ACTION PLAN FOR ABATEMENT OF POLLUTION IN CRITICALLY POLLUTED INDUSTRIAL CLUSTERS (IB VALLEY-JHARSUGUDA AREA)

ORISSA POLLUTION CONTROL BOARD

BHUBANESWAR

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1.0 Background

Environmental pollution in industrial clusters has been a national issue particularly in a period which is witnessing a rapid industrial growth. The environmental problem in a cluster is a complex multi-dimensional problem which is often difficult to measure and manage. In order to address such complex problem Central Pollution Control Board (CPCB) developed a Comprehensive Environmental Pollution Index (CEPI). This is a rational number to characterize the environmental quality of an industrial cluster following an algorithm of source-receptor-pathway framework. Increasing value of CEPI indicates adverse impact on environment. The objective is to identifying the planning needs for abatement strategies for polluted clusters and eventually bringing down the level of impact to an acceptable level. Industrial clusters having aggregated CEPI score of 70 and above is considered a critically polluted cluster. In Orissa there are three industrial clusters; Angul-Talcher, Ib-valley and Jharsuguda with CEPI score of more than 70, thus considered as critically polluted. However, Ib-valley and Jharsuguda industrial area are adjacent and have overlapping geographical area, thus for clarity and comprehensiveness these two areas are considered to be one.

The action plan for abatement of pollution in the critically polluted clusters was prepared on the basis of previous studies conducted by the SPCB and data collected during various monitoring program.

2.0 Objective

Since the CEPI score of Ib valley area is 74.0 and that of Jharsuguda is 73.34, which is beyond, 70 a detailed action plan for pollution prevention and control as well as remediation of various environmental components is formulated as per the terms of reference (TOR) suggested by Central Pollution

Control Board, New Delhi communicated to Orissa State Pollution Control Board vide CPCB letter Dated 15/06/2010. The objective of the entire exercise is to:

1. Determine the boundary of the industrial cluster
2. Determine the critical environmental issues within the cluster
3. Determine the critical environmental parameters which needs to be addressed through an appropriate action plan
4. Draw up an action plan for abatement of environmental pollution in the cluster
5. Engage with various stakeholders for refinement of the action plan and effective implementation.

Though efforts were made to prepare this action plan to fulfill the above objective, consultation with the stakeholders could not be made possible since only two weeks time was made available to the SPCB for preparation of this action plan.

3.0 Ib valley-Jharsuguda area

The area was earlier characterised by mining and trading activities but a number of sponge iron plants, thermal power plants, aluminum smelters as well as iron and steel plants have come up in the region in the past few years. Huge deposits of coal, proximity to Hirakud, one of the largest reservoirs have made Ib valley-Jharsuguda area as one of the most attractive and globally most competitive destination for mineral based industries. The region makes an ideal site for production of iron & steel, thermal power and aluminum. Small scale industries like rice mills, brick kilns and stone crushers are also found in clusters in this region. The cluster is rich in mineral resources, particularly coal, iron ore and has a high level of mineral based industries.

With the nature of industrial activity, suspended particulate matter (SPM), Sulphur dioxide (SO_2) and PM_{10} are the three critical parameters in air quality management. Fluoride which is emitted from the smelting process is the most potent to cause extensive damage to agriculture and forest.

Hirakud reservoir is the lifeline of the entire industrialization process in the region. Run off contamination is the major problem in the region. The

runoff in this region is likely to be contaminated with fluoride since the smelter in this region would annually consume about 80,000 tons of fluoride bearing materials. Fluoride level of more than 1.5 mg/l in water is known to cause fluorosis, a deadly disease for which there is no cure, if contaminated water is consumed for a prolonged period. Besides this, run-off from various stock piles like coal, iron ore and char also has potential for water pollution

At present rate, the solid waste generation is about 4.5 MTPA mostly from power plants, steel plants and aluminum smelter. Conversion of natural land into dump sites would enhance soil erosion and the rate of siltation of the reservoir is likely to be accelerated further.

