate of M/s NTPC Ltd.

Photo-3 : Installation of CAAQMS of M/s NTPC Ltd.

Photo-4 : Civil work under progress of HCDS system of M/s CSEB (E)

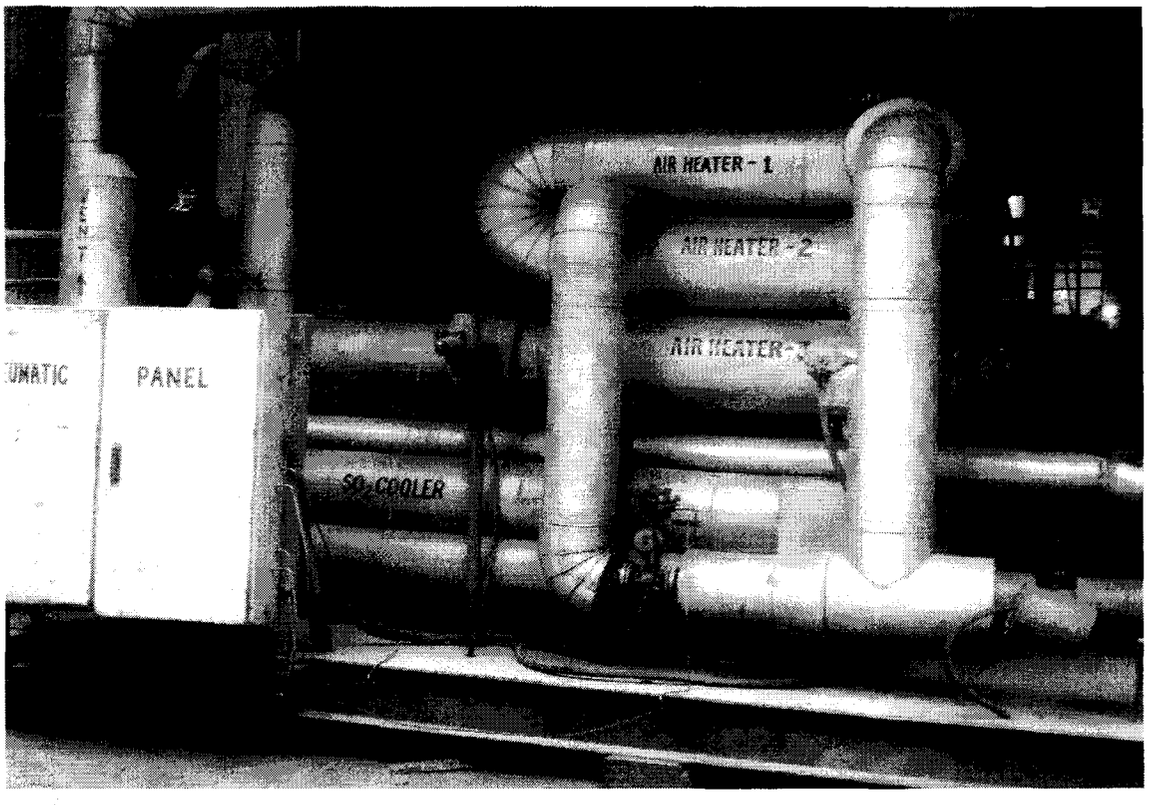

Photo-5 : Duel flue gas conditioning system of M/s CSEB (E)

