Report of the High-Powered Committee

(Before Hon'ble NGT, PB)

In the Matter of:

Original Application No. 32(THC) of 2014

(M.A. No.921/2018)
(CWP No. 9503/2012)

KisanParyavaranSangaharshSamiti, Jaipur
Vs
State of Rajasthan &Ors.

Report submitted in compliance of

order dated December 21, 2018

Report Submitted by:

1. **Dr. AjitPratap Singh, Professor, BITS, Pilani**
2. **Dr. Akhilendra Gupta, Professor, MNIT, Jaipur**
3. **Dr. A.B. Akolkar, Former Member Secretary, CPCB**

15th January, 2019

Prof. Ajit Pratap Singh Prof. A. B. Gupta Dr. A.B. Akolkar

Dr. AjitPratap Singh, Professor, BITS,Pilani	Dr. AkhilendraGupta, Professor, MNIT, Jaipur	Dr. A.B. Akolkar, Former Member Secretary, CPCB

2919

In Original Application No. 32 (T_{HC})/2014

Kisan Paryavaran Sangarsh Samiti

Vs

State of Rajasthan & Ors.

Report of the Team of Scientists/ Commissioners in compliance of order of Hon'ble NGT dated 21.12.2018 relating to; River Bandi and Common Effluent Treatment Plants (CETPs) at Pali, Rajasthan.

Report submitted by:

Dr. Ajit Pratap Singh, Professor and Dean, BITS, Pilani, Rajasthan
Dr. A.B Gupta, Professor, NIT, Jaipur, Rajasthan
Dr. A.B Akolkar, Former Member Secretary, CPCB, New Delhi

Dated: 17.01.2019

Contents of Main Report

1. Order of Hon'ble NGT (21.12.2018).....2
2. Team of Scientists/Commissioners.....2
3. Issues of concern.....2
4. Findings and background of visits earlier reports.....2
5. Task performed by the of team.....4
6. Visit schedule and coverage.....4
7. Observations 4
   - 7.1 River Bandi.....4
   - 7.2 Nehda Dam.....5
   - 7.3 CETPs.....5
   - 7.4 Random checks of industries.....13
   - 7.5 Health and Agriculture.....13
   - 7.6 The Ground water.....14
8. Compliance with Action Plan, 2018.....14
9. Damages to the environment and compensation.....16
10. Concluding observations and Action Plan, 2019.....17
11. Surveillance and Monitoring.....21

1. **Order of Hon'ble NGT dated 21.12.2018**:

Hon'ble National Green Tribunal (NGT) in *O.A No. 32 (T_{HC}) of 2014 in the matter of Kisan Paryavaran Sangharsh Samiti Vs. State of Rajasthan & Ors,* ordered on 21.12.2018 that team of Scientists to visit Pali, its industrial areas and river Bandi as well as Nehda Dam and Common Effluent Treatment Plants (CETPs). (Annexure R-1).

2. **Team of Scientists/Commissioners:**

The team of Scientists/Commissioners included:

i. Dr. Ajit Pratap Singh, Professor and Dean, BITS, Pilani Rajasthan

ii. Dr. A. B. Gupta, Professor, NIT, Jaipur, Rajasthan

iii. Dr. A. B. Akolkar, Former Member Secretary, CPCB, New Delhi

3. Issues of concern:

i. River Bandi is polluted due to discharge of industrial effluents and sewage disposal of Pali town.

ii. Polluted water flowing in River Bandi is a constant threat for health of villagers and to the agriculture.

iii. Installed CETPs not achieving zero liquid discharge (ZLD) and effluents still being discharged into River Bandi.

iv. Industries discharging effluents to CETPs without having primary effluent treatment plants (PETPs)

4. Findings (Background) of earlier visit reports:

4.1 The team of Scientist referred and studied the following Reports placed on records. The Action Plan/Recommendations of the Committee, dated 15.04.2018 is as follows:

