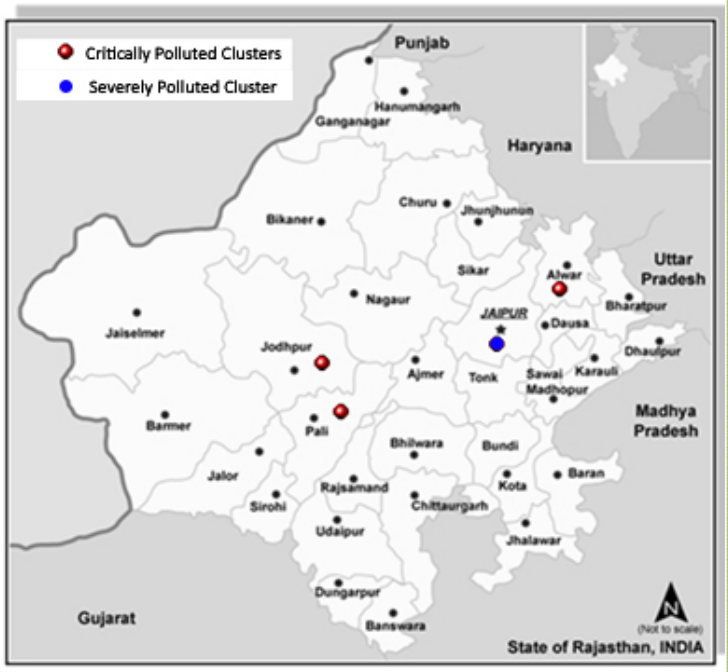

PDCOR Limited

IL&FS Environment

CEPI

COMPREHENSIVE ENVIRONMENTAL POLLUTION ABATEMENT ACTION PLAN FOR CRITICALLY POLLUTED INDUSTRIAL CLUSTER – PALI (REVISED POST CPCB IN-HOUSE COMMITTEE REVIEW)

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Abbreviations

APCS	Air Pollution Control System
BGL	Below Ground Level
BIS	Bureau of Indian Standards
BMW	Bio medical Waste
BOD	Biological Oxygen Demand
CBOs	Community Based Organisations
CBWTDF	Common Biomedical Waste Treatment and Disposal Facility
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CGWB	Central Ground Water Board
CHWTSDF	Common Hazardous Waste Treatment, Storage and Disposal Facility
Cl_2	Chlorine
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CPCB	Central Pollution Control Board
DBOOT	Design Built Own Operate Transfer
DG	Diesel Generator
DO	Dissolved Oxygen
EP Act	Environment (Protection) Act, 1986.
ETP	Effluent Treatment Plant
FC	Faecal Coliform
GHGs	Green House Gases
GoI	Government of India
Ha	Hectare
HCs	Hydro carbons
HDPE	High density Polyethylene
IIT	Indian Institute of Technology
IMD	Indian Meteorological Department
IS	Indian standard
kg	kilogram
km	kilometer
Leq	Linear equivalent
lpcd	Litres per capita per day
LPG	Liquified Petroleum Gas
LSI	Large Scale Industries
m.	Meter
M.S.	Mild Steel
MLD	Million Liters per Day
MNES	Ministry of Non conventional Energy Resources
MoEF	Ministry of Environment & Forests
MSI	Medium Scale Industries
MSW	Municipal Solid waste
MTA	Metric Tonnes per Annum
NAAQS	National Ambient Air Quality Standards

NAMP	National Air Quality Monitoring Programme
NGOs	Non Governmental Organisations
NH_3	Ammonia
NIO	National Institute of Oceanography
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOC	No Objection Certificate
NOx	Nitrogen Oxide
NWMP	National Water Quality Monitoring Programme
PDCOR	Project Development Company of Rajasthan Ltd
PHED	Public Health and Engineering Department
PM_{10}	Particulate Matter with a diameter of less than 10 microns
$PM_{2.5}$	Particulate Matter with a diameter of less than 2.5 microns
ppm	Parts per million
ppt	Parts per trillion
PWD	Public Works Department
RH	Relative Humidity
RIICO	Rajasthan State Industrial Development & Investment Corporation Ltd
RO	Reverse Osmosis
RSPCB	Rajasthan State Pollution Control Board
RSPM	Respirable Suspended Particulate Matter
SEZ	Special Economic Zone
SO_2	Sulphur Dioxide
SPM	Suspended Particulate Matter
SPV	Special Purpose Vehicle
sq.km	Square Kilometer
SSI	Small Scale Industries
SWM	Solid Waste Management
TC	Total Coliforms
TDS	Total Dissolved Solids
ToR	Terms of Reference
TPA	Tonnes per Annum
TPD	Tonnes per Day
TSDF	Treatment Storage and Disposal Facility
TSS	Total Suspended Solids

EXECUTIVE SUMMARY

Background

The Central Pollution Control Board (CPCB) in association with Indian Institute of Technology (IIT) New Delhi carried out an environmental assessment of industrial clusters across the country. Based on this, "Comprehensive Environmental Pollution Index (CEPI)" was calculated to identify polluted industrial clusters in the country.

The main objective of the study to establish CEPI was to identify polluted industrial clusters or areas in order to take concerted actions towards pollution abatement and to centrally monitor the compliance of those actions at the National level to achieve the restoration of the environmental quality in the respective clusters. A total of 88 industrial areas or clusters have been identified across the country by the CPCB in consultation with the Ministry of Environment & Forests (MoEF), Government of India (GoI) for the preparation of the effective remedial action plans.

Preparation of Comprehensive Environmental Pollution Abatement Action Plan

This report is for the Pali Industrial Cluster, selected under the CEPI study of Critical Industrial Clusters, in the State of Rajasthan. The cluster needs a long term comprehensive environmental remedial action plan for pollution abatement and improvement of the environmental quality. Presented below is the CEPI score assigned to the Pali Industrial Cluster by CPCB.

Parameter-wise CEPI Scores for Pali Industrial cluster

S.No	Parameter	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index	Existing CEPI
1	**Air**	3	5	15	4	0	0	4	5	4	3	23	10	52	
2	**Water**	4	5	20	8	3	3	14	5	3	0	15	15	64	
3	**Land**	2	5	10	6	3	3	12	5	3	0	15	15	52	73.73

Pali Industrial Cluster

Located in the Marwar Region of Rajasthan, Pali City is the administrative headquarters of Pali District. Pali is famous for its Textile Industries. The selected industrial areas for the CEPI study include Mandia Road, Punayata Road and Sumerpur Road Industrial Areas located in close proximity to the Bandi River. Mandia Road is the largest industrial area among these with total of 350 units.

Water Environment

Pali Industrial Cluster is located on the banks of River Bandi. Major water polluting industries in this region are textile and dyeing units. Effluents from these industrial units are discharged into drains connected to the CETPs. Treated effluent is finally sent to the Bandi River. At present, there are four functional CETPs in this Cluster with a capacity to treat 34.68 MLD of industrial effluent. CETP Units I and II are located at Mandia Road and CETP Units III and IV are located at Punayata Road Industrial Area. Almost all water intensive units are connected to the CETPs. Keeping in view the future expansion needs, two more CETPs of 12 MLD capacity each were proposed by the CETP Trust. One CETP is proposed at Mandia Road and the other at Punayata Road.

Air Environment

The main cause of air pollution in Pali City is the use of coal fired Boilers / Thermo-packs in the Textile industries. Air pollution due to vehicular emissions is observed in traffic intersections, commercial nodes, etc.

Land Environment

Main sources of soil contamination in Pali are spill over dyes, effluent from industries and CETPs, city sewage insidious flows and solid waste.

Waste Generation and Management

Waste includes hazardous waste, biomedical waste, and municipal solid waste. The RSPCB has conducted survey and inventorization of various hazardous waste and biomedical waste sources and generation.

Pali Town generates about 100 tons of municipal solid waste but, there is no Waste Processing Facility or Sanitary Landfill proposed in Pali; as of date. Hazardous waste from Pali is sent to the State level facility for disposal of hazardous waste namely, the Common Hazardous Waste Treatment; Storage & Disposal Facility developed at Village Gudli, Tehsil Mavli, Dist. Udaipur. Biomedical waste generated at Pali is sent to the Common Bio Medical Waste Treatment Facility (CBWTF) installed by M/s Sales Promoters in Jodhpur (ADB Waste site, Jaisalmer Road).

Proposed Action Plan for Pollution Abatement

The Final Action Plan for abatement of pollution is based on the secondary data collected from RSPCB and other concerned agencies. The action points mentioned have been

categorized into Short Term and Long Term Measures based on the timeframe required for their implementation. The Short Term Action Points include measures that require one year or less for implementation i.e., December 2012, while the Long Term Action Points include measures that require time beyond one year for implementation. The effective implementation of the remedial action plan will help in abatement of pollution and to restore the environmental quality of these industrial clusters.

The Action Plan was presented on July 20, 2010 before the Steering Committee appointed by the CPCB. Consequent to their suggestions/observations, the Action Plan was modified and resubmitted to CPCB in August 2010. This revised Action Plan was further reviewed by the In-house Committee of CPCB and certain observations/suggestions were made on the Plan and clarifications/additional information, pertaining to those observations were sought vide CPCB's letter number B-29012/ESS(CPA)/2010/4619 dated October 7, 2010. This Action Plan addresses all those issues.

A tabulated summary of the Final Action Plan **(Revised Post CPCB In-House Committee Review)** for Pali Industrial Clusters is presented below.

Impact on CEPI Score

Pollution load in the industrial cluster is long term and has a cumulative effect. Hence, change in the CEPI score post implementation of the Action Plan will take some time depending on the individual parameters. However, for the purpose of this study, the CEPI score post implementation of the pollution abatement measures is calculated and presented below. It is expected that, post effective implementation of the pollution abatement measures, the CEPI Score for Pali Industrial Cluster will be lowered by nearly 23 points to **50.43.**

Parameter-wise CEPI score Post Implementation of Action Plan for Pali Industrial Cluster

S.No	Parameter	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index	Post Action Plan CEPI
1	**Air**	3	5	15	3	0	0	3	5	3	3	18	5	41	
2	**Water**	3	5	15	3	3	3	9	5	3	0	15	0	39	**50.43**
3	**Land**	2	5	10	3	3	3	9	5	3	0	15	5	39	

Final Action Plan for Pali Industrial Cluster: Short Term and Long Term Action Points - (REVISED POST CPCB IN-HOUSE COMMITTEE REVIEW)

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
Short Term Action Plan- Air					
1	Performance monitoring of major air polluting industry for assessment of compliance of the notified air emission standards.	RSPCB, RIICO, Industrial Association	April 2012	Approx. Rs. 25-40 Lakhs	The work of stack emission monitoring of the identified major air polluting industries in the industrial cluster would be taken up by RSPCB in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the emission standards notified under EP Rules '86
2	Up-gradation of the air pollution control measures e.g., dust collector, multi cyclone etc. with the non compliance industries.	RSPCB, RIICO Industrial Association	October 2012	Not Available	The State Board will issue directions under the provision of Air Act' 81 to the non complying industry for up gradation for the air pollution control measures before end of Oct- 2012
3	Installation of ambient air quality monitoring station	RSPCB/RIICO/Industries Department	March 2012	Approx. Rs. 45 lakhs	At least three ambient air quality monitoring stations to monitor the ambient air quality as per the NAAQMS are under consideration in Pali with analytical facilities (lab facilities) for monitoring of the air quality of the Pali industrial clusters.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
4	Discontinuation of the use of wood and high sulphur based coal in Industries	RSPCB, Industry	Ongoing activity	---	The State Board has already issued direction to ban use of wood as fuel in February 2011. The industries are also being advised to discontinue use of high Sulphur content coal.
5	Adoption of measure to curb vehicular pollution	District administration, RSPCB , Transport Department and RIICO	December 2012	Not Available	a. To develop bypass road/ring road for heavy traffic in the industrial cluster. b. One way traffic system with traffic signals in industrial cluster. c. To augment cleaner fuel availability in Pali. d. To repair, widen and maintain the existing roads in the industrial cluster.
Long Term Action Plan-Air					
1	Installation of Real Time Ambient Air Quality Monitoring Station	RSPCB & CPCB	March 2013	Approx. Rs. 1.25 crores	The Station will provide real time Ambient Air Quality for PM 2.5, PM10, SO2, NOx, CO, O3 and BTX. The real time data shall be available with Board's Head office Jaipur and Regional Office, Pali for future plans/ strategy for prevention and control of ambient air quality of