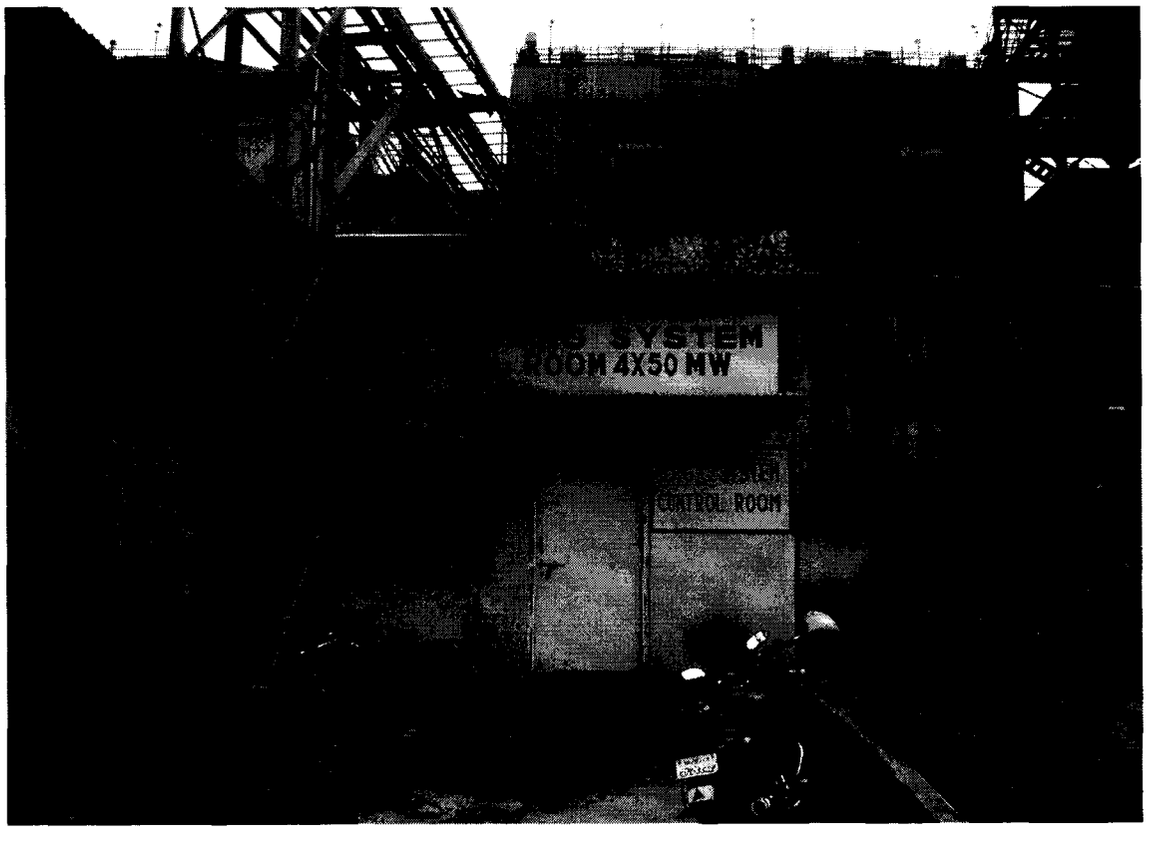

Photo-6 : Control room of duel flue gas conditioning system of M/s CSEB (E)

Photo-7 : Work under progress for conveyer system of HCSD of M/s CSEB (E)

Photo-8 : Work under progress for construction of silo in M/s CSEB (E)

Photo-9 : Construction of silo for dry ash collection of M/s CSEB (W)

Photo-10 : Construction of conveyer system of M/s CSEB (W)