"In view of the grave situation of the water quality of the river and Nehda reservoir, ground water quality and land pollution, and in the overall interest of the health of the people of Pali, we recommend that no

treated or untreated industrial effluent should be allowed to be discharged in river or on adjacent land in any form. Further, considering not only the feasibility but also the economic viability and the environmental sustainability of CETPs, even on a small to moderate scale, we recommend that:

a. *The industries should be required to recover water and reuse it form the tertiary treated effluent instead of discharging into the river.*
b. *CETP-VI should adopt multi stage Reverse Osmosis System (RO Plant) of adequate capacity for recovery of water and its reutilization by the member units of CETP, followed by RO reject management system such as Multi Effect Evaporator, and residual salt management.*
c. *The CETP management should also prevent the river and land from any damage from the RO reject generated from CETP.*
d. *CETP-II, III and IV should also be upgraded to incorporate a tertiary treatment system together with the multi stage Reverse Osmosis System (RO Plant) of adequate capacity for reuse and reutilization of treated water along with the reject management system such as Multi Effect Evaporator, and residual salt management.*
e. *The individual industries should periodically monitor the quality of effluent discharged from the primary treatment facilities for smooth and efficient operation of CETPs, and should comply with the consent conditions."*

4.2 Report of the District Collector filed on 08.06.2018 based on visit made by him on 06.06.2018 (Pg No. 2681 to 2691).

4.3 Report of the Divisional Commissioner filed on 03.07.2018 based on visit made on 26.06.2018 (Pg No. 2693 to 2719).

4.4 Report of Member Secretary of Rajasthan Pollution Control Board dated 30.10.2018 based on his visit made on 26.10.2018 in compliance of Hon'ble Tribunal's order dated 09.10.2018 (Pg No.2841 to 2857).

5. **Task performed by the team:**

The team of Scientists based on past reports, performed following task:

i. Field visit to River Bandi and Nehda Dam

ii. Interaction with villagers, farmers and the village "Pradhans"

iii. Inspection of CETP units 1,2,3,4,5 and 6 and STP at Pali

iv. Random check of Industries.

6. Visit Schedule and coverage:

i. The Team assembled at Jodhpur and Pali and carried out inspections on 12th and 13th January, 2019.

ii. Team collected samples of river Bandi and from CETPs. Team also checked pH values using pH strips.

iii. Collected samples are being analysed.

7. Observations:

7.1 River Bandi (Jodhpur by-pass)

i. Team visited upstream location of the river (Pali town) where ditches/pools in river bed were seen. There was no flow of fresh water in the river and only ponding was seen.

ii. At this location, water quality data is not available with RPCB and sampling if carried out, will not be representative.

iii. The next location was river Bandi at Jawadia - Giradara Puliya, where it was seen that green coloured effluent was flowing. Villagers and the farmers interacted with the Team and expressed their anguish. They expressed that the river water cannot be used for irrigation as its use for irrigation is damaging the crops and also resulting in long term deterioration of soil productivity. Also, the condition of puliya

(culvert) is the worst which is very risky for vehicular movements. No sign board and railing have been found.

iv. The next location was seen at Jaitpura-Gadhwara Puliya where the same coloured effluent was flowing in the river with foam formation. The pH of river water at the site was observed as 9.0. The dark greenish sludge at the site can be seen very clearly which may be due to reaction of reactive dyes.

v. Another location was NH bye-pass bridge which is located downstream of CETP. This is the critical location where river has been found severely polluted due to illegal disposal of industrial and sewage effluents.

7.2 The Nehda Dam:

This dam was built in the year 1985 with the purpose for irrigation. At his location, village Pradhans along with villagers gathered and expressed their views on damaging effects of effluents stored on dam site. The villagers informed on health effects and showed us affected agricultural fields. All along the river banks, there was deposition of green coloured sludge which is a clear indication of industrial effluents flowing in the river.

The results of water quality monitoring at Nehda dam provided by RSPCB is placed at Annexure R-2. The water quality parameters at Nehda dam indicate; Chemical Oxygen Demand (COD) values ranging from 94.0 to 313 mg/l, Bio-Chemical Oxygen Demand (BOD) ranging from 10.0 to 44.0 mg/l and importantly, high values of fixed dissolved solids from 4008 to 6624 mg/l and such water may be detrimental for use for irrigation.