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					the Industrial Cluster. The station will also provide necessary meteorological data including wind speed, wind direction, temperature, pressure and humidity.
2	Construction of Bypass roads for non industrial activity related traffic movement	RIICO, local Authority/ Municipality and PWD	March 2013	Not Available	The details of the action plan & estimated cost will be prepared by concern authority.
3	Cleaner fuel availability for industry	Industries Department, GAIL & RIICO	Not Available	Not Available	A GAIL pipe line is passing through Pali District at a distance of about 50 kms from Pali Town. The Industrial Association has taken up with the Industries Department of the State Government to tap the available gas through a link pipeline for the commercial and industrial use. The plan is in the initial phase, therefore, a clear time schedule and estimated cost on the use of gas as fuel by the Industries is not submitted at this stage.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
4	Promotion of Clean Fuel and latest technology (boiler/ thermopack by the industry)	RSPCB, Industry and Industrial Association/ RIICO	Not Available	Not Available	The State Board may take a view to advise the major air polluting industries for promotion of cleaner fuel and replacement of existing boiler/thermo pack which are 10 year old.
Short Term Action Plan- Water					
1.	Assessment of the compliance of the effluent quality standards of the water polluting industries with the prescribed standards of effluent quality for inlet to CETP as specified under EP Rules	RSPCB, RIICO Industrial Association, CETP Trust	June 2012	Approx. Rs 25 lakhs	The work of effluent quality assessment of the identified major water polluting industries in the industrial cluster would be taken up by RSPCB in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the inlet to CETP standards notified under EP Rules'86.
2	Up-gradation of the primary treatment facilities e.g., physicochemical treatment etc. with the non compliance industries.	RSPCB, RIICO Industrial Association, CETP Trust	October-2012	Not available	The State Board will issue directions under the provision of Water Act' 74 to the non complying industry for up gradation for the primary treatment facilities before end of Oct- 2012
3	Installation of Flow meter / Water mater with each member unit of CETP trust for monitoring of compliance of	RSPCB, RIICO Industrial Association, CETP Trust	March 2012	Not Available	RIICO will ensure that each industry sets up water meter/flow meter within the given timeframe.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
	the permitted discharge quantity by CETP Trust.				
4	Development of Sewerage System	RSPCB, RUIDP, Municipal Corporation	July 2012	Approx. Rs. 30.11 crores	Under UIDSSMT scheme project for development of 100 km sewer pipeline was sanctioned. The development work of 24 km of sewer line has been completed. The remaining work is under progress Subsequent to completion of the work; the city sewage shall be segregated from the industrial waste water & shall be taken to STP for required treatment.
5	Commissioning of Sewage Treatment Plant (STP)	RSPCB, RUIDP and Municipal Corporation	March 2011	Approx Rs. 8.22 crores	Under UIDSSMT scheme project of construction of 7.5 MLD STP was sanctioned. The construction work of STP was completed and shall be commissioned once the work of laying down the sewerage line is completed. The commissioning of STP will prevent discharge of untreated sewage to River Bandi which will result in prevention of contamination of groundwater.
6	Up-gradation of the ETP of large scale polluting Industry of Pali	RSPCB, Industry	September 2010	Approx. Rs. 2.25 crores	The only large scale textile processing industry of Pali viz M/s Maharaja Shree Umed Mill has up-graded the

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					existing ETP having capacity of 900 KLD by installation of RO Plant of 1.1. MLD capacity for reuse of treated effluent.
7	Cleaning, Desilting & repairs of the open drains for transportation of untreated industrial effluent to CETP in the industrial area	RIICO CETP Trust, Pali RSPCB	March 2012	Appox. Rs. 20 Lakhs	The cleaning of the drains will prevent overflow and spread of effluent on the land. This will also help in smooth conveyance of effluent to the CETP.
8	Performance monitoring of CETPs and STPs	RSPCB, CETP Trust and Municipal Corporations	Ongoing Activity	Appox. Rs 2 lakhs	RSPCB is monitoring the performance of CETP on monthly basis which includes the quality of treated effluent and disposal of ETP sludge. The performance monitoring of STP shall be taken up after its regular commissioning.
9	Construction of a CETP of 12 MLD capacity	CETP Trust, Industrial Associations and RSPCB	August 2012	Approx. Rs. 15.10 crores	Construction work of CETP Unit V at Mandia Road Industrial Area has been started. Foundation stone has been laid on 4 Sept 2011. Environmental Clearance has been issued.
10	Monitoring of groundwater quality	RSPCB, CETP Trust, RIICO	March 2012	Approx. Rs. 1-2 lakhs	The State Board has increased groundwater quality monitoring points from earlier two points to six

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					points around Pali under NWMP having frequency of monitoring one sample in six month. The frequency of the sampling of all the six points shall be increased to once in three months for upgrading the monitoring of groundwater.
Long Term Action Plan- Water					
1	Construction of an additional CETP of 12 MLD capacity	CETP Trust, Industrial Associations and RSPCB	August 2014	Approx. Rs. 13.40 crores	Environmental Clearance has been issued. Construction of CETP Unit VI at Punayata Road Industrial Area is proposed in the same premises of CETP III.
2	Construction of closed conduit conveyance system for carrying industrial effluent to CETP	RIICO, CETP Trust and Industrial Association	December 2013	Not Available	Presently, the industries are connected with CETPs I, II and III by open channel to carry their effluent in Mandiya Road Industrial Area and Industrial Area Phase I & II. The existing open conveyance system is to be replaced by closed conduits. The proposals shall be considered by the CETP Trust and RIICO in December 2012. Further action shall be taken on their decision.
3	Recycling of Treated Effluent	CETP Trust, RSPCB,	Not Available	Not Available	The CETP Trust is to consider the

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
	of CETP	RIICO			feasibility for establishment of RO plant with existing and proposed CETP no. V &VI to reuse of the treated effluent. The permeate from the RO plant will be sold to member units so as to meet with the operating costs of the RO plant. The recycling of the treated effluent will also save the natural resources.
4	Installation of rain water harvesting system in the buildings and institutions	RIICO, Municipal Corporation, RSPCB	Ongoing activity	Not Available	The RIICO Limited is making allocation of new plots with the condition for installation of proper rain water harvesting structures for the proposed industrial unit. This will improve the level of groundwater in the industrial cluster as well quality of groundwater.
Action Plan Land					
1	Development of Municipal Solid Waste (MSW) treatment and disposal facility	Municipal Corporation, RIICO and RSPCB	Not Available	Not Available	To secure proper collection, transportation and disposal of municipal solid waste in accordance with the provisions of municipal solid waste (Management & Handling) Rules 2000, proper secure landfill facility is to be developed. The proper disposal of MSW will prevent polluted runoff of rain water

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					from the disposal site during rainy days as well percolation of leachate to groundwater. The Pali Municipal Corporation has already identified a land area of 220 bigha near village Khetawas for development of MSW treatment and disposal facility. The identified land has been allotted and approved by the District Administration for the development of MSW Facility. The detail project report, estimated costs and time schedule is to be received from Pali Municipal Corporation.
2	Augmentation of treatment and disposal facility for Bio-medical Waste	Medical and Health Department, RSPCB and Municipal Corporation	December 2012	Not Available	The Biomedical waste from the health care facilities of Pali is being collected, transported and disposed with the authorized Common Bio Medical Waste Treatment and Disposal Facility located in Jodhpur i.e., at distance of approx. 85 km. The RSPCB is monitoring the disposal of Biomedical Waste in accordance with the provision of Bio Medical Waste (Handling & Management) Rules 1998. The disposal facility requires augmentation for the compliance of CPCB guidelines for treatment and

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					disposal facility of BMW.
3	Disposal of Hazardous Waste	CETP Trust, Industries, RIICO , RSPCB, Rajasthan Waste Management System and UCCI	Ongoing Activity	---	The CETP sludge from physico chemical treatment comes under the definition of hazardous waste. This sludge is presently collected, dried and transported to, common treatment storage and disposal facility develop by Rajasthan Waste Management System near village Gudli in accordance with the provisions of Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules 2008. The RSPCB has advised the CETP Trust to encourage co incineration of the ETP sludge in Kiln of Cement Plant with prior approval under the Rules for co-incineration. This will result in reduction of disposal cost as well recovery of the energy.
Action Point-Others					
1	Development of green belt and tree plantation in industrial area	Forest Department, Industry, RIICO, RSPCB	Ongoing activity	Appox. Rs. 30-50 Lakhs	The RIICO Limited and CETP Trust is to develop & encourage road side plantation in the industrial cluster as well as to develop green spot in cluster for maintenance of ambient

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					air quality. RIICO has proposed annual budget of Rupees 30-50 lakhs for the plantation of tree.
2	Capacity Building for prevention & control of Pollution	RIICO , CETP Trust & RSPCB	December 2013	--	**1. Following actions shall be taken up by the RSPCB:** a. Strengthening of technical and scientific manpower of Regional Office, Pali (RO , Pali) b. Strengthening of regional laboratory of RO, Pali for regular assessment of PCM with the industries, CETP, water quality and air quality of the area c. Education and training of technical and scientific staff of familiarization with the latest technology for pollution control and analytical techniques d. Strengthening of online connectivity of RO, Pali with HO-Jaipur and CPCB Delhi for upgrading the data transfer mechanism

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					e. Seminar and workshop for education and awareness of the project proponents for adoption of cleaner fuel and advanced process techniques for reduction of air emission and effluent discharge as well as to reduce the consumption of chemicals and dyes. **2 Following action shall be taken up by RIICO & CETP Trust**: i. Development of Regional Research Centre for development of new technology for reduction of dyes & chemicals in textile processing as well as reduction of water requirement. ii. To encourage use of cleaner fuel by providing soft loan for replacement / conversion of the existing boiler / thermo pack to cleaner fuel.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					iii. To develop non polluting industries like weaving units / ready made garment manufacturing units for diversion of industrial activities. iv. To encourage & provide soft loan to major polluting industrial unit which intends to install RO plant at their own for recycling of their effluent.

Note: While reporting the interventions to reduce CEPI, various studies, reports, Master Plans, RSPCB and RIICO data was referred to and wherever the information was available, the costs of interventions have already been included in the Final Action Plans. These interventions will be implemented by different agencies, including RIICO as identified in the Report.

1. INTRODUCTION

The Action Plan was presented on July 20, 2010 before the Steering Committee appointed by the CPCB. Consequent to their suggestions/observations, the Action Plan was modified and resubmitted to CPCB in August 2010. This revised Action Plan was further reviewed by the In-house Committee of CPCB and certain observations/suggestions were made on the Plan and clarifications/additional information, pertaining to those observations were sought vide CPCB's letter number B-29012/ESS(CPA)/2010/4619 dated October 7, 2010. This Final Action Plan addresses all those issues.

This report[1] is the Final Action Plan for Pali Industrial Cluster based on the data collected from RSPCB and other Agencies/responsible key stakeholders. The Plan has been prepared with due field verifications and consequent implementation of various actions included therein.

[1] This report has been structured based on the document titled "Framework of Model Action Plan for Critically Polluted Industrial Areas/Clusters" which was circulated by the CPCB on July 20, 2010 after going through all the presentations made by various State Pollution Control Boards.

2. ACTION PLAN FOR PALI INDUSTRIAL CLUSTER

2.1. Introduction

2.1.1. *Location*

Located in the Marwar region or Rajasthan, Pali City is the administrative headquarters of Pali District. It is situated on the banks of the river Bandi and is 72 km south east of Jodhpur. It is known as "The Industrial City", famed for its textile units. As of Census of India, 2001, Pali city had a population of 1,87,571.

Refer ***Figure 1*** for location of the Pali Industrial Cluster.