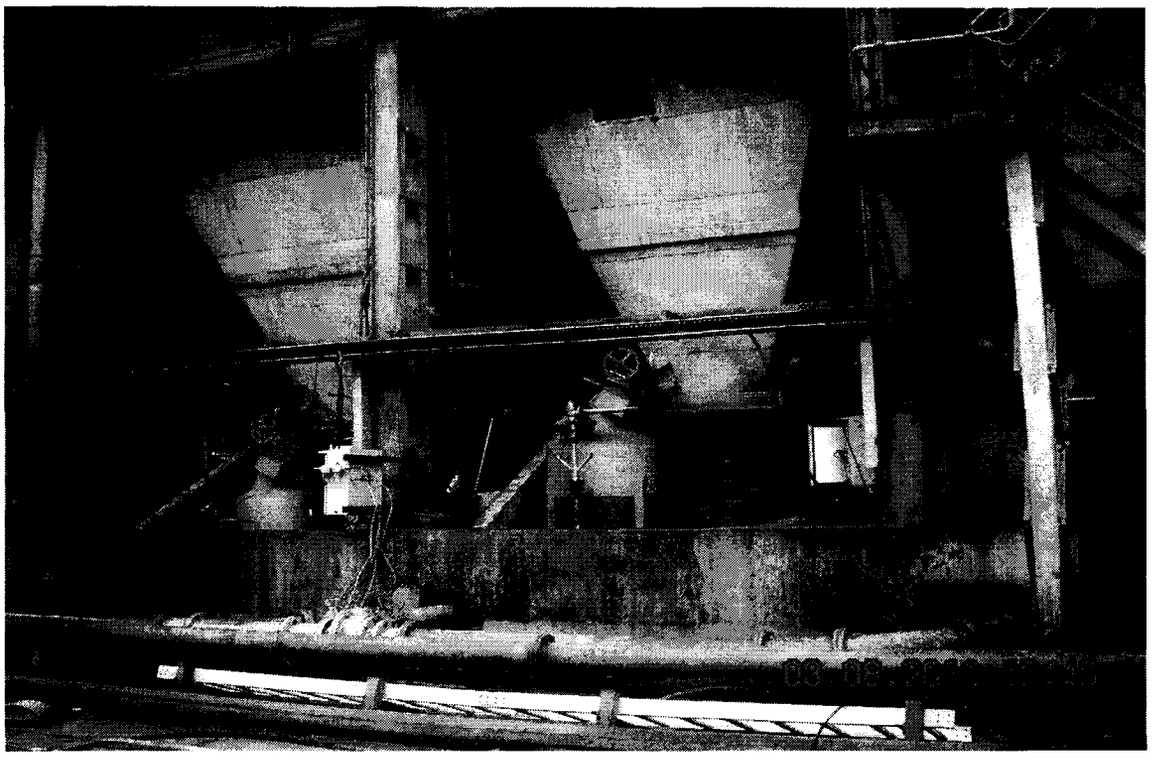

Photo-11 : Hopper bottom for preparation of HC slurry M/s CSEB (W)

Photo-12 : Installation of control panel for HCDS system of M/s CSEB (W)

Photo-13 : Silos under final stage of installation for dry ash collection of M/s CSEB (expansion project)

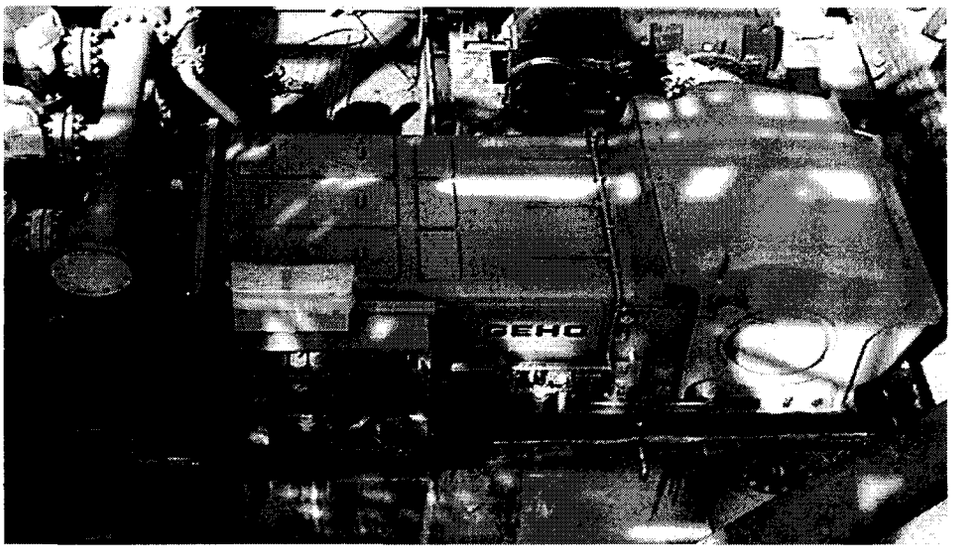

Photo-14 : Pump for HCSD System of M/s BALCO (540 MW)