7.3 Common Effluent Treatment Plants (CETPs):

The Team visited all the six CETPS to study following aspects;

a. Installed and utilization capacity
b. Inlet and outlet effluent quality
c. Stipulated consent conditions
d. Unit wise operations

7.3.1 CETP-1: Abandoned and not in use. Now, the effluent is being treated in CETP-2 which exists in the same premises.

7.3.2 CETP-2:

i. This CETP is meant for receiving effluent from 282 textile units of Mandia road industrial area.
ii. Installed capacity of CETP is 8.40 million litres per day (MLD).
iii. The technical data of CETP is provided at Annexure R-3.
iv. The treated effluent from this CETP is fed to CETP 6.
v. The consent granted to CETP-2 (Annexure R-4) is valid till 31.3.2012 and stipulated with condition to send effluent to CETP-6 for tertiary treatment.
vi. Upkeep of this plant is not satisfactory with respect to maintenance of machinery and spillages.

7.3.3 CETP-3:

i. The plant caters the need of 62 units located in RIICO industrial area and Mahavir Udyog Nagar.
ii. The treated effluent from this plant is also going to CETP-6 for tertiary treatment. Technical details are given in Annexure R-5.
iii. The consent granted to this plant is valid till 31.03.2022 (Annexure R-6).

7.3.4 CETP-4:

i. This CETP has an installed capacity of 12.0 MLD to cater need of 226 industries located in Punayata industrial area. Technical Data is given in Annexure R-7.
ii. The treated effluent from this plant also goes to CETP-6 for tertiary treatment.

iii. **The consent granted to this plant (Annexure R-8) was valid up to 30.09.2018.**

iv. This plant is 'non-complying' with respect to;

a. Not meeting the standards (condition given in the consent)

b. Not utilizing effluent with high rate transpiration system (HRTS).

c. Upgradation of CETP for ZLD and tertiary system (condition 20 and 21 of the consent granted).

7.3.5 CETP-5: Not completed and works halted.

7.3.6 CETP-6:

i. This CETP is meant to treat the waste water being received from CETP 2, 3 and 4 with installed capacity of 12.0 MLD. Details of Textiles and their connection to CETP are given in Annexure R-9 and Technical data of CETP-6 is given in Annexure R-10.

ii. As per consent granted to CETP-6; no waste water is to be disposed and it should be based on ZLD. (Annexure R-11).

iii. Plant is non-complying. (Annexure R-12).

The Team after visiting all the four operating CETPs (2, 3, 4 and 6) suggests the following points for performance improvement:

Performance improvement of CETP- Suggestions

- We were informed that dyes of many colors are used in the textile industry but we observed that a predominantly green tinge was present in raw as well as finally discharged effluent in to the stream. This calls for in-house experimentation on raw effluent through a series of tests on characterization of dye suspensions as well as on optimization of coagulation-flocculation process.
- For characterization of suspensions the scan mode of UV-Visible spectrophotometer can be to identify major peaks for different dyes present in the raw water sample and this should be repeated for every stage of treatment to identify which dyes are efficiently removed by which individual process.

- Zeta sizing may be carried out to characterize the suspension for their particle sizes as well as their surface charges to get an idea of the possible requirement of type of coagulant(s).
- Try mixture of coagulants of anionic as well as cationic and both monomeric and polymeric coagulants (flocculants) to optimize the process. One such readymade product is made by M/s Aditya Birla, which may be tried for assessing its efficacy and economics.
- Adjust pH to the optimum range of the coagulant used so that chemical dosing can be minimized. Presently pH adjustment is done in a pre-decided range while coagulant is changed based on its availability (FeSO4 or PACl both of which require widely different pH for optimal use) resulting in loss of efficiency of the process.
- Since the bulk of Suspended Solids is removed by coagulation-flocculation process any optimization of it will accrue more money to the CETP as the sludge is purchased by the cement industry to be used as a co-fuel. Further it will result in lesser pressure on tertiary treatment in terms of activated carbon treatment and pressure filters thus saving cost of treatment.
- Even after tertiary treatment using granular activated carbon bed, a typical green color was seen to persist. During our inspection of the CETP 6, we found that though the coagulation/flocculation was able to make substantial difference in the effluent quality, there was not much change after activated carbon treatment. One reason may be that perhaps the carbon bed was exhausted as it was replaced 6 months back, the other could be that activated carbon treatment was less effective against the predominantly green colored dye residual observed after the previous treatment step.
- Activated carbon regeneration/replacement should follow scientific protocols based on breakthrough curve.
- We had an observation that the TDS addition to the raw water during processing of cloth is much higher at Pali than that at Jodhpur the reasons for which should be ascertained. The strict volumetric discharge limit on industries has perhaps prompted some industries to adopt some measures for reduction in the quantity of water used for processing the cloth. Though it is a good practice, but it results in a more concentrated effluent, which further requires upgrading