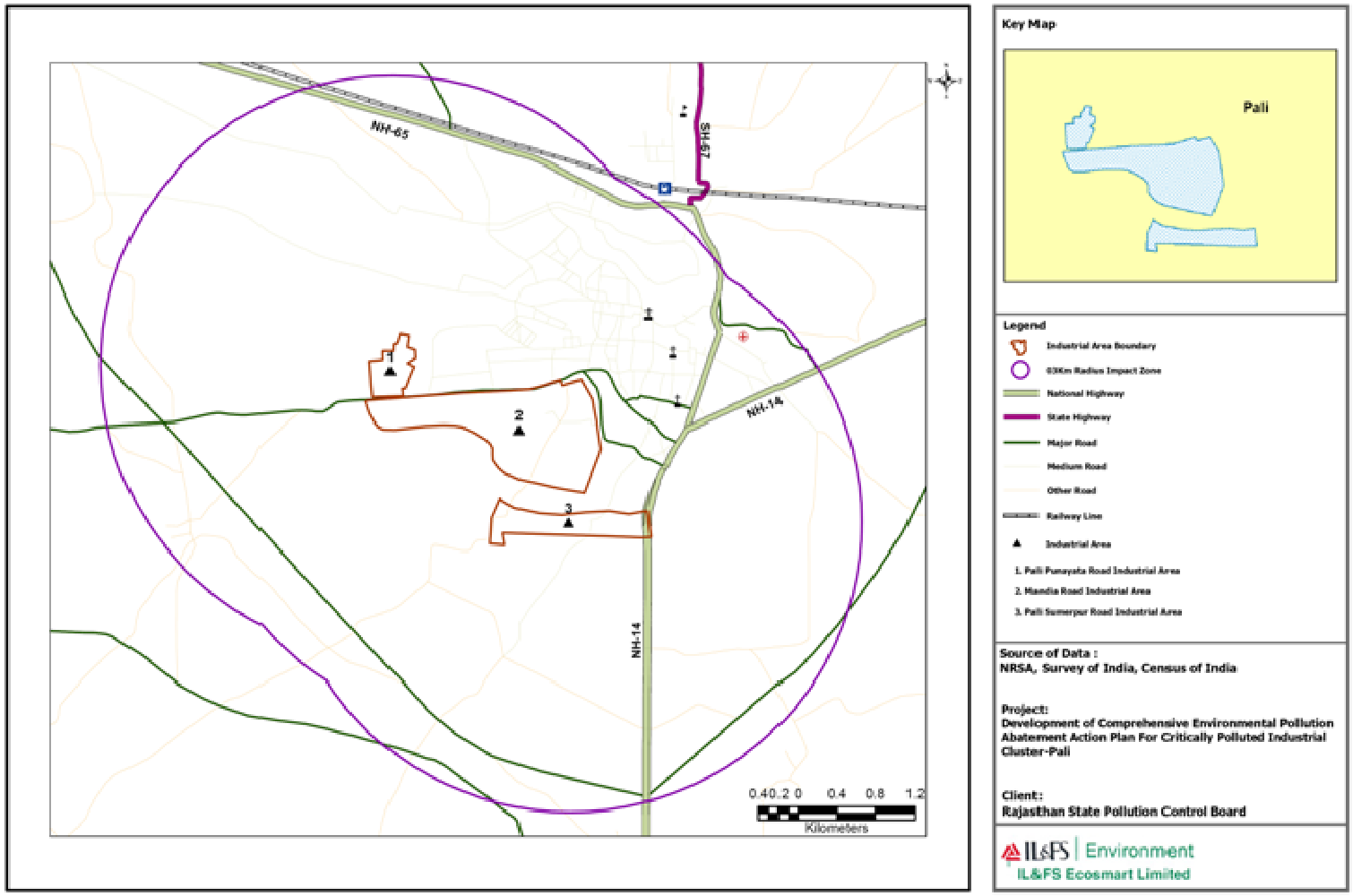

Figure 1 Pali Industrial Cluster Location Map

2.1.2. *CEPI Areas and Score*

The MoEF Office Memorandum dated March 15, 2010, lists the areas for CEPI study in the Pali Industrial Cluster. **Table-1** gives the list of areas to be covered under the Pali Industrial Cluster as per the CEPI Study. The Pali Cluster is ranked '31' in the list of country-wide critically polluted clusters under CEPI. The environmental parameter-wise CEPI scores of Pali Industrial Cluster are listed in **Table-2**.

Table 1: List of Critically Polluted Areas in Pali Industrial Cluster

Sl No	*Critically Polluted Industrial Area (CPA) and CEPI*	*Industrial Cluster / Potential Impact Zone*
1	Pali (Rajasthan) CEPI – 73.73 (As_Wc_Ls)	a) Existing industrial areas: Mandia Road, Puniata Road, Sumerpur[2] b) Pali Town

Note: A – Air, W – Water, L – Land, s – severe, c - critical

Table 2: Parameter-wise CEPI Scores of Shortlisted areas in Rajasthan

Rank	Industrial *Area / clusters*	Air	Water	Land	CEPI	Comment
31	Pali	52.00	64.00	52.00	73.73	As Wc Ls

Note: A/W/L: Air/ Water /Land; c/s: Critical/Severe

As a sequel to the identification of those clusters and the directions of CPCB, it is required to prepare Comprehensive Environmental Pollution Abatement Action Plan for the selected areas.

2.1.3. *Climate*

The climatic conditions of Pali region are somewhat different from the rest of Western Rajasthan. The climate here is semi-arid. Although the temperature in summers rises up to 46-47 ^{0}C, a large variation in temperature is found due to adjoining green and hilly areas of the Aravali Range. Winters are moderately cool during December-January lowering the mercury to 4-5 ^{0}C occasionally.

During the entire year, winds from south-west to west are most prevalent in Pali region. Pali region receives seasonal but, erratically distributed rain from the south-west monsoons. Average rainfall in the district during the months of July-October is 300 mm.

2.1.4. *Physiography*

Most of the Pali region is gently undulating erosional plain. The general elevation of the plain is about 320m above mean sea level in the south-east, about 270m in east and north-east and

[2] For the purpose of this study, Sumerpur Road has been considered as it is the only Industrial Area within the Pali Municipal Area.

about 180 m on the west. Pali city is situated at 212m above mean sea level. On the eastern part of the Pali region are the Aravali hills. The highest point of Aravali hills in the region measures 1099m. Western Rajasthan's famous river *Luni* and its tributaries *Jawai, Mithadi, Sukadi, Bandi and Guhiabala* flow through this region. The largest dams viz. Jawai Dam and Sardar Samand Dam are also located in Pali District.

2.1.5. *Soil & Geology*

In the Pali region, Quaternary deposits and marine and continental sedimentary rocks of late Purana rest on a basement of Archaean metamorphic rocks and late Purana intrusive and volcanic rocks. Quaternary deposits include intercalated lenses of stream laid clay, silt sand and gravel and windblown sand (generally above the regional water table) which form a thin blanket over bed rock formations in much of the region. Younger alluvium yields moderate to meager supplies of salty water to shallow wells from discontinuous underflow conduits along large water courses. Older alluvium yields moderate to meager supplies of salty brackish water to wells where present in the zone of saturation.

2.1.6. *Impact Zone*

Based on the suggestion in the *Framework of Model Action Plan for Critically Polluted Industrial Areas / Cluster* by CPCB, the geographical area of the industrial cluster and its impact zone has been considered here. A radius of 3 kms has been considered to fully cover the Industrial Clusters as well as the sensitive receptors in the area. Since, the three Industrial Areas to be considered in Pali are within close proximity to each other, a common overlapping impact zone has been considered as shown in the Location Map; refer ***Figure 1.***

The impact zone for the Pali Industrial Cluster does not have sensitive features such as reserved forests, heritage sites, etc. The major receptors are the Bandi River and Pali town having population of about 2 lakhs. ***Figure 2*** shows the industrial area wise analysis of the land use and land cover in the Impact Zone.

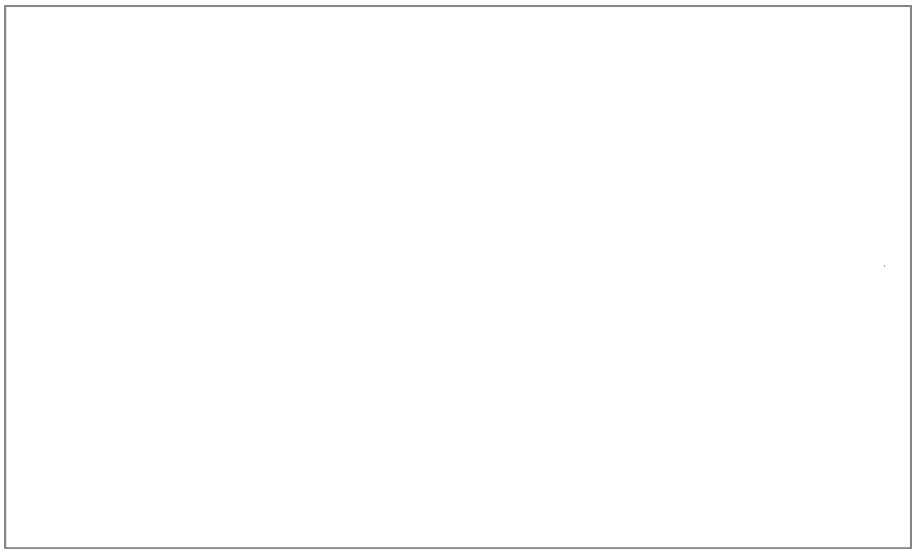

Figure 2: Landuse Area for Pali Industrial Cluster

Source: Spatial Solutions Division, IL&FS Ecosmart Ltd.

Pali town forms the major part of the Impact Zone which covers 68% of the area. Scattered pockets of low density vegetation are present in this area. The seasonal River Bandi is the major surface water body in the area. Refer ***Figure 3*** for the map showing sensitive receptors in the Pali Industrial Cluster.

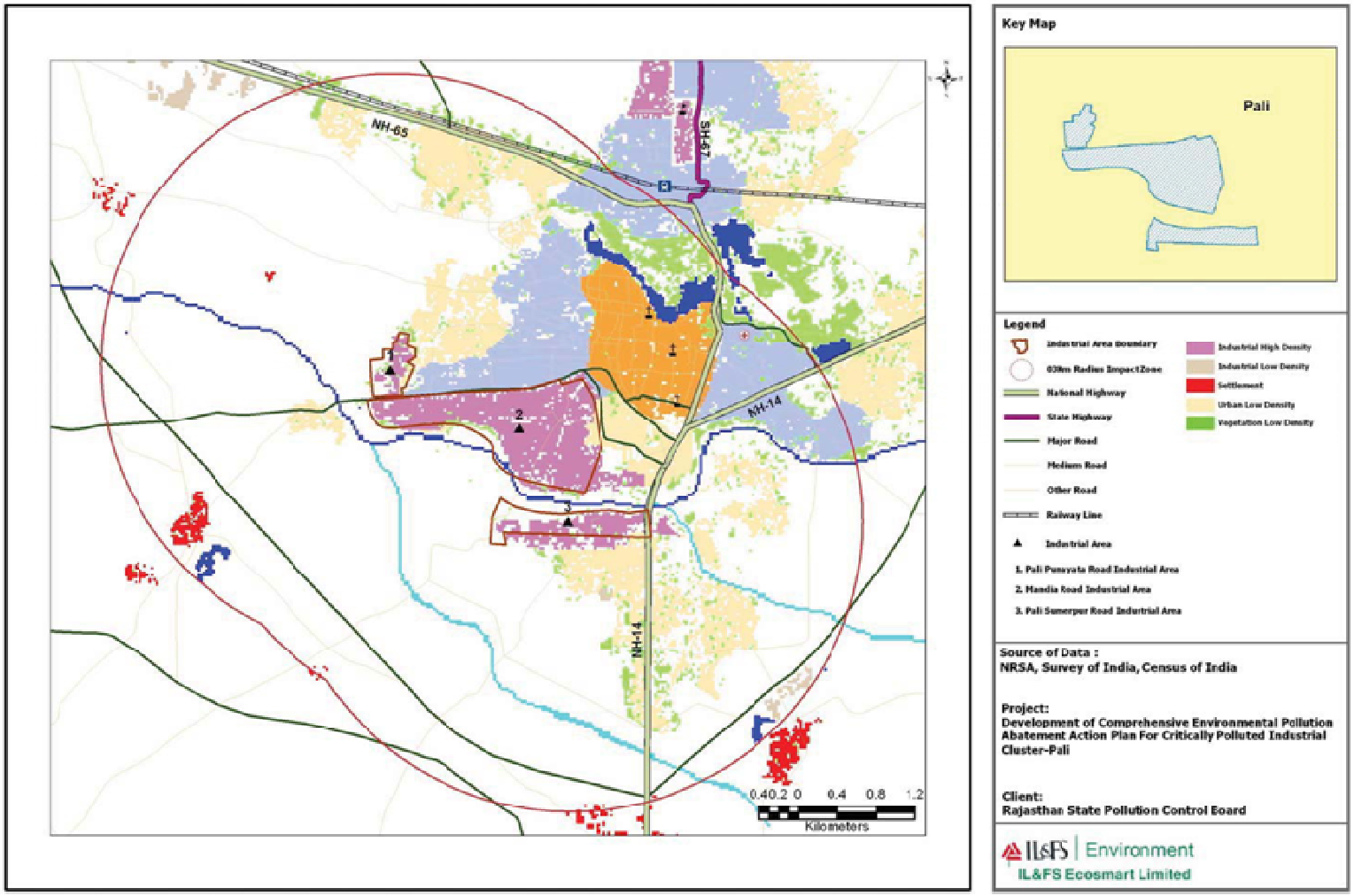

Figure 3 Sensitive Receptors Map of Pali

2.1.7. *Industrial Development*

Pali is famous for its textile industries. Some new industries have also been developed like marble cutting, marble finishing, etc. in the industrial areas in Pali.