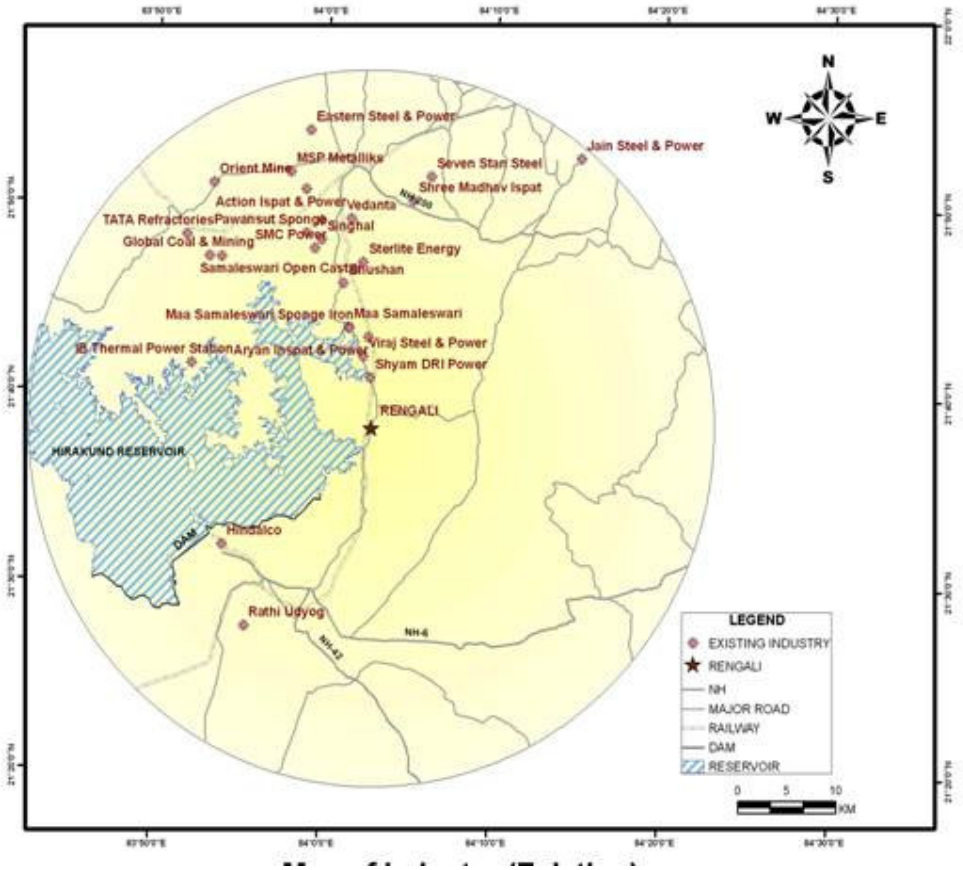

Figure-3 Location of Ib valley-Jharsuguda industrial area

Sensing that Ib valley-Jharsuguda area is an emerging industrial hub, OPCB has initiated study to prepare a Regional Environmental Management Plan (REMP) through NEERI, Nagpur. For demarcation of boundary, evaluating the

environmental quality, pollution load and drawing up the action plan, inputs from this study was extensively used. Inputs from OPCB's own monitoring and survey were also used in this exercise.

4.0 Demarcation of geographical boundary

Determination of the boundary of the critically polluted cluster started with identifying and locating the industries on a map. For this purpose survey of India topo sheets was collated and the Ib valley-Jharsuguda area was digitized. The report of CPCB for critically polluted cluster identifies Ib valley and Jharsuguda as two separate clusters. However, in reality these two areas are adjacent or even having over lapping areas. While the coal mines cover the valley area, industries are mostly in and around Jharsuguda. There is a strong symbiosis between the industries and mines in the Ib valley area and Jharsuguda area. On this ground it is thought appropriate that these two areas be combined and action plan be prepared for the combined area. For this purpose the cluster is termed as "Ib valley-Jharsuguda" area. The positions of existing polluting industries were marked on the collated topo sheet. The industries and mines that have an impact CEPI scores was considered for this purpose.

There are about 27 major industries already existing in the region and proposals are already approved for further 22 more Industries. The total industrial belt in the area has been divided into four sectors namely Aluminum smelters, Thermal power plants, and steel industries including sponge iron and coal mines.