the treatment strategy. Some of the possible alternatives are indicated below.

- Acid activated sand filtration may be tried to improve the dye removal, which may prove as a less costly substitute to activated carbon and pressure filtration adopted presently.
- Another option may be replacing this step by ozonation, which may be relatively costlier dye removal option, but it may again bring the quality of this treated water to an acceptable level for one reuse within the industry (TDS may govern this choice) as the colour removal would be very high.
- Chemico-biological or physico-biological sequences for more meaningful "treatment" rather than only "separation" (Ozonation followed by biological oxidation or cavitation followed by biological oxidation after the coagulation/flocculation/settling steps may be some other options that can compete well with the existing system).

General Suggestions

- There was a distinct agitation among farmers we met who wanted that no wastewater should be allowed to discharge as it was creating havoc with their soil productivity. Compensation to farmers may be evaluated by agricultural scientists based on per unit area loss of money due to lesser crop production due to deterioration in soil health, but the command area to be covered for compensation should be delineated in advance based on scientific principles to avoid false claims made later (soil investigation may cover some signature pollutants apart from high TDS impact). NPC report can be a starting point (though it touches only general parameters) for building up such data with agriculture and health departments besides any other related line departments being duly involved.
- SCADA data indicate that only 40% of the volumetric flow is contributed by industries having more than 50 KLD capacity, while the rest 60% is coming from the cluster of small units which do not

pre-treat wastewater in their premises leading to a highly concentrated effluent reaching CETP. Charges to be paid by the industry to the CETP operators should be on the basis of total COD (discharge multiplied by concentration) and not on the volumetric basis alone. pH and TDS should also be added to SCADA system with online sensing to catch any violations.

- The strict volumetric discharge limit on industries has perhaps prompted some industries to transfer/outsource some process steps generating polluted streams to small industries, which may or may not be connected to the CETP. Near "Bye pass bridge", we found that just below the bridge there was a location where a single channel was bringing flows from both CETP and STP treated effluents together. The total discharge in this channel appeared to be much higher than that of the sum of the above two and at the same time, the bulk fluid seemed to have a higher concentration of color than what can be explained by these two streams.
- We propose that RSPCB conducts a short study on mass balance (explained to the RSPCB authorities at site) to identify the factual conditions. If the total flows are explainable quantitatively but concentration of dyes is higher in the total mixed effluent after mass balance, some "bleed back" is occurring from the sludge deposits at the bottom of this channel and dredging may be proposed. If volumetric loads are more than the sum of the two streams, unauthorized discharges of untreated or partially treated industrial effluents are reaching the channel. The state authorities in such cases should identify such culprits and take appropriate punitive measures. The deposited sludge in the channel was evident and its dredging may prove useful. Based on the sludge characteristics

either this can be used as a co-fuel by cement industry or disposed in any other environmentally acceptable technologies.