One of the biggest composite textile mills of India 'M/s Maharaja Shri Ummaid Mills' (established in the year 1940) is also situated at Pali. However, the industry is not within the limits of the CEPI study and hence not covered in this study.

The main industrial areas to be considered in this Cluster include Mandia Road, Punayata Road and Sumerpur Road. All these three industrial areas are located towards the South of the City; in close proximity to the Bandi River.

The industrial scenario of Pali is dominated by small scale textile units. The RSPCB has indentified 628 units in the industrial area of Pali. The details are as under:

Table 3 Details of the Industries in Pali Industrial Area

S.No.	Name of Industrial Area	Total units	Textitle units	Red category Tex. units	Orange category Textile units
1	Phase I&II	78	78	70	7
2	MRIA	350	335	285	64
3	Punayata	191 (Under installation)	191	189	2
4	Mahvir Udyog Nagar	9	9	4	5

There are approximately 364 units in textile dyeing and printing units in this cluster who are engaged in manufacturing. Rajasthan State Industrial Development and Investment Corporation Ltd. (RIICO) is main agency involved in industrial development. Refer Table-4 for the present status of industrial development in the Pali Industrial Cluster. Mandia Road is the largest Industrial Area among the three areas mentioned above. At present there are no units operating at Sumerpur Road. Sumerpur Road had all highly polluting textile units (12-14 nos.) which were directed to shift by a High Court Order in 2007. As a result, Punayata Road Industrial Area was developed for accommodating all industries from Sumerpur Road. In Punayata Road, a total of 304 plots were planned by RIICO, 269 plots were allotted but, only about 14 units are presently operational and 35 plots are still vacant. As per future development plan of RIICO these vacant plots shall be allotted for establishment of dying and printing units.

Table 4: Status of Development of various Industrial Areas in Pali Industrial Cluster

SNo	Location	Land Acquired (acres)	Developed Land (acres)	Saleable Land (acres)	No. of Plots Planned (Nos.)	Plots Allotted (Nos.)	Vacant Area (acres)	Vacant Plots (Nos.)
1	Mandia Road	360	360	265.38	528	524	2.68	4
2	Punayata Road	228.04	228.04	147.23	304	269	13.26	35

(Source: RIICO, status up to May 31, 2010)

Types of Industries

Major identified industrial units in Pali Cluster are textiles and dyeing industries.. The main reason for such a large number of textile units is the availability of cheap labour during peak season – April to October and the suitability of the groundwater for dyeing and block printing.

Table-5 gives the type and number of industries in the Pali Industrial Cluster. Mandia Road is the major Industrial Area and has 350 units; out of which 335 are Textile units. Nearly 80% of the industries in Mandia Road are Red Category units. Punayata Road Industrial Area has 191 units, all of which are Textile units falling in the Red Category. There are no highly polluting industries in this Cluster as per the CPCB categorization.

Table 5: Types of Industries in Pali Industrial Area

S. No	Type of Product	Mandia Road Industrial Area				Punayata Road			
		Units	Orange Units	Red Units	Others	Units	Orange Units	Red Units	Others
1	Textiles, Yarn, Thread Manufacturing	335	53	282	0	191	02	189	0
2	Plastic, Polymers	4	3	0	1	0			
3	Chemical, Dyes	11	8	3	0	0			
	Total	**350**	**64**	**285**	**1**	**191**	**02**	**189**	**0**

(Source: Regional Office – Pali, RSPCB)

The segregation of the of the referred textile units as water/air polluting units is as under:

S. No.	Name of Industrial Area	Total textile units	Water polluting	Air polluting	Both
1	Phase I&II	78	57	3	16
2	MRIA	335	225	17	83
3	Punayata	191	88	2	101
4	Mahvir Udyog Nagar	9	4	4	1

The distribution of air polluting units is presented in **Table-6**.

Table 6 Distribution of the Air Polluting Industries in Pali Industrial Area

S.No.	Name of the Industrial Area	Air polluting Units	Boiler (less than 1 Tonne)		Boiler (1-2 Tonne)		Boiler (more than 3 Tonne)	
			No.	PCM	No.	PCM	No.	PCM
1	Phase I&II	19	4	Settling chamber	14	Dust collector	1	Multi cyclone
2	MRIA	100	34	Settling chamber	24	Dust collector	-	-
3	Punayata	103	-	Yet to be established	-	Yet to be established	-	-
4	Mahvir Udyog Nagar	5	-	-	-	-	-	-

S.No.	Name of the Industrial Area	Air polluting Units	Thermopack (less than 1 Lac kcal)		Thermopack (1-2 lac kcal)		thermopack (more than 3 lac kcal	
			No.	PCM	No.	PCM	No.	PCM
1	Phase I&II	19	-	-	14	Dust collector	1	Multi cyclone
2	MRIA	100	46	Settling chamber	24	Dust collector	-	-
3	Punayata	103	-	Yet to be established	-	Yet to be established	-	-
4	Mahvir Udyog Nagar	5	02	Settling chamber	02	Dust collector	-	-

2.2. Water Environment

2.2.1. *Present Status of Surface Water*

2.2.1.1. Surface Water Resources

Pali District is situated on the banks of Bandi River. Western Rajasthan's famous river Luni and its tributaries Jawai, Mithadi, Sukadi, Bandi and Guhiabala which are all ephemeral streams, flow through Pali district and drain the district. These streams and the principal confluents rise on the western slopes of Aravali range, whose elevation is 2,000 to 3,000 feet above the mean sea level. The largest dams of this area i.e. Jawai Dam and Sardar Samand Dam are also located in Pali district.

The drinking water supply to Pali is from Jawai Bandh. In case of non availability of water in Jawai Bandh, Pali City receives water through a pipeline laid from Jodhpur. Alternatively, the railway tankers also bring water during the non availability from the above two sources.

2.2.1.2. Surface Water Quality

The CETP Trust is regularly monitoring the treatment of industrial effluent and submitting the results to RSPCB.

The state board is presently carrying water quality monitoring at **11 points** around River Bandi under National Water Quality Monitoring programs. This includes water quality monitoring of **6 wells, 3 hand pumps and 2 surface water**. The analysis reports are submitted to CPCB regularly. Beside, the state board is also monitoring the water quality at **3 points** in the downstream of River Bandi under State Water Quality Monitoring Programs that includes **6 wells and 3 surface water**. The State Board is also considering addition of **3 monitoring points** for the intensive monitoring of water quality of River Bandi. The comparison of analytical data shall help to assess the impact upon the water quality due to installation and operation of CETP/STP and implementation of the River Cleaning Project (RCP) of River Bandi by the district administration at Pali. This has helped in cleaning of polluted stretches of River Bandi.

Recently there is **1 sampling point** at Nehra Dam, downstream of River Bandi to check the water quality of the Dam water. Additional monitoring points may be considered and added in the monitoring program for regress monitoring of the surface water quality/underground water quality in and around Nehra Dam.

Water quality Monitoring

The RSPCB is also monitoring the nature of chemicals and their doses with individual CETP's so as to reduce the generation of chemical sludge. It is normally observed that the consumption of hydrated lime and ferrous sulphate improves the quality of treated effluent but it also results into generation of larger quantity of chemical sludge. In case, if PAC is consumed for treatment, then the quantity of the sludge would be less but the quality of the treated effluent shall deteriorate and therefore the consumption of ferrous sulphate and hydrated lime is preferred despite generation of large quantity of sludge.

There are four existing National Water Quality Monitoring Stations located at Pali. The details are presented in **Table-7**.

Table 7 Existing National Water Quality Monitoring Stations located at Pali

S.No.	Station code	Name of Location/ Station Identifier	Type	District	Regional Office	Frequency of Monitoring
1	1415	Well of sh. Loomji chaudhary, near naya gaon, pali, (u/s 1 km. From Pali town), Rajasthan	W	Pali	Pali	Halfyearly
2	1416	Well of sh. Mohan Singh Sultan Singh, Sakurlai Pali, Rajasthan	W	Pali	Pali	Halfyearly
3	1716	Nakki lake mt. Abu	lake	Sirohi	Pali	monthly
4	1717	Kodar Dam Mount Abu	R	Sirohi	Pali	monthly

2.2.1.3. Sources of Surface Water Pollution

Industrial

Major identified units in Pali are tie and dye, textile processing and dyeing industries. Industrial wastewater from these industries is discharged into drains connected to CETP. Treated effluent from CETP is finally sent to the Bandi River and is the main source of river water pollution.

These industries discharge a variety of chemicals, dyes, acids and alkalis besides other toxic compounds like heavy metals, which are known for their hazardous properties.

The industries wise data for quantity and quality of various dyes used by them for last 3 years are not available though the most of the dyes in use are chemical dyes. It was clarified by the Industrial Association that the dress material processed by the small scale textile units are mainly meant for low income group and hence the use of costly chemical dyes or the vegetable dyes will add to the cost there-by making the dress material expensive as well as noncompetitive with the similar dress material processed in other regions in the country. The Industries Association is willing to replace chemical dyes provided the good quality vegetable dyes are made available at comparatives prices and their use is made mandatory by the Textile Ministry to have uniform policy and cost for the use of such dyes in the country. In view of submitted reasons, the time schedule of 31/12/2011 does not appear to be feasible.

Domestic

A study on pipeline network and diversion and interception of all the drains in the City, which carry sewage to River Bandi, has been completed. The total cost of the sewage system and the sewers of **100 km length is Rs. 30.11 crores**, out of which, about 20 km length of sewer line has already been laid. The RUIDP has taken the project and is being executed through a private agency. Financial support from the GoI to complete the project is under consideration. The cleaning of Gandhi Nagar drains and other main drains and repair work has been completed by the PMC. Separate drains have been laid to carry domestic wastewater between Subash Nagar siphon to Gandhi Nagar.

2.2.1.4. Effluent Disposal Methods

Mandia Road Industrial Area

Presently, industrial wastewater from about 279 Textile units situated in Mandia Road Industrial Area is being treated at two CETPs at Mandia Road on the banks of River Bandi. The effluent presently being received at the two CETPs (total capacity 13.6 MLD) at Mandia Road is almost at par with the capacities of the existing CETPs.

RSPCB have laid conditions for the close conduit in the consents granted to the industries in Mandiya area. All Textiles in these Industrial Areas are connected to the CETPs.