There is one aluminum smelter in the region namely Vedant Aluminum Ltd., at Jharsuguda. There are 6 thermal power plants existing in Ib valley and Jharsuguda region. Out of 6 existing thermal power plant, 5 have proposed for expansion and there are total 18 existing steel industries including sponge iron Industries, out of these 9 have their expansion plans. The capacities of the industrial sectors in this cluster have grown many times during past few years. Current Sector-wise scenario of the industries is presented in Table-1.

Table-1 : Industrial scenario in Ib valley-Jharsuguda area

Sl. No	Industrial sector	Numbers	Capacity
1.	Coal mines	13	44 MTPA
2.	Thermal power plants	6	2012 MW
3.	Iron and Steel including sponge iron plants	11	2.85 MTPA
4.	Aluminum smelter	1	0.25 MTPA
5.	Coal Washeries	3	6.0 MTPA
6.	Other Red - B industry	72	--
	Total	106	

The boundary was drawn by including all the major polluting industries and mines which are under operation and closely located. While determining the boundary care was taken to include areas having common environmental problems as per the public opinion expressed in the local news papers and also expressed during various public hearings that took place in the past for different projects in the area. The summary of industries in terms of RED category industries is shown in Table-2.

Table-2 Summary of RED industries in Talcher-Angul area

Sl. No.	Type of industries	Nos
1	RED-A (17 categories of highly polluting type)	25
2	RED-B (54 categories of polluting type)	75
3	RED-B (Mines)	13

5.0 Environmental issues in the cluster

Nature and magnitude of environmental issues relevant to an area forms the basis on which action plans are drawn. To identify the critical environmental issues in this area, all major local news papers and proceedings of public hearing conducted during last two years were scanned and the environmental issues raised were aggregated and summarized as in the following section. Because of paucity of time direct interaction with stakeholders could not be made possible. The identified issues were then corroborated with the various monitoring studies conducted by OPCB, interim

report on Regional Environmental Management Plan prepared by NEERI, Nagpur.

1. There has been a rapid growth of iron and steel industries around Jharsuguda. The problem of air pollution particularly black dust from the sponge iron plants is a major problem in this area.
2. An aluminum smelter plant is operating close to Bheden river which is discharging its water to Hirakud reservoir. Since the smelter plant handles substantial quantity of fluoride bearing materials it may find its way to Bheden River and contaminate the water.
3. During monsoon the run-offs from various stock piles like coal, minerals, solid waste etc flows down the area and gets discharged to river Ib, Bheden and Hirakud reservoir through its feeder streams.
4. The ambient temperature of this area rises close to 50°C and the general perception that the temperature of this area is going high on three accounts. One, the industrial process like thermal power generation, aluminium smelting and iron and steel making are all being high temperature operation releases a lot of heat to the environment. Two, after the coal mines are exposed the black surface of coal mines causes increase in temperature. Thirdly, the exposed coal seam and stack yards catch fire during summer month due to self oxidation. Continuous burning of coal is also thought to be one of the causes of rising temperature.
5. The sewage from Jharsuguda and Brajarajnagar town is discharged to river Ib without any treatment causing contamination of river water.
6. Increasing amount of land is being converted to ash ponds and solid waste disposal facilities. This process converts agricultural land to unproductive barren land.
7. Groundwater level around the mining area is depleting due to extraction of ground water by the mining activity. This causes acute shortage of water in the surrounding villages.

6.0 State of environment

The State Pollution Control Board, Orissa monitors emissions and discharges of the concerned industries and mines and also monitors environmental parameters of the area. The Board takes peoples feedbacks during public hearings and during redressal of public grievances. The local news papers for last two years were scanned all the environmental issues raised through them were also aggregated to filter out the issues. After the area was tagged as critically polluted an intensive survey was conducted by OPCB on critical parameters and they were compared with either the existing norms stipulated by the Ministry of Environment and Forest or the limits suggested in the report on "Criteria for Comprehensive Environmental Pollution Index" released by CPCB. The critical parameters were chosen by linking the environmental issues and relevance of the parameter. The abstract of data collected from OPCB's own monitoring and data collected by NEERI, Nagpur during preparation of REMP for Jharsuguda area is summarized in Table

Air quality					
Parameter	**Avg. Result**	**Standard**	**Total Sample**	**Nos of sample Exceeded**	**Percent exceedance (%)**
RPM	60	100	118	06	5
SPM	154.77	200/500	119	11	9
SO_2	10	80	119	00	0