- There is an opportunity for using sewage after advanced due treatment by the industries. Presently there is one STP of 7.5 MLD capacity, which is under loaded as the sewerage system is still under construction and is receiving only about 4 MLD out of which 1 MLD is temporarily contributed by the Dairy. Due to low volumetric loading rate its PST has a lot of floating sludge as anaerobic conditions develop at the bottom of the tank due to large detention time. The overall treated sewage is meeting the old CPCB norms of 30 mg/L of BOD and 150 mg/L of COD. However, as new norms of 20 mg/L for BOD and 1000 Total coliform Count are already in force since 2017, disinfection of this secondary treated sewage is essential. Up to this upgradation, the municipal authorities have to pay in order to meet the present standards. If the tertiary treatment is further pursued, this sewage can be made available to the industry at a competitive price. Experiments may be conducted if ozonation for complete removal of organics and coliform would make it fit for reuse in the industry, it may incur marginal additional expenditure and a cost-benefit analysis may be carried out for the same. Otherwise also, application of RO process may be a competitive option since the water supply in the city is through Jawai dam, which contains low TDS. The sewage will be of much lesser TDS than the locally available groundwater, which has a TDS range of 4000-5000 mg/L and is brought to the industry through tankers. As these areas are already in the "over exploited (critical/semi critical)" zones as per groundwater extraction rates, and as such, this measure would go a long way in reducing the demand of water and hence

would improve sustainability of the industry. Treatment plants at Singapore and Chennai are two of the best examples in the international/national scenario.

- The CETP authorities informed that they are contemplating to place RO and MEE combination, as a way to achieve ZLD norms, but had a fear that they would lose competitiveness as similar measures were not enforced in neighbouring states which has already resulted in migration of a few industries, the above mentioned step may bring down the volumetric requirement for treatment of effluent as demand reduction can be achieved making RO-MEE process less costly.
- Alternatively, technologies like nano-filtration and vacuum membrane distillation (examples are available in Tamil Nadu) may also be explored for their competitiveness to RO-MEE combination, which has its inherent limitations.
- In one of the industries, M/s Parwati Dyeing (Vinita Process), we found that they were using wood for feeding the boiler for providing hot water for process use. If it is replaced by solar operated geyser, it may not just be a viable measure, but also be an environment friendly measure as it saves wood as well as emissions coming from the use of wood. Sunlight all through the year is available in plenty in this region and plenty of roof area is available in the industry premises.
- We were informed and it looked evident also on inspection of the area that industries are presently operating for 12 hours a day and 5 days a week only to meet the strict wastewater discharge conditions. System improvement is imperative to bring viability in an environment friendly way.

7.4 Random Checks of Industries:

The Team randomly visited three units namely;

i. M/s Nitesh Industries, F-184, RIICO Industrial Area, Punyata, Pali. (Annexure R-13)

ii. M/s Parwati Dyeing (Vinita Process) F-51, RIICO Industrial Area, Punyata, Pali. (Annexure R-14)

iii. Shree Padmavati Dyeing, F-72, RIICO Industrial Area, Punyata. (Annexure R-15)

a. It has been observed that, three units are operating with reduced capacity and on roaster basis.

b. The effluent generated by these units is stored in a tanks within their premises and Quantity of effluent for sending to the assigned CETP is regulated through SCADA system.

7.5 Health and Agriculture:

i. During the interaction with villagers, the Team was informed about ill effects due to effluent disposal into river resulting skin diseases, etc.

ii. The farmers present during the visit, have shown agricultural fields expressing 'poor' or 'no' yield.

iii. The Team was provided with Executive Summary of the Report on "Study of Health and Environment Impact due to Pollution from Textile Units in Pali" executed by National Productivity Council (NPC) in June, 2010 at the instance of Department of Environment, Government of Rajasthan. (Annexure R-16)

7.6 The Ground Water:

i. The water source for industries in Pali is ground water being supplied by tankers from different sources.

ii. Villagers have informed that ground water sources in the catchment of Bandi River have significantly depleted and in some wells, the water is coloured. The ground water is saline and not fit for human consumption and Agriculture.

iii. The Team has been provided with the Report on "status of ground water quality and pollution in some districts of Rajasthan" prepared by Central Ground Water Board (2004). (Annexure R-17)

8. **Compliance with the Action Plan (2018):**

The Monitoring Committee constituted by Hon'ble NGT on 26.05.2017, in its report dated 15.04.2018, recommended action plan to be taken for execution (Reference: Page 2657). The status of compliance to this Action Plan is as under:

S. No	**Action Plan**	**Status (As on 13.01.2019) Observed by the Team**
1	No treated or untreated industrial effluent should be allowed to be discharged in river or on adjacent land in any form. Further, considering not only the feasibility but also the economic viability and the environmental sustainability of CETPs, even on a small to moderate scale	• Not complied • It was seen that entire effluent of CETP-6 is being discharged into river Bandi.
a	The industries should be required to recover water and reuse it form the	As per information of RSPCB, out of 570 textile units, 18

	tertiary treated effluent instead of discharging into the river	units have ZLD facilities. Hence, 'Not-Complied'.
b	CETP-VI should adopt multi stage Reverse Osmosis System (RO Plant) of adequate capacity for recovery of water and its reutilization by the member units of CETP, followed by RO reject management system such as Multi Effect Evaporator, and residual salt management.	Non-Compliant
c	The CETP management should also prevent the river and land from any damage from the RO reject generated from CETP.	Non-Compliant
d	CETP-II, III and IV should also be upgraded to incorporate a tertiary treatment system together with the multi stage Reverse Osmosis System (RO Plant) of adequate capacity for reuse and reutilization of treated water along with the reject management system such as Multi Effect Evaporator, and residual salt management.	Non-Compliant

e	The individual industries should periodically monitor the quality of effluent discharged from the primary treatment facilities for smooth and efficient operation of CETPs, and should comply with the consent conditions.	PETP has been enforced only on those units discharging effluent more than 50 KLD which are reported to be 128 and 106 units have installed PETP. Hence, 'Partial-compliance. Also, industries having capacity less than 50 kLD are contributing about 60% of effluent discharge do not have provision of PETP presently.

9. **Damages to the Environment and Compensation:**

The Team in addition of checking compliance status of directions issued by Hon'ble NGT and referring observations and recommendations of the Committees constituted earlier, attempt has been made to study existing status in terms of damages and deterioration in environment particularly with reference to river catchment of Bandi, ground water near the river Bandi, health of villagers and the effects on use of polluted water of river Bandi and ground water on agriculture.

The present Team of Scientist referred an 'Executive Summary' of the Report submitted by the National Productivity Council (NPC) prepared on the request of Department of Environment, Government of Rajasthan in the year 2010 (June). The Report entitles "Study of Health and Environment Impact due to Pollution from Textiles in

Pali, Balotra and Bithuja". This Report has highlighted the following points;

i. Ground water based salinity, nitrates and fluoride indicates that the ground water quality in Pali and Rohat blocks is not suitable for drinking or unpotable.

ii. Barring few locations, soil has been affected in the farmer's plot.

iii. The economic damages caused by the textile processing industries in Pali and Barmer study area during last 15 years is estimated at Rs. 9890.05 lakhs and Rs. 7627.91 lakhs respectively.

10. Concluding observations and Action Plan, (2019):

The present Team of Scientists has referred the available Inspection Reports placed on record of Hon'ble Tribunal on issues relating to pollution issues caused by textile units in Pali.

The Team has also examined water quality data that is, of river Bandi at Nehda Dam, ground water report of CGWB and performance report of CETPs.

After assessing overall environmental status of the area and the nature of industries in existence (Textile) and remedial measures taken to control industrial pollution by installing CETPs, the Committee considered to place the following suggestions which may be considered as an upgraded version of already existing action plan suggested by earlier Committees.

The key observations with Action Points are given below:

10.1 The River Bandi and its Rejuvenation:

i. The River Bandi is not having its natural flow but, it is only carrying industrial waste water as well as domestic sewage.

ii. Water quality is "not-fit" for any use.

iii. The River water has been deteriorated to the worst quality. It has been reported that upstream location of river at Hemawas reservoir indicate pH 8.22, BOD 1.13 mg/l, COD 28 mg/l and TDS 470 mg/l against the downstream location of river at Nehda Dam with pH 7.9 to 8.61, BOD 9.9 to 44 mg/l, COD 94 to 313 mg/l and dissolved solids 4008 to 6624 mg/l.