Punayata Road Industrial Area

Two more CETPs, Unit-III and Unit-IV are located in the Punayata Road Industrial Area. The industrial wastewater from about 72 textile units situated in Phase I & Phase II

Industrial Areas[3] is being treated at Punayata road CETP Unit no.-III which has a capacity of 9.08 MLD. CETP Unit-IV of capacity 12 MLD is also functional but, only 5-7 MLD of wastewater is being presently treated at this CETP. Apart from the 4.05 MLD of industrial effluent from various industrial areas in the North of Pali City, about 6.5 MLD city sewage is also being received at the CETPs.

The work of *pakka* drain and up-gradation of first three CETPs, Units-I, II and III was completed and the CETPs have been operating since March, 2007. The CETP Unit-IV at Punayata Road was commissioned and is operational from December, 2009. All CETPs are provided with diesel generators for power back-up. Industries in the non-confirming area, about 242 units which were not connected to the CETPs up to March 31, 2007 were given closure order by disconnecting the electricity supply. At present all the industries are connected to the four CETPs and additional CETPs are proposed to cater to other industries and future development.

In Punyata Industrial area, closed conduit pipeline has been installed and is connected to 12 MLD CETP. To transfer the additional effluent from the other CETPs, RCC pipelines have been laid and to transfer effluent to above CETP. Mandiya Road is the oldest Industrial Area.

Additional Requirement for Wastewater Disposal

The CETP Trust has planned two more CETP(s), one at Mandia Road and other at Punayata Road. The CETP Trust has got sanction for 12 MLD CETP Unit no. – V at Mandia Road, and for 12 MLD CETP Unit no. – VI at Punayata Road, including CETP premises. Thus, at present, all water intensive units are connected to CETPs. After the two proposed CETPs are completed all the industrial units will be connected to the CETPs.

The CETP Trust Pali has given the operation and maintenance of CETP's to M/s **Enhanced Web System (I) Pvt. Ltd**., New Delhi. The referred firm is having large expertise and experience for operation and maintenance of CETP's and therefore all the CETP's are operating efficiently and upto the designed capacities. The Consultants are also sharing their experience and expertise with the CETP Trust for smooth and efficient operation of CETP's. Based on their advice the CETP Trust has planned to set up a RO Plant of 2.5 MLD with **CETP no. I & II at** Mandia Road at the cost of **Rs. 4.5 Crores.** The

[3] Phase-I and Phase-II Industrial Areas are not included in the Cluster defined under the CEPI Study

proposed RO Plant shall be installed by **March 2012**. In addition, Tertiary Treatment Plants are also proposed with proposed CETP No. 5 and No. 6. The trust has finalized the tender and given the letter of intend to M/s. Creative Enviro Control Pvt. Ltd. (M/s. Gujarat Enviro Protection & Infrastructure Limited), Surat for Rs. 16.02 crores. The CETP no. V will have tertiary treatment, SBR-C-Tech technology. The treated water of RO Plant shall be recycled to the member units thereby reducing the demand of raw water for process.

Disposal of Wastewater

The wastewater after treatment at the CETPs is being discharged into River Bandi. The River Bandi is a seasonal river and carries domestic as well as industrial wastewater from the City.

There has been no direct discharge of untreated wastewater. The Trust has inter connected CETP I, II & III with CETP IV by 600 mm diameter cement concrete pipe line to overcome any untreated wastewater discharge (in case of issues with the inlet of CETP I, II & III). **Table-8** summarizes the information on existing and proposed CETPs in the Pali Industrial Cluster.

Table 8: Details of CETP in Pali

Sl. No.	Name of CETP	Commissioning and Upgradation Year	Location	Capacity in MLD	Capacity used in MLD	Type of Industries connected
1	CETP Unit-I	1983, 2007	Mandia Rd	5.2	5.2	Textile (351 units)
2	CETP Unit-II	1997, 2007	Mandia Rd	8.40	8.40	
3	CETP Unit-III	1999, 2007	Punayata Rd	9.08	9.08	
4	CETP Unit-IV	2009	Punayata Rd	12	5 to 7	Textile (289 units)
5	CETP (Unit-V)	Proposals forwarded to DoE/MoEF vide letter dated 23/3/2009	Mandia Rd	12		
6	CETP (Unit-VI)	Proposals forwarded to DoE/MoEF vide letter dated 23/3/2009	Punayata Rd	12		

Source: RIICO and RSPCB

Two additional CETPs of 12 MLD capacity each, are being established at Mandiya Road and Punayata Road Industrial areas, respectively.

Cleaning of River Bandi, undertaken by the District Administration in association with nearly 44 Govt. Departments, and Social Agencies, NGOs, CETP Trust and Industries Association was completed between **October 2, 2010 and November 14, 2010.** Under this Bandi cleanup operation proper bunding of the river banks has been completed to stop the effluent going into the river. A channel has been dug-up in the river bed to ensure free flow of the water in the river and to prevent the stagnation of water in the river and the odour nuisance.

There are four CETPs already in operation in Mandia Road and Punayata Industrial areas, of which Units 1 and 2 are in Mandia Road and Unit no. 3 and 4 are in Punayata Road Industrial area. All these CETPs are inter-connected with pipelines to treat any additional effluent generated from these two industrial areas. The additional effluent, if any, from CETP Unit no. 1 and 2 is sent by pipeline to CETP Unit No.4 for treatment.

The CETP Trust is regularly monitoring the member units and outlet of the CETP for which a full- fledged laboratory has been setup by the CETP Trust.

Reuse and Recycling of Wastewater

A RO Plant of 2.5 MLD capacities is being implemented on BOT basis. The construction work is presently under progress. Besides, tertiary treatment facility shall also be provided for proposed CETP Units – V and VI.

There are two RO plants already in operation at M/s Maharaja Ummaid Mills (Cost Rs 2 crores) and M/s Gogar Group of Industries (Cost Rs 1.5 Crores), which are re using 1 MLD of water treated in the RO.

A RO plant of 2.5 MLD capacity is being setup at the cost of Rs 4.5 crores and is expected to be completed in March 2012. This will receive only the treated effluent coming from the CETP with tertiary facility.

With the continuous and persisting efforts of RSPCB and Industrial Association, all the water polluting units located within the industrial areas have been connected with either of the four CETP's located in Pali. Due to connectivity of CETP, individual effluent treatment plant are not developed with these industries except M/s Gogar Group of Industries, which has established its own ETP followed by RO unit for recycling of the treated process water.

DIC has also stopped registration of the new industries till the 5th CETP unit is commissioned. No new industries are being permitted.

The only large scale and water intensive textile industry viz. M/s Maharaja Shri Ummaid Mills, located outside the industrial area on the converted land has its own ETP (capacity 1.0 MLD) with RO system so as to reuse the treated water into the process and to maintain zero discharge status outside its own premises.

The RSPCB, Industrial Association and the CETP Trust are aware about purposeful utilization of natural resources including water resources and therefore have planned following mechanism for Reuse/recycle of treated waste water from CETP:

1. To develop RO Plant of 2.5 MLD at the cost of Rs. 4.5 crores by March 2012
2. To develop tertiary treatment with proposed CETP V (capacity 12 MLD) so that the treated effluent shall either be used directly by the textile units or may be diverted to RO unit.
3. To encourage development of RO Plant by the group of industries or at individual unit level on the basis of RO Plant established by M/s Gogar Group of Industries.

Sewage Disposal

To segregate the city sewage from industrial effluent, a City Sewer Line is under construction at a cost of **Rs. 30 crores**. After completion of the same 4 MLD of city sewage will be diverted from the present industrial drains to the new sewer line. Work order has been issued by Pali Municipal Council on 30.7.08 for construction of separate municipal drain from Subhash Nagar Siphon to Gandhi Nagar. Till now, 3,000 meters separate drain has been constructed and work of culverts and diversions is under progress. The sewer line will be connected to the 7.5 MLD STP, constructed at Punayata Road. The sewage from the City flows in to the River through three major and several small drains.

It is submitted that city growth is taking place along three highways towards Jodhpur, Jaipur and Sumerpur (on Ahmadabad Highway). Considering the general slope and sewage system design, Sewage Treatment Plant (STP) is already constructed on the bank of the River Bandi. A piece of land measuring 8.4 Ha, close to the proposed alignment of outfall sewer near Mandia Road, was provided by the Pali Municipal Corporation (PMC) for setting up this project. The capacity of proposed STP is 7.5 MLD and the estimated cost is **Rs. 8.2 Crores.**

The PMC has undertaken a study to establish the feasibility of power generation from its sewage treatment plant being established. Further actions in this regard shall be based on the findings of the study.

The cleaning of Gandhi Nagar drains and other main drains and repair work has been completed by the PMC. Separate drains have been laid to carry domestic wastewater between Subash Nagar siphon to Gandhi Nagar.

Pollution due to Effluent Disposal

Pali has four functional CETPs with a capacity to treat 34.68 MLD of industrial effluent. However, the Bandi River still remains polluted[4]. Bandi is a seasonal river which flows only during monsoon months and hence has less capacity to assimilate pollution.

The CETP Trust has established well equipped laboratory and is monitoring the treated water quality of the individual CETP, on daily basis, to confirm compliance of the stream standards imposed by the RSPCB. The Regional Office Pali is also monitoring the quality of the treated effluent of the individual CETP's once a month. The results of analysis are intimated to the CETP Trust for the required improvement in their operation. The monitoring of the individual unit is not preferred as all such units are connected with the CETP's.

2.2.2. *Present Status of Groundwater*

The District Administration with the help of Irrigation Department has managed to improve the water flow of the catchment areas to River Bandi resulting into improvement of the groundwater level and availability. Besides, the District Administration has also successfully executed the river cleaning project last year which will also help in the improvement in the quality of sub-soiled water.

2.2.2.1. Groundwater Quality

The ground water quality monitoring is being carried out by RSPCB at 6 locations on regular a basis. There are two MINAR point in addition to GW quality monitoring in Pali. The State Water Board is monitoring the Groundwater quality at 6 wells and 3 handpumps. The analysis reports are submitted to CPCB on regular basis.

[4] http://www.cseindia.org/category/topics/river-pollution as accessed on 8/8/2010

2.2.2.2. Sources of Pollution

Major identified units are tie and dye, textile processing and dyeing industries. Main industries located in this area are in operation since past 12 to 15 years. The main reason for such a large number of units is the availability of cheap labour during peak season, from April to October and suitability of ground water dyeing and block printing.

It was intimated by the Collector, Pali during the referred meeting that a River Cleaning Project (RCP) has already implemented by the District Administration, in association with the CETP Trust, Pali Municipal Council (PMC), Industries Association, Government Departments, NGOs and local people of Pali. By the said RCP, a 12 km stretch of River Bandi from bypass to downstream has been cleaned with an expenditure of **Rs 50 Lakhs** between October 2, 2010 to November 14, 2010. During this Bandi cleanup operation, proper bunding of the river banks has been completed to stop the effluent going into the river. A channel has been dug-up in the river bed to ensure free flow of the water in the river and to prevent the stagnation of water in the river and the smell nuisance.

2.2.3. *Action Plan for Control of Pollution*

2.2.3.1. Water Quality Monitoring Network

- Stringent monitoring mechanisms for effluent quality from individual industries and for treated effluent from CETPs
- Monitoring of wells along and downstream of River Bandi.
- Monitoring the chemical dosage used in CETPs for sludge reduction
- Water audit and metering (of both water used and effluents) should be made mandatory for industries
- There are 8 National water Quality Monitoring stations proposed at Pali. The details of each station are presented in **Table-9.**

Table 9 Proposed National Water Quality Stations at Pali

S.No.	Station code	Name of Location/ Station Identifier	District	Regional Office	Water Type	Frequency of Monitoring
1	2965	Shri Girdhari Singh Choudhary Near Bandi River Bridge, Pali Bye Pass Road,	Pali	Pali	Well	Half Yearly
2	2966	Shri Girdhari Singh Rajpurohit Near Village- Punayata, Jodhpur- Sumerpur Bye pass Road	Pali	Pali	Well	Half Yearly
3	2967	Sh. Pol Singh Purohit, Village- Punayata,	Pali	Pali	Well	Half Yearly
4	2968	Sh. Bhana Ram Kalal,Dharu Nagar, Near Main Mandia road Opp. Village-Mandia	Pali	Pali	Well	Half Yearly
5	2947	Jawai Dam, River Jawai	Pali	Pali	Dam	Quarterly
6	2948	Hemawas Dam, River Bandi	Pali	Pali	Dam	Quarterly
7	2950	Dhanari Dam, near Sawroopganj,River Banas	Sirohi	Pali	Dam	Quarterly
8	2949	Rankpur Dam, Ranakpur,River Luni	Pali	Pali	Dam	Quarterly

2.2.3.2. Pollution Control Measures

- Construction of appropriate closed conduit conveyance system for industrial effluents.
- Installation of tertiary treatment facilities with RO. for complete reuse of wastewater within the industry leading to zero-discharge.
- The CETP Unit No. 5 of **12 MLD** capacities shall have tertiary treatment so that treated effluent can be sent to the RO plant.
- In addition to existing four CETPs in Pali Industrial Areas, CETP Trust is also establishing a 5th CETP Unit of 12 MLD capacity with an investment of **Rs. 15.10 crores** is in Mandia road industrial area**.** The tenders for this CETP have been called. The work of 5TH CETP **shall be** completed by **August 2012.** RIICO has allotted 20,000 sq.m. land at a concessional price to set up the 5TH Unit of CETP.