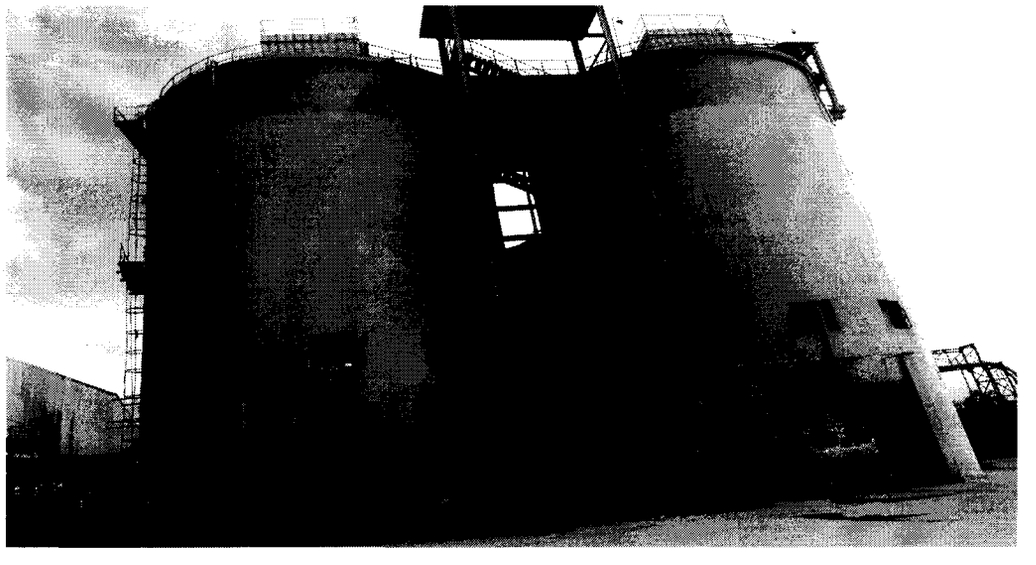

Photo-15 : Ash Silo for collection of dry fly ash of M/s BALCO (540 MW)

Photo-16 : A view of ash pond based on HCSD System of M/s BALCO (540 MW)