Water quality					
Parameter	**Avg. Result**	**Standard**	**Total Sample**	**Nos of sample Exceeded**	**Percent exceedance (%)**
Fluoride	0.094	1.5	15	00	0
Hg	0.0009	0.001	15	00	0
Cd	0.009	0.005	15	12	80
BOD	2.72	8.00	15	00	0

Parameter	**Avg. Result**	**Standard**	**Total Sample**	**Exceeded**	**Percent exceeded (%)**
Fluoride	0.327	1.00	19	01	5
Cd	0.0087	0.005	19	05	26
Hg	0.00084	0.001	19	00	0

7.0 Action Plan for abatement of pollution

Based on the background information, monitoring reports, interim report prepared by NEERI, Nagpur for REMP of this area and factoring into the public concerns on local environmental issues voiced through the local news papers and through the public hearings conducted by OPCB for the proposed projects in this area, an action plan for Ib valley-Jharsuguda area is prepared. In this action plan, sector specific abatement strategies were drawn up. Improvement in environmental management practice, technological up-gradation in process and pollution control, development of adequate infrastructure remained the thematic area. Sector-wise action plan is prepared after a few rounds of brain storming sessions between the officers, including the concerned Regional Officer of OPCB. The plan and possible target date to achieve it, is presented in the Tables 6 to Table 10.

Table-6 : THERMAL POWER PLANT

Sl. No.	Action plan	Target Date	Issues being addressed
1.	All TPPs to install ESP/BF to meet the emission standard of 50 mg/m^3 with one spare field • Existing Plants • Future plants	 • 31.03.2014 • Concurrently with commissioning	 • SPM • RPM in ambient air
2.	All lean slurry disposal system to be converted to (High Concentration Slurry Disposal) HDSD	31.03.2014	• Water (Cd & Hg) • Land requirement
3.	Online monitoring with real time display facility to be installed	30.06.2011	Particulate matter
4.	Create silo for a capacity of at least 7 days ash generation for its dry storage and subsequent utilization for cement and after fly ash based products	31.03.2012	Ash utilization

Sl. No.	Action plan	Target Date	Issues being addressed
5.	Real time ambient air quality monitoring (SO_x, NO_x, CO, $PM_{10,}$ $P.M_5$)	31.03.2011	SPM, RPM, SO_2, NO_X,
6.	All the thermal power plants shall adopt zero discharge	31.03.2012	Water scarcity

Table-7 : COAL MINES

Sl.No.	Action plan	Target Date	Issues being addressed
1.	A dedicated coal transport corridor to be constructed in Ib valley coalfields.	31.03.1015	SPM in ambient air, Congestion
2.	Creation of reservoir for storage of mine drainage water and run off which can be used for industrial purpose	31.03.2013	Water conservation
3.	Use of surface miner for coal mining purpose. At least 60% coal in this area to be produced by surface miner technology.	31.03.1013	Particulate matter
4.	Adoption of concurrent mine filling with dry ash from the thermal power plants	30.06.2012	Ash disposal
5.	Making provision for supply of drinking water in the peripheral villages of coal mining area	31.03.2013	Water scarcity
6.	Enhancement of rake loading facility in the coal mines.	31.03.2015	SPM, Congestion
7.	MCL to take up a comprehensive coal mine fire control plan	30.06.2011	SO_2, Heat
8.	Back filling of the mine voids and restoration of the mined out area. An action plan to be prepared.	30.06.2011	Land degradation

Table-8 : IRON & STEEL AND FERRO ALLOYS

Sl.No.	Action plan	Target Date	Issues being addressed
1.	All DRI plants to install ESPs, in the kiln, bag filter in dust generating points and pneumatic dust handling system	31.03.2011	Air pollution (SPM)
2.	All steel plants and sponge iron plants to develop collection and treatment facility for mineral char and coal pile run off during monsoon.	30.06.2011	Water pollution
3.	Installation of online stack monitoring system with real time display system	30.06.2011	Particulate matter
4.	Real time ambient air quality monitoring (SO_2, NO_x, CO, $PM_{10,}$ $PM_{2.5}$)	31.03.2011	SPM, SO2, NOx, RPM
5.	Use of SMS slag and ferro alloys slag for haul road construction in the mine area	30.06.2012	Metallurgical solid waste utilization