- A 12 MLD capacity CETP unit no. 6 in Punayata road industrial area has also been approved and its estimated cost is **Rs 13.40 crores.** The work on this unit has not yet started for want of funds. RIICO shall allot land available in the area of Unit No. 3 to set up the 6th CETP
- A study on pipeline network and diversion and interception of all the drains in the City, which carry sewage to River Bandi, has been completed. The total cost of the sewage system and the sewers of **100 km length is Rs. 169 crores**, out of which, about 24 km length of sewer line has already been laid. The RUIDP has taken the project and is being executed through a private agency. Financial support from the GoI to complete the project is under consideration. The cleaning of Gandhi Nagar drains and other main drains and repair work has been completed by the PMC. Separate drains have been laid to carry domestic wastewater between Subash Nagar siphon to Gandhi Nagar.
- The RSPCB vide its order dated **22-02-2011** has permitted replacement of existing processes, machines with new machines provided the replacement is for conservation of natural resources and /or reduction of pollution load without increasing the capacity/discharge of effluent/consumption of water .
- In view of the advantages of the closed conduit conveyance system for carrying industrial effluent, the CETP Trust has already developed closed conduit HDPE pipeline (diameter varying from 210 mm to 700 mm) network for connecting the water polluting units in Punayta Industrial Area with CETP IV (capacity 12 MLD).
- The Trust is also considering to connect the member units located in Mandiya Road Industrial Area and Industrial Area Phase I and II with CETP I, II and III by closed conveyance system. The Trust is proposing to cover the existing open drains of Industrial Area that are being used for carrying industrial effluent to CETP. The concrete proposal shall be considered by CETP trust and RIICO Ltd in December 2012.
- The CETP Trust has also interconnected all the four CETP with the help of 600 mm, non-pressure RCC pipes to transfer any excess effluent of one CETP for treatment.

2.2.3.3. Infrastructure renewal

- The District Administration has also taken up restructuring and repairing of the old and traditional water storage structures for achieving better water management mechanism.

- PMC has issued tenders for the widening of the road between Housing Board to Panch Moukha on Jodhpur Road and construction of remaining drain between Housing Board to Petrol Pump.

2.2.3.4. Proposed Water pollution abatement measures

- Explore the possibility of development of the groundwater quality contours with groundwater board. The systematic study regarding variation of groundwater quality within the radius of 10 km from the industrial area can be considered after consultation with groundwater department.
- A Study by CAZRI/AFRI on identification of suitable plant species which can be successfully grown using treated waste water.
- Explore the possibilities to identify land parcels and their allotment for plantation based on recommendation of CAZRI/AFRI study report on raising a plantation of suitable plant species using the treated waste water.
- Study for development of lined channel system in the river course of Bandi River for disposal of treated effluent at suitable disposal point in order to prevent groundwater pollution in nearby area in consultation with district administration/water resource department.

2.2.3.5. Impact on CEPI Score

If all the recommendations for improving the water environment are implemented in a timely manner, CEPI score for 'Water' is expected to reduce by nearly twenty points. The CEPI Score post implementation of Action Plan will be 39.

Table 10: CEPI Score for Water Environment Post Implementation of Action Plan

S. No	CEPI Score	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index Water
1	**Existing CEPI**	4	5	20	8	3	3	14	5	3	0	15	15	**64**
2	**Post Action Plan CEPI**	3	5	15	3	3	3	9	5	3	0	15	0	**39**

2.2.4. *Managerial and Financial Aspects*

The details of actions to be undertaken and associated budgetary provision and expected Timelines of completion has been tabulated in the Short and Long-term Action Plans Incorporated in the Report.

2.2.4.1. Identified private / public sector, potential investors and their contribution/obligation

RIICO is the agency which would be responsible for development of industrial areas and provision of environmental infrastructure to abate pollution from industrial units. RIICO should be backed by relevant industrial associations and industries in respective areas to bring in perceptible improvement in environmental quality.

Municipal Council of Pali is the agency responsible to provide city level facilities. Both RIICO and the local body would have to work in tandem in aspects like stoppage of effluent and waste related disturbances / negative externalities on canals, lakes and other sensitive receptors. Support of the Ground Water Board, Water Resources Department and NGOs shall be sought in the rejuvenation of traditional water harvesting structures and rain water harvesting. Local bodies downstream of River Bandi shall arrange water supply and treatment facilities for the downstream villages, with the support of PHED.

For large infrastructure projects, National Competitive Bidding procedure should be adopted to bring in required technical expertise and investment. Funds from various Central and State government schemes in addition to attracting investment and operating support from specialized private agencies shall be suitably selected for various projects. For maintenance of critical infrastructure facilities, support of specialized private agencies shall be sought.

2.2.4.2. Governmental / Budgetary support requirement

For city level infrastructure projects, suitable funding can be availed from existing Central and State Government schemes like UDISSMT.

2.2.4.3. Monitoring System

A self monitoring system should be arranged within the industry premises for regular monitoring at the ETP. This would help in checking the effluent quality reaching the CETP thus reducing the effective load on the treatment facility.

2.3. Air Environment

Presently, the small scale textile units of Pali are not using Pet coke as the basic fuel because of its poor availability and cost. The use of wood as fuel has also been banned by RSPCB since February, 2011. Efforts are made by the Regional Office RSPCB and Industrial Association to prevent use of Pet coke without adequate preventive measures for control of

SO2. The ban on the use of wood as fuel by the RSPCB is being strictly monitored by the Regional Office, Pali with the help of District Administration.

The units are presently using coal or Refuse Derived Fuel (RDF) pellets procured from outside Rajasthan. The Industrial Association is also taking educational and awareness programmes with the industries so as to promote fuel efficient boilers and thermopacks for their own benefits as well as to reduce pollution. The RSPCB is also encouraging the low sulphur coal and other such fuels.

Most of the units have provided common stacks for their boiler and thermopack. Generally, the height of stack is around 30 meters from ground level and equipped with dust settling chamber/dust collector for prevention and control of air pollution (particulate matter). The few major industries like M/s Maharaja Ummaid Mills and M/s Gogar Group of Industries have already installed more efficient air pollution control device i.e. multi cyclone with their common stacks.

Nearly all the textiles units are willing to use the cleaner fuels like CNG or LPG provided such alternate fuels are available.

A GAIL pipe line is passing through Pali district at a distance of about 50 Kms from Pali town. The Industrial Association has taken up efforts with the Industries Department of the State Government to tap the available gas through a link pipeline for the commercial and industrial use. The plan for laying the link pipeline is not yet ready and thus a clear time schedule on the use of gas as fuel by the textile units cannot be given at this stage.

The units are utilizing the solar energy in the conventional methods for the drying of dyed fabric thereby saving the considerable fuel. The use of wind energy by the textile industries has not been considered.

A study on the stack emission monitoring during the trial runs of co- incineration in cement kiln at M/s JK Lakshmi Cement, Jaykaypuram, Sirohi Rajasthan was jointly conducted by RSPCB and CPCB in 2008. The results of this study indicate that the impacts of CETP sludge for co-processing as fuel were negligible. The study concluded that the co-processing of the CETP sludge in cement kiln was beneficial to environment in terms of its disposal and conservation of the fossil fuels.

The Trust has recently approached cement industries, viz. M/s Binani Cement Industries and M/s JK Lakshmi Cement Industries at Pindwara (Sirohi) and M/s Shri Cement Industries at Beawar. However, all the cement industries are awaiting the approval of CPCB.

The Ambient Air Quality is being monitored at Regional office of RSPCB Pali, RIICO Regional office, Pali and Circuit House Pali on a regular basis.

Presently, the RSPCB has not installed any ambient air quality station in Pali due to non-availability of instruments. Subsequent to installation and commissioning of the Regional Laboratory, the ambient air quality monitoring is likely to be carried at Regional office, RSPCB Pali, RIICO Regional Office, Pali, circuit House Pali, CETP Pali and Residential and commercial areas of Pali. There are no major mines or quarrying areas close to Pali town therefore such monitoring is not required.

2.3.1. *Sources of Air Pollution*

Air pollution due to Road Traffic / Vehicular Emissions

Air pollution due to vehicular emissions is observed in traffic intersections, commercial nodes etc. However, pollution monitoring network need to be further strengthened to suggest effective measures to control and prevent air pollution.

2.3.2. *Action Plan for Compliance and Control of Pollution*

2.3.2.1. Ambient Air quality monitoring network

Pollution should be monitored at main traffic intersections and commercial nodes in addition to industrial areas.

2.3.2.2. Impact on CEPI Score

Impact on the CEPI score after installation and commissioning of air pollution control systems has been calculated as shown in **Table-11**. The CEPI Score is expected to reduce to 41.

Table 11: CEPI Score for Air Environment Post Implementation of Action Plan

S.No	CEPI Score	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index, Air
1	**Existing CEPI**	3	5	15	4	0	0	4	5	4	3	23	10	52
2	**Post Action Plan CEPI**	3	5	15	3	0	0	3	5	3	3	18	5	**41**

2.3.3. *Managerial and Financial Aspects*

2.3.3.1. Cost and time estimates

Cost and time estimates are provided in the consolidated tables on Action Points.

2.3.3.2. Governmental / Budgetary support requirement

For city level infrastructure projects (like traffic management measures) suitable funding can be availed from existing Central and State Government schemes like UDISMT.

2.4. Land Environment

2.4.1. *Soil Contamination*

2.4.1.1. Present levels of pollutants in land / soil

The soil studies along the River Bandi were conducted by Central Arid Zone Research Institute (CAZRI) about 10 yrs back. In order to fresh assessment of the contamination of soil along Bandi River, the Agriculture Department has been directed by the District Collector in the meeting held on 22.3.2011 to undertake the soil contamination study along River Bandi. The study is expected to be completed by July 2011. The National Productivity Council has conducted a damage assessment of River Bandi on the directions of Hon'ble High Court.

2.4.1.2. Sources of soil contamination

Main sources of soil contamination in Pali are spill over dyes, effluent from industries and CETPs, city sewage and solid waste.

2.4.2. *Waste Generation and Management*

2.4.2.1. Municipal Solid Waste

It has been estimated that total MSW generation for Pali city with a population of 1,87,571 is 100 tonnes per day (TPD). Currently there is no Waste Processing Facility or Sanitary Landfill proposed in Pali.

Table 12: Details on Municipal Waste Generation at Pali

Name	Class	Status of land identified	Quantity of MSW	Establishment of Disposal Facility	Year of Commissioning
Municipal Council of Pali	I	Identified	95-100 MT/Day	-	-

To secure proper collection, transportation and disposal of Municipal Solid Waste, the PMC has already identified a land near village KHETAWAS measuring approx 220 bigha which has been allotted and approved by the District Administration for the development of Municipal Solid Waste Facility. The PMC has also appointed M/s Aawas Vikas Sansthan Ltd., Jaipur for the preparation of Project report for development of integrated Municipal Solid Waste Facility.