The Action Plan:

i. The river may be dredged so to remove industrial and sewage sludge deposited.

ii. River may be canalised (earthen canal) at appropriate locations.

iii. Not allowing industrial (even treated) and sewage disposal into River Bandi. To monitor this, CCTVs be installed at strategic locations and monitored by District Collector and Regional Office of RSPCB.

iv. Tertiary treated industrial and sewage effluent after its utilisation and if surplus, may go into river but not exceeding value of BOD; 3mg/l, TDS/FDS; not more than 2100 mg/l and fecal coliform; less than 230 MPN/100ml.

v. To prohibit unauthorised/illegal discharges of industrial effluent through tankers and particularly from adjoining States should be monitored at inter-State borders and within the State also at various check-posts. Further, vigilance squad should also be deployed to check such incidences of discharging effluents in the River through tankers.

vi. RSPCB must monitor regularly river water quality and quantity at critical locations including NH bye-pass bridge location (with inflow and outflow) to apply mass balance of selected stretches

so that illegal disposal of industrial wastewater into river can be monitored.

10.2 The Ground Water:

i. Industries are using ground water supplied by tankers through private parties.

ii. There is no regulation on supply of such ground water by private parties to the industries.

iii. Granting permission by CGWB to industries and those being done by private parties through tankers is not clear on permissions and many applications are pending with CGWB.

The Action Plan:

i. Through Industrial Association and State Government, some of the village wells having relatively less TDS, may be fitted with RO and Fluoride, Arsenic and other contaminant removal system and provide potable/usable water to villagers and farmers for their use. This plan may be proposed and executed within six months.

ii. To conserve ground water, in Pali town, dual piping system be enforced and waste water of kitchen and bath, be used for flushing of toilets. This can be planned and executed within one year. (This may cover hotels, new residential societies/complexes, and other Institutions).

10.3 Sewage Treatment and its utilisation:

i. The treated sewage (at secondary level) of 7.5 MLD plant is presently disposed into River Bandi.

ii. M/S Pali Zila Dugdh Utpadak Sahakari Sangh Ltd. is sending its effluent to this STP for treatment.

iii. The STP of 15 MLD located in the same premises is under construction and targeted for completion before March, 2019.

iv. The 7.5 MLD plant is not receiving full sewage due to incomplete sewer line works and connections.

The Action Plan:

i. The existing plant of 7.5 MLD should be provided with tertiary system to remove fecal coliforms to meet the standards.

ii. Treated effluent be further refined and entire effluent from this plant be utilised by industries as process water and thereby prohibiting use of ground water being supplied by tankers.

iii. Steps may be initiated at this stage to use 15 MLD treated sewage for industries.

iv. In no case, effluents from both the plants to go into river. If it is required to be discharged as surplus then it should meet standards of BOD; less than 3.0 mg/l and FC; less than 230 MPB/100 ml.

10.4 Industrial Pollution Control:

i. None of the CETPs is meeting the standards.

ii. No standards are given for CETP-2 and sending its effluent to CETP-6.

iii. CETP-2 has poor maintenance.

iv. No standards prescribed to CETP-3 and sending effluent to CETP-6.

v. CETP-4 has also not been given standards for disposal to CETP-6. But, as per consent, effluent is consented for disposal of effluents to river.

vi. CETP-6 is disposing non-compliant quality of treated effluent to river. Facilities to recover water and supplying to the industries, is not complied.

The Action Plan:

i. CETP Association, RSPCB and RIICO, should review that why not receive all waste water of CETP 2, 3 and 4 directly at CETP-6 for treatment and dispense with the functioning of CETP 2,3 and 4 which for practical purpose not serving any purpose. Response to this action points may be provided in 4 weeks.

ii. If, CETP 2, 3 and 4 are to be operated, then they should be provided with outlet norms which will become inlet norms of CETP-6. Consent granted to CETPs, be accordingly modified and consent may be granted within 4 weeks.

iii. There should be regular inspection and maintenance schedule of closed pipeline carrying effluent to CETPs.

iv. RIICO and industrial Association should clean all the storm water drains and no choking should be seen.

v. In industrial area of Pali, no waste should be burnt.

vi. RIICO with Industrial association, should work out for use of solar panel to energise the boilers and minimise use of wood or coal as fuel.

vii. All the member industries be insisted to make pH correction particularly of units generating effluent less than 50 KLD.