Table-9 : ALUMINIUM

Sl.No.	Action plan	Target Date	Issues being addressed
1.	Pot lines of smelter plant to be upgraded to meet the emission norm of 0.3 kg of fluoride per ton of Aluminum by revamping the fume treatment plant.	31.03.2013	Fluoride in air
2.	Online stack emission monitoring system with display system shall be installed	31.06.2011	Fluoride in air
3.	Installation of fluoride removal (Fume treatment) system from bake oven plant	31.03.2013	Fluoride in air

Sl.No.	Action plan	Target Date	Issues being addressed
4.	Construction of secured landfill by VAL within its premises	31.03.2011	Fluoride in water and soil
5.	Conducting a comprehensive wastewater audit for the smelter plant including runoff management	31.03.2012	Fluoride in water and soil
6.	Real time ambient air quality monitoring (SO_2, NO_x, CO, $PM_{10,}$ $P.M_{2.5}$)	31.03.2011	SO_2, NO_x, CO, RPM

Table-10 : Common infrastructure and services

Sl.No.	Action plan	Target Date	Parameter being addressed
1.	Construction of a sewage treatment plant for Brajaraj Nagar and Jharsuguda town	31.03.2013	Organic pollution of river
2.	Establishment of an extensive air quality monitoring network for Ib valley-Jharsuguda area.	31.03.2013	Air quality parameter
3.	Construction of water storage reservoirs to collect the mine water from the under ground mines.	31.03.2015	Water conservation
4.	Construction of common disposal site facility for char and other iron and steel plant waste.	31.03.2013	Unsafe waste disposal and demand on land
5.	Development of a municipal solid waste disposal facility for Jharsuguda town	31.03.2015	MSW management

8.0 The way forward

The action plan was prepared to address the environmental issues identified by the people and verified scientifically. The target dates are chosen considering the nature of the activity and its relative importance from environmental point of view .Implementation and monitoring being key aspects of success of an action plan a framework for monitoring and evaluation of performance of the industrial cluster with CEPI as the key indicator is proposed to be in place once the action plans are frozen after adequate refinement.

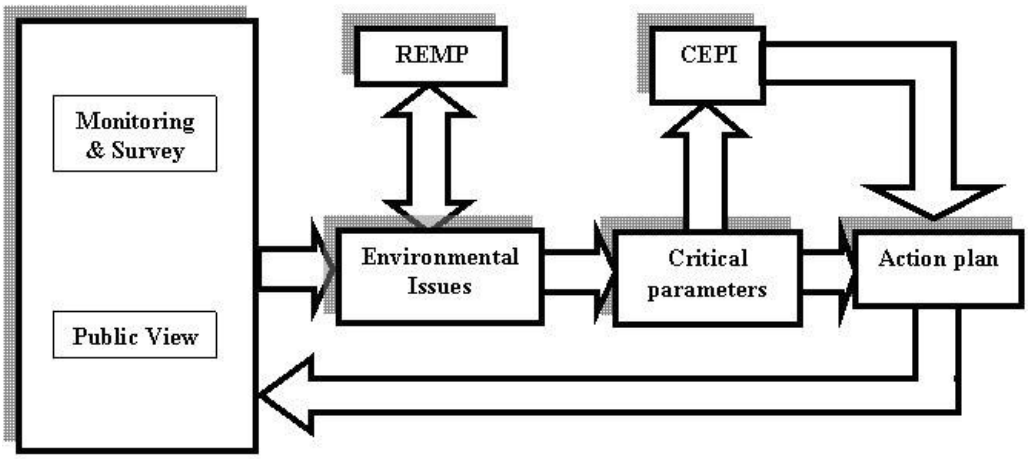

Fig-Framework of review of action plan

The proposed action plan has been drawn in an inclusive manner, however since it was formulated in a short span of time, it is essential that this plan be reviewed at different level before finalization and implementation.

At the same time the boundary demarcated on the map shall be subjected to ground toothing and the exact boundary indicating the villages which forms the cluster shall be determined accordingly.