2.4.2.2. Hazardous waste[5]

Present status of Compliance of Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 in Rajasthan

The RSPCB is regularly conducting survey, inspections of hazardous waste generating units for compliance of Hazardous Waste (MH & TM) Rules, 2008 and subsequent amendments. The RSPCB has identified 785 units up to end of June 2010 which is covered under the HW (MH & TM), 2008. Out of identified 785 industries, 115 industries are closed since long or dismantled or closed subsequent to the directions issued by the RSPCB for violation of the provisions of HW (MH & TM) Rules, 2008.

Present Status of Hazardous Waste in Pali Industrial Cluster

Hazardous waste generation is summarized in **Table-13**.

Table 13: Inventory of Hazardous Waste Generated in Pali Region

Sr. No	Industrial Area	Hazardous Waste Generated			Hazardous Waste Disposal (MTA)		
		Schedule - I (MTA)	Schedule – II (MTA)	Total (MTA)	Land Disposable	Incinerable	Reprocessable
1	Pali	3045	0	3045	15	3000	30

Source: Solid Waste Management Cell, RSPCB

Hazardous waste from the district is sent to the State level facility for disposal of hazardous waste namely, the Common Hazardous Waste Treatment; Storage & Disposal Facility developed at Village Gudli, Tehsil Mavli, Dist. Udaipur. The waste from CETPs is also being disposed off in CHWTSDF at Udaipur. As per records of CETP Trust, Pali, 1843.25 tons of hazardous waste was disposed during last year (April 2009 to March 2010). Prior to developing the CHWTSDF at Udaipur, the sludge from CETPs was stored at 3m deep lined pits. The sludge was then used by Laxmi Cements as an alternate fuel (5% mix with regular fuel). To encourage co-processing of hazardous waste, the CPCB has granted

[5] Source: Inventory of Hazardous Waste Generation Units in Rajasthan & Action Taken Report (up to 30.06.2010), Rajasthan Pollution Control Board.

permission/approval under Rule 11 of HW (MH & TM) Rules, 2008 to some industrial units for co-processing of ETP sludge from textile industries.

To secure proper disposal of the hazardous waste i.e. chemical sludge of Common Effluent Treatment Plant (CETP), the entire sludge of the all four CETPs dried on the cemented platforms, transferred to covered storage and subsequently transported to Hazardous Waste Treatment, Storage and Disposal Facility (TSDF) near Udaipur. The State Board is also encouraging the CETP Trust to obtain permission under Rule 11 of the Hazardous Waste (Management, Handling and Trans boundary Movement) Rules'2008 from CPCB.

The CETP Trust has constructed two sheds to store the sludge generated from the existing CETPs which is sent to CHWTSDF, Udaipur.

Development of laboratory

The RSPCB has developed a fully fledged analytical facility with well qualified scientific officials for analysis & characterization of hazardous waste at its Central Laboratory at Jaipur. The Regional Officer of RSPCB at Pali have also been entrusted the work for monitoring of the provisions of HW (M,H & TM) Rules, 2008 by the identified hazardous waste generating units as well as disposal facilities of their jurisdiction.

2.4.2.3. Biomedical Waste

Biomedical waste generated at Pali is sent to the Common Bio Medical Waste Treatment Facility (CBWTF) installed by M/s Sales Promoters in Jodhpur (ADB Waste site, Jaisalmer Road).

Presently, there are 185 Health Care Facilities (HCFs) in Pali which includes nil hospitals of bed capacity more than 500 beds,1-hospitals with bed capacity between 200 to 500 beds, 11 hospitals with bed capacity between 50 to 200 beds, 91 hospitals of bed capacity less than 50 beds and 82 other HCFs including clinics, dispensaries and pathology labs. The estimated quantity of the biomedical waste is 729.70 kg. per day. Presently the BMW from these HCFs is segregated, collected, transported treated and disposed in the Common Bio Medical Waste Treatment and Disposal Facility located at a distance of app 85 K.M. at Jodhpur. The current common treatment facility requires augmentation to comply with CPCB guidelines for operation and establishment of common treatment facility.

2.4.3. *Pollution Abatement Measures*

- The CETP Trust is also making efforts to supply CETP sludge for co-incineration in cement kilns. However, the response from the cement industry in this regard is poor in spite of the beneficial uses of sludge in the kilns established under CPCB-RSPCB joint study.
- It was clarified by the Industrial Association that the dyes used by the textile units cannot be stored in open as such storage is not recommended by the manufactures of the dyes as it would adversely affects the quality of the dyes. In order to save the quality of dyes and other chemical, nearly all the units have provided proper covered storage rooms for dyes and chemical. Also, there is no open storage of dyes in the Pali market. The empty containers of the used dyes and chemicals are either recycled to the manufactures or are sent to CHWTSDF, Udaipur for disposal by textile units
- Excessive use of synthetic chemical dyes should be restricted. They should be replaced by vegetable dyes, which are eco-friendly.

2.4.4. *Impact on CEPI score after Abatement of Pollution*

The present CEPI score for Land Environment is much below 60 indicating not very severely polluted condition. With the action points as suggested in the previous section, the score would further reduce to 39.

Table 14: CEPI Score Post for Land Environment Implementation of Action plan

S.No	CEPI Score	A1	A2	A	B1	B2	B3	B	C1	C2	C3	C	D	Sub Index, Land
1	**Existing CEPI**	2	5	10	6	3	3	12	5	3	0	15	15	52
2	**Post Action Plan CEPI**	2	5	10	3	3	3	9	5	3	0	15	5	**39**

2.4.5. *Infrastructure facilities*

- Co-processing of CETP sludge in Cement industries: To encourage co-processing of hazardous waste, the Central Pollution Control Board has granted permission/approval under Rule 11 of HW (MH & TM) Rules, 2008 to some industries for co-processing of ETP sludge from textile industries. The sludge from CETP at Pali may be allowed by RSPCB to be sent to approve cement industries preferably in or near Pali, for co-processing.

- Preparation of Detailed Project Report and Setting up of a Comprehensive Solid waste management system including segregated storage, collection, transport, treatment and disposal (composting and Sanitary landfill facility for 100 TPD of Municipal Solid waste (MSW)) at Pali, as per MSW Rules 2000.
- RSPCB will coordinate and cooperate with the CETP Trust, Transport Department, Municipal Council, and Industries Association to ensure protection of the environment in Pali.
- The RSPCB has already initiated a program for web enabled environmental information management system for data access and data linkage for the monitoring results carried under National Air Monitoring Program (NAMP), National Water Monitoring Program (NWMP), State Air Monitoring Program (SAMP) and State Water Monitoring Program (SWMP). The program is likely to be started by **November 2011.** Presently there is no proposal to install real time continuous ambient air quality monitoring stations at Pali and therefore, it would not be feasible to have direct linkage between the environmental information management system and the monitoring device.

2.4.6. *Managerial and Financial Aspects*

2.4.6.1. Cost and time estimates

Cost and time estimates are provided in the consolidated tables on action points.

2.4.6.2. Identified private / public sector, potential investors and their contribution/obligation

City level infrastructure like SWM system shall be developed by the Municipal Council of Pali.

2.4.6.3. Governmental / Budgetary support requirement

Suitable funding can be availed from existing Central and State Government schemes.

2.5. Other Infrastructural Renewal Measures

Below is the summary of infrastructure up-gradation/renewal measures suggested for overall improvement of the Pali Industrial Cluster:

- Development of proper road infrastructure within the Industrial Cluster
- Green Belt Development:
    - About 250 trees have been planted in the Mandia Road Industrial Area. In addition, about 250 plants have been planted in the Punyata Industrial Area (a

newly developed area by RIICO) and about 300 plants have been planted in the Industrial Area Phase I and II.

- The CETP Trust and industries association have also under-taken road side plantation in the entire industrial area. A small garden has been also established near RIICO Phase III at Mandiya Road.
- RIICO Ltd., the Industrial Association and the CETP Trust are promoting plantation in available open lands and on road side in the industrial areas so as to maintain the ambient air quality as well as to prevent air borne dust particles produced by transportation and material movement.
- **500 trees have been planted on open land in Industrial area. 750 trees have been planted near the road side of the newly developed Industrial Area.**
- The PMC is regularly undertaking road side plantation and in the vacant areas before monsoon. PMC has identified following areas to undertake plantation in the ensuing monsoon.
    - Khaitawas, about 2,000 trees
    - About 220 Bhigas of land has been identified in new colony at Sumerpur Road
    - About 10 Bhigas of land have been identified on near Bypass road in Sumerpur.
- A "Smriti Van Project" is to be developed on a plot area of 20,000 sqm in the RIICO Industrial Area **adjacent to Punayata Industrial Area** in the remembrance of the River Cleaning Project, carried out during **October and November 2010**. PMC and Industries Association Pali have contributed **Rs. 5 lakhs** each for development of the Smrati Van. The project is expected to be developed by September 30, 2011.
- The PMC has made it mandatory the development of plantation in 33% of the total area under new up-coming residential colonies. Besides this, any cutting of the tree requires prior approval of the Forest Department so as to prevent illegal cutting of trees

2.6. Specific Schemes

Following schemes are suggested for better monitoring and enforcement of environmental improvement measures in the Pali Industrial Cluster:

- The RSPCB has planned to establish well equipped laboratory with the Regional office Pali. The process for procurement of required equipments is under process, which is likely to be completed by **November 2011** and the regional laboratory shall start functioning from **December 2011**.
- Subsequent to commissioning of Regional Laboratory Pali, the work related with the water quality monitoring and air quality monitoring shall be enhanced. It shall be then feasible to ensure frequent periodic monitoring of the influent and treated effluent of CETP, surface drains of city, leachates of hazardous waste storage facility, outlets of individual units and frequent water quality monitoring in upstream and downstream of River Bandi.

2.7. Public awareness and Capacity Building

The RSPCB has recently undergone complete restructuring for better management of the State Board activities. Under this restructuring process following new cells/departments were established at the RSPCB Head Office in Jaipur:

- Planning & Internal Capacity Building Cell
- Technical Cell - 3 Nos., based on various types of industries
- Vigilance Task Force
- Mining Cell
- Solid Waste Management Cell- HW/BMW/MSW/Plastics/e-Waste
- Climate Change Cell
- Miscellaneous Urban Infrastructure Development Cell
- Public Awareness and Assistance Centre
- IT Support and E-governance Cell
- Legal Cell
- Central Laboratory
- Accounts
- Administration and Cess

In addition to monitoring and enforcement, the RSPCB is taking initiatives in the issues and activities related to Public Environmental Education, Awareness and Assistance. Following activities are included in the agenda for public awareness:

- Distribution of promotional literature
- Well established library facility
- Dissemination of information on issues related to brick kilns and lime kilns
- Awareness creation on issues related to Noise Pollution and Noise Pollution (Regulation & Control) Rules, 2000.
- Environmental awareness programs on FM Radio.

The regional office at Pali has 4 technical officers (EE:1, AEE:1, JEE:2) and 4 scientific officers (SO:1, JSO:1 and SSA:2). There is an urgent need to double the strength of technical and scientific staff at regional office Pali with a provision of separate transport facilities to them in order to enhance the regulatory and monitoring functions carried out by this staff in order to enforce the regulatory regime by the regional office Pali.

Training and capacity building of the RSPCB staff is underway. Regular training programs in various technical as well as administrative spheres are being conducted for strengthening of central and regional laboratories. e-Governance is being introduced for faster and better Consent Management and efficient monitoring of environmental infrastructure facilities such as air and water monitoring stations, CETPs, STPs, etc.

2.8. Summary of Proposed Action Points

The proposed Action Plan for abatement of pollution is based on the secondary data collected from RSPCB and other concerned agencies. The action points mentioned have been categorized into Short Term and Long Term Measures (refer **Table-15**) based on the timeframe required for their implementation. Short Term Action Points include measures that require one year or less for implementation i.e., December 2012, while the Long Term Action Points include measures that require time beyond one year for implementation.