10.5 Environmental Compensation:

i. Team could not get authentic official records on damages to agriculture, loss of ground water quality and health.

The Action Plan:

i. State Department of Agriculture and Health may provide information on status of agricultural loss, ground water conditions and health due to pollution by textile units.

ii. Environment compensation and relief to villagers and farmer may be considered and at the same time, detecting factors of natural desertification effects. State Government may provide information within 2 months.

11. Surveillance and Monitoring:

The Team suggests that there is need to have a regular surveillance mechanism to monitor the compliance of Action Plan as well as ground level checking. For this purpose, a District Level Task Force under the chairmanship of District Collector with representatives of State Pollution Control Boards, RIICO, Transport Department and Police and also be represented by District Legal Services Authority. The task force may meet and review the progress of implementation of Action Plan on weekly basis and also carryout random checks. It would also be appropriate to have a Monitoring Committee under chairmanship of Divisional Commissioner (Jodhpur) to monitor progress of implementation of Action Plan for Pali as well as Jodhpur industries including CETPs as has already been directed by the Hon'ble Tribunal.

Dr. Ajit Pratap Singh, Professor and Dean, BITS, Pilani, Rajasthan	Dr. Akhilendra Gupta, Professor, MNIT, Jaipur, Rajasthan	Dr. A.B. Akolkar, Former Member Secretary, CPCB, New Delhi

Dated: 17.01.2019

2941
R-1.

Item No.09 Court No. 2

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

Original Application No. 32(THC) of 2014
(M.A. No.921/2018)
(CWP No. 9503/2012)

KisanParyavaran
SangaharshSamiti, Jaipur Applicant(s)

Versus

State of Rajasthan&Ors. Respondent(s)

Date of hearing: 21.12.2018

CORAM :
HON'BLE MR. JUSTICE RAGHUVENDRA S. RATHORE, JUDICIAL MEMBER
HON'BLE DR. SATYAWAN SINGH GARBYAL, EXPERT MEMBER

For Applicant (s) Mr. Devdas, Advocate for Mr. DipeshChoudhary, Advocate

For Respondent(s) Mr. Pinaki Mishra, Sr. Advocate and Mr. Vinay Kothari, Advocate for R-5
Mr. SanyatLodha, Advocate for R-9
Mr. Saurabh Rajpal, Advocate for Mr. Shiv Mangal Sharma, Advocate for State of Rajasthan and RSPCB
Mr. Anoop Kumar Saxena, Sr. RDI for RIICO
Mr. Rajkumar, Advocate for CPCB
Mr. BalenduShekhar and Mr. Raj Kumar Maurya, Advocates for MoEF& CC

ORDER

In this case, a serious question with regard to environment is involved wherein, *interalia,* one river namely Bandi and Nehda dam is in danger of being

23

polluted. The Environment Pollution is alleged on account of discharge of effluent by the industries, in and around the city of Pali, Rajasthan. The Tribunal had vide its order dated 26.05.2017 sought a report by (1) constituting a Committee which included officer of Pollution Control Board, Member of the IIT Jodhpur and Senior Officers of CPCB. After receipt of the report of the Committee, the Collector, Pali was directed to give a (2) report on the issue. The said report was totally unsatisfactory as it was vague and devoid of any details on the issue for which the information was sought from him.

Therefore, on 18.06.2018, the Divisional (3) Commissioner, Jodhpur was directed to visit the site personally and give a time bound action plan on the recommendations made by the Committee. After receipt of the report on 5th July, 2018, RIICO was directed to submit its reply. Instead of it, the RIICO has filed an affidavit where in para 6, the deponent has stated that no specific direction/action proposed to be taken on behalf of the RIICO, Unit Pali. However, subsequently it is stated that all efforts are being made on behalf of RIICO to take necessary action for ensuring protection of environment as well as development and continuation of the industrial activities. It has also been stated that work order will be issued to ensure cleanliness of