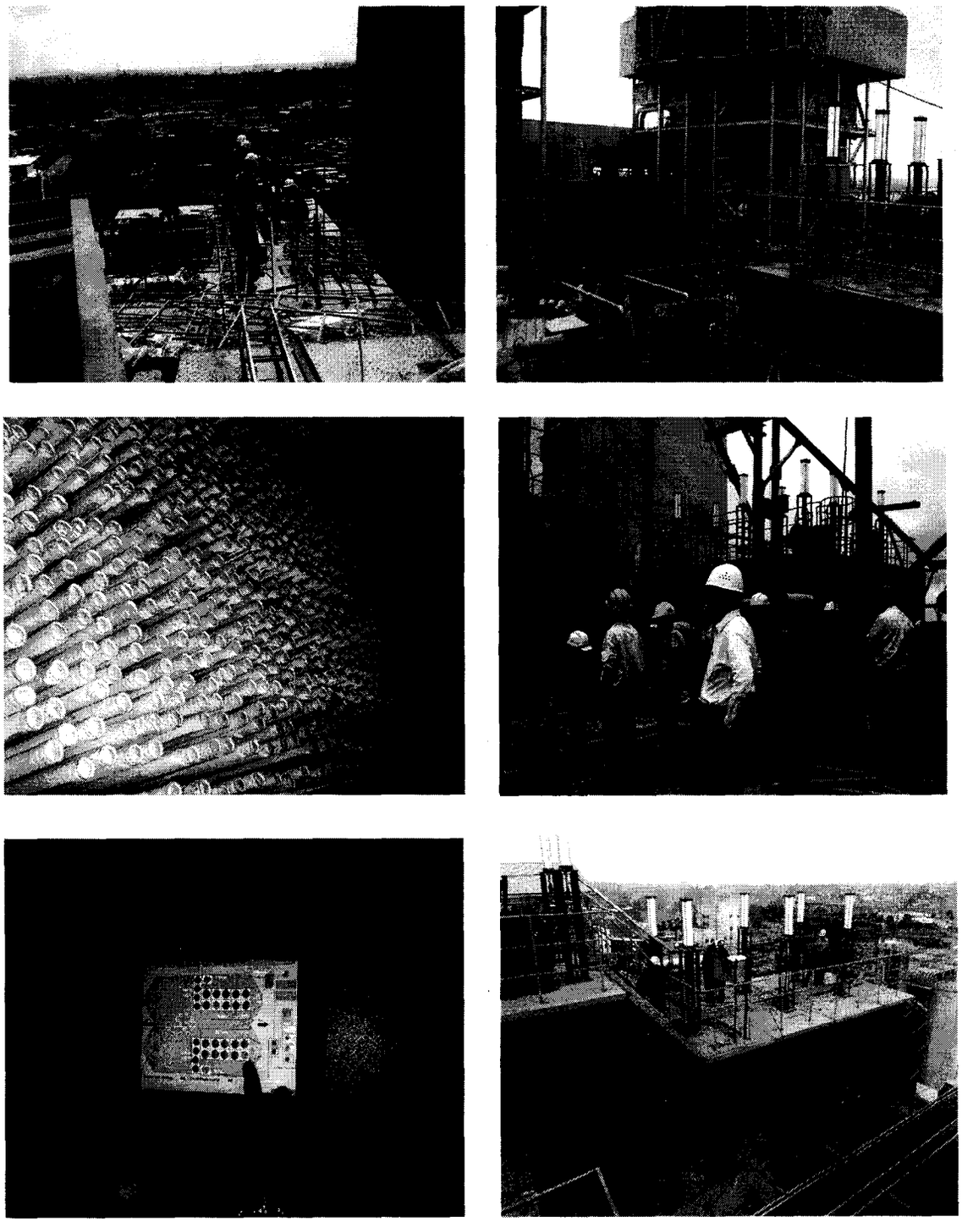

Photo-17 : Photographs showing upgradation work of ESP by installation of Hybrid Bag Filter by M/s BALCO (540 MW)

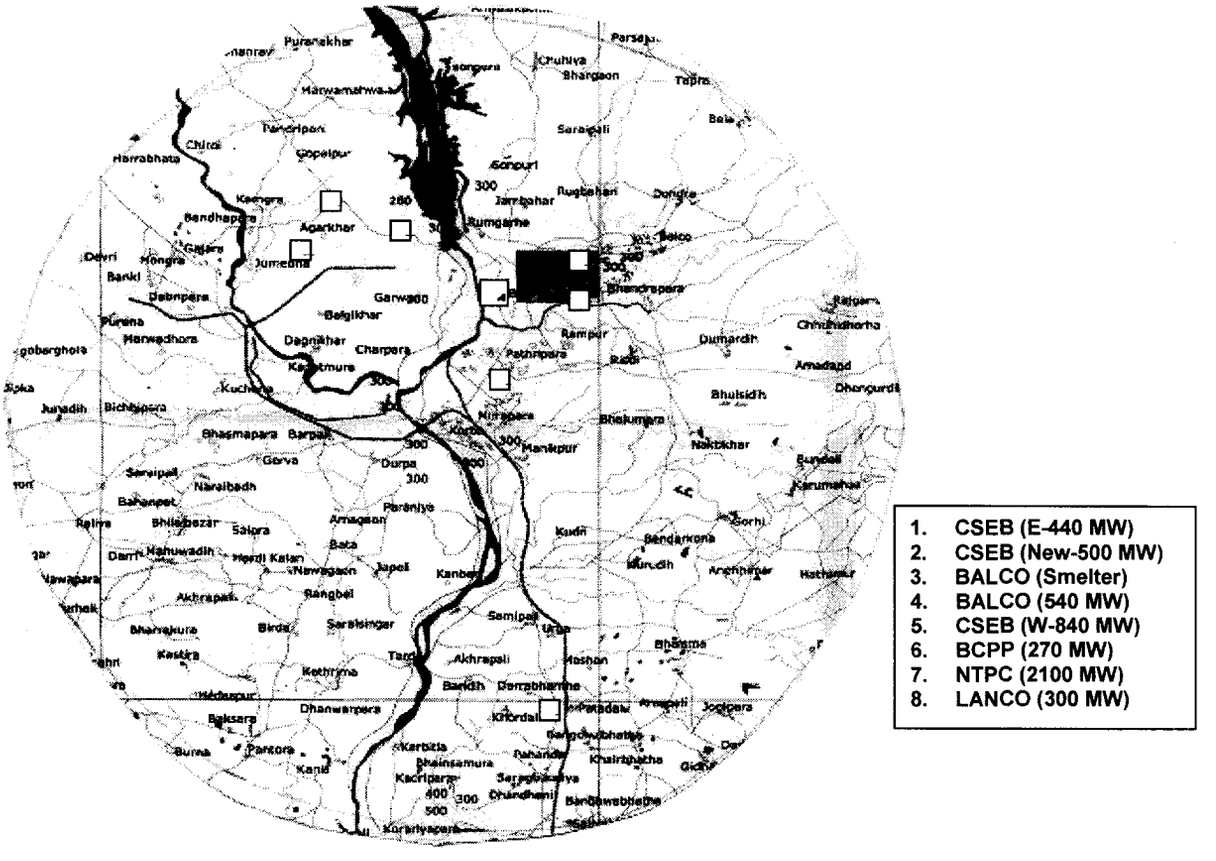

Figure-1 : Showing Korba region of 15 km radius with Korba township as epicenter

Figure-2 : Showing Industrial setup of M/s NTPC, M/s CSEB (E), M/s CSEB (W) & M/s BALCO with their townships at Korba