Table 15: Final Action Plan for Pali Industrial Cluster: Short Term and Long Term Action Points (REVISED POST CPCB IN-HOUSE COMITTEE REVIEW)

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
Short Term Action Plan- Air					
1	Performance monitoring of major air polluting industry for assessment of compliance of the notified air emission standards.	RSPCB, RIICO, Industrial Association	April 2012	Approx. Rs. 25-40 Lakhs	The work of stack emission monitoring of the identified major air polluting industries in the industrial cluster would be taken up by RSPCB in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the emission standards notified under EP Rules '86
2	Up-gradation of the air pollution control measures e.g. dust collector, multi cyclone etc. with the non compliance industries.	RSPCB, RIICO Industrial Association	October 2012	Not Available	The State Board will issue directions under the provision of Air Act' 81 to the non complying industry for up gradation for the air pollution control measures before end of Oct- 2012
3	Installation of ambient air quality monitoring station	RSPCB/RIICO/Industries Department	March 2012	Approx. Rs. 45 lakhs	At least three ambient air quality monitoring stations to monitor the ambient air quality as per the NAAQMS are under consideration in Pali with analytical facilities (lab facilities) for monitoring of the air quality of the Pali industrial clusters.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
4	Discontinuation of the use of wood and high sulphur based coal in industries	RSPCB, Industry	Ongoing activity	---	The State Board has already issued direction to ban use of wood as fuel in February 2011. The industries are also being advised to discontinue use of high Sulphur content coal.
5	Adoption of measure to curb vehicular pollution	District administration, RSPCB , Transport Department and RIICO	December 2012	Not Available	a. To develop bypass road/ring road for heavy traffic in the industrial cluster. b. One way traffic system with traffic signals in industrial cluster. c. To augment cleaner fuel availability in Pali. d. To repair, widen and maintain the existing roads in the industrial cluster.
Long Term Action Plan-Air					
1	Installation of Real Time Ambient Air Quality Monitoring Station	RSPCB & CPCB	March 2013	Approx. Rs. 1.25 crores	The Station will provide real time Ambient Air Quality for PM 2.5, PM10, SO2, NOx, CO, O3 and BTX. The real time data shall be available with Board's Head office Jaipur and Regional Office, Pali for future plans/ strategy for prevention

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					and control of ambient air quality of the Industrial Cluster. The station will also provide necessary meteorological data including wind speed, wind direction, temperature, pressure and humidity.
2	Construction of Bypass roads for non industrial activity related traffic movement	RIICO, local Authority/ Municipality and PWD	March 2013	Not Available	The details of the action plan & estimated cost will be prepared by concern authority.
3	Cleaner fuel availability for industry	Industries Department, GAIL & RIICO	Not Available	Not Available	A GAIL pipe line is passing through Pali District at a distance of about 50 Kms from Pali town. The Industrial Association has taken up with the Industries Department of the State Government to tap the available gas through a link pipeline for the commercial and industrial use. The plan is in the initial phase, therefore, a clear time schedule and estimated cost on the use of gas as fuel by the Industries is not submitted at this stage.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
4	Promotion of Clean Fuel and latest technology (boiler/ thermopack by the industry)	RSPCB, Industry and Industrial Association/ RIICO	Not Available	Not Available	The State Board may take a view to advise the major air polluting industries for promotion of cleaner fuel and replacement of existing boiler/thermo pack which are 10 year old.
Short term Action Plan- Water					
1.	Assessment of the compliance of the effluent quality standards of the water polluting industries with the prescribed standards of effluent quality for inlet to CETP as specified under EP Rules	RSPCB, RIICO Industrial Association, CETP Trust	June 2012	Approx. Rs 25 lakhs	The work of effluent quality assessment of the identified major water polluting industries in the industrial cluster would be taken up by RSPCB in association with recognized laboratory of the State Board/ CPCB/MoEF for assessing compliance of the inlet to CETP standards notified under EP Rules'86.
2	Up-gradation of the primary treatment facilities e.g. physicochemical treatment etc. with the non compliance industries.	RSPCB, RIICO Industrial Association, CETP Trust	October-2012	Not available	The State Board will issue directions under the provision of Water Act' 74 to the non complying industry for up gradation for the primary treatment facilities before end of Oct- 2012
3	Installation of Flow meter / Water mater with each member unit of CETP trust for monitoring of compliance of	RSPCB, RIICO Industrial Association, CETP Trust	March 2012	Not Available	RIICO will ensure that each industry sets up water meter/flow meter within the given timeframe.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
	the permitted discharge quantity by CETP Trust.				
4	Development of Sewerage System	RSPCB, RUIDP, Municipal Corporation	July 2012	Approx. Rs. 30.11 crores	Under UIDSSMT scheme project for development of 100 km sewer pipeline was sanctioned. The development work of 24 km of sewer line has been completed. The remaining work is under progress Subsequent to completion of the work; the city sewage shall be segregated from the industrial waste water & shall be taken to STP for required treatment.
5	Commissioning of Sewage Treatment Plant (STP)	RSPCB, RUIDP and Municipal Corporation	March 2011	Approx Rs. 8.22 crores	Under UIDSSMT scheme project of construction of 7.5 MLD STP was sanctioned. The construction work of STP was completed and shall be commissioned once the work of laying down the sewerage line is completed. The commissioning of STP will prevent discharge of untreated sewage to river Bandi which will result in prevention of contamination of groundwater.
6	Up-gradation of the ETP of large scale polluting Industry of Pali	RSPCB, Industry	September 2010	Approx. Rs. 2.25 crores	The only large scale textile processing industry of Pali viz M/s Maharaja Shree Umed Mill has up-graded the

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					existing ETP having capacity of 900 KLD by installation of RO Plant of 1.1 MLD capacity for reuse of treated effluent.
7	Cleaning, Desilting & repairs of the open drains for transportation of untreated industrial effluent to CETP in the industrial area	RIICO CETP Trust , Pali RSPCB	March 2012	Appox. Rs. 20 Lakhs	The cleaning of the drains will prevent overflow and spread of effluent on the land. This will also help in smooth conveyance of effluent to CETP.
8	Performance monitoring of CETPs and STPs	RSPCB, CETP Trust and Municipal Corporations	Ongoing Activity	Appox. Rs 2 lakhs	RSPCB is monitoring the performance of CETP on monthly basis which includes the quality of treated effluent and disposal of ETP sludge. The performance monitoring of STP shall be taken up after its regular commissioning.
9	Construction of a CETP of 12 MLD capacity	CETP Trust, Industrial Associations and RSPCB	August 2012	Approx. Rs. 15.10 crores	Construction work of CETP Unit V at Mandia Road Industrial Area has been started. Foundation stone has been laid on 4 Sept 2011. EC has been issued.
10	Monitoring of groundwater quality	RSPCB, CETP Trust, RIICO	March 2012	Approx. Rs. 1-2 lakhs	The State Board has increased groundwater quality monitoring points from earlier two points to six

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					points around Pali under NWMP having frequency of monitoring one sample in six month. The frequency of the sampling of all the six points shall be increased to once in three months for upgrading the monitoring of ground water.
Long Term Action Plan- Water					
1	Construction of the additional CETP of 12 MLD capacity	CETP Trust, Industrial Associations and RSPCB	August 2014	Approx. Rs. 13.40 crores	EC has been issued. Construction of CETP Unit VI at Punayata Road Industrial Area is proposed in the same premises of CETP III.
2	Construction of closed conduit conveyance system for carrying industrial effluent to CETP	RIICO, CETP Trust and Industrial Association	December 2013	Not Available	Presently, the industries are connected with CETPs I, II and III by open channel to carry their effluent in Mandiya Road Industrial Area and Industrial area Phase I & II. The existing open conveyance system is to be replaced by closed conduits. The proposals shall be considered by CETP Trust and RIICO in December 2012. Further action shall be taken on their decision.
3	Recycling of Treated Effluent of CETP	CETP Trust, RSPCB, RIICO	Not Available	Not Available	The CETP Trust is to consider the feasibility for establishment of RO plant with existing and proposed

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					CETP No. V &VI to reuse of the treated effluent. The permeate from the RO plant will be sold to member units so as to meet with the operating cost of RO plant. The recycling of the treated effluent will also save the natural resources.
4	Installation of rain water harvesting system in the buildings and institutions	RIICO, Municipal Corporation , RSPCB	Ongoing activity	Not Available	The RIICO is making allocation of new plots with the condition for installation of proper rain water harvesting structures for the proposed industrial unit. This will improve the level of groundwater in the industrial cluster as well quality of ground water.
Action Plan Land					
1	Development of Municipal Solid Waste (MSW) treatment and disposal facility	Municipal Corporation, RIICO and RSPCB	Not Available	Not Available	To secure proper collection, transportation and disposal of municipal solid waste in accordance with the provisions of municipal solid waste (Management & Handling) Rules 2000, proper secure land fill facility is to be developed. The proper disposal of MSW will prevent polluted runoff of rain water from the disposal site during rainy

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					days as well percolation of leachate to ground water. The Pali Municipal Corporation has already identified a land area of 220 bigha near village Khetawas for development of MSW treatment and disposal facility. The identified land has been allotted and approved by the District Administration for the development of MSW Facility. The detail project report, estimated costs and time schedule is to be received from Pali Municipal Corporation.
2	Augmentation of treatment and disposal facility for Bio-medical Waste	Medical and Health Department, RSPCB and Municipal Corporation	December 2012	Not Available	The Biomedical waste from the health care facilities of Pali is being collected, transported and disposed with the authorized Common Bio Medical Waste Treatment and Disposal Facility located in Jodhpur i.e., at distance of approx. 85 km. The RSPCB is monitoring the disposal of biomedical waste in accordance with the provision of Bio Medical Waste (Handling & Management) Rules 1998. The disposal facility requires augmentation for the compliance of CPCB guidelines for treatment and

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					disposal facility of BMW.
3	Disposal of Hazardous Waste	CETP Trust, Industries, RIICO , RSPCB, Rajasthan Waste Management System and UCCI	Ongoing Activity	---	The CETP sludge from physico chemical treatment comes under the definition of hazardous waste. This sludge is presently collected, dried and transported to, common treatment storage and disposal facility develop by Rajasthan Waste Management System near village Gudli in accordance with the provisions of Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules 2008. The RSPCB has advised the CETP Trust to encourage co incineration of the ETP sludge in Kiln of Cement Plant with prior approval under the Rules for co-incineration. This will result in reduction of disposal cost as well recovery of the energy.
Action Point-Others					
1	Development of green belt and tree plantation in industrial area	Forest Department, Industry, RIICO, RSPCB	Ongoing activity	Appox. Rs. 30-50 Lakhs	The RIICO and CETP Trust is to develop & encourage road side plantation in the industrial cluster as well as to develop green spot in cluster for maintenance of ambient

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					air quality. RIICO has proposed annual budget of Rupees 30-50 lakhs for the plantation of tree.
2	Capacity Building for prevention & control of Pollution	RIICO , CETP Trust & RSPCB	December 2013	--	**2. Following actions shall be taken up by the RSPCB:** a. Strengthening of technical and scientific manpower of Regional Office, Pali (RO, Pali) b. Strengthening of regional laboratory of RO, Pali for regular assessment of PCM with the industries, CETP, water quality and air quality of the area c. Education and training of technical and scientific staff of familiarization with the latest technology for pollution control and analytical techniques d. Strengthening of online connectivity of RO, Pali with HO-Jaipur and CPCB Delhi for upgrading the data transfer mechanism

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					e. Seminar and workshop for education and awareness of the project proponents for adoption of cleaner fuel and advanced process techniques for reduction of air emission and effluent discharge as well as to reduce the consumption of chemicals and dyes. **3 Following action shall be taken up by RIICO Limited & CETP Trust**: i. Development of Regional Research Centre for development of new technology for reduction of dyes & chemicals in textile processing as well as reduction of water requirement. ii. To encourage use of cleaner fuel by providing soft loan for replacement / conversion of the existing boiler / thermo pack to cleaner fuel.

Sr. no	Action points (Including source and mitigation measures)	Responsible stakeholders/Agency involved	Time limit	Cost (INR)	Remarks
					iii. To develop non polluting industries like weaving units / readymade garment manufacturing units for diversion of industrial activities. iv. To encourage & provide soft loan to major polluting industrial unit which intends to install RO plant at their own for recycling of their effluent.

Note: While reporting the interventions to reduce CEPI, various studies, reports, Master Plans, RSPCB and RIICO data was referred to and wherever the information was available, the costs of interventions have already been included in the Final Action Plans. These interventions will be implemented by different agencies, including RIICO as identified in the Report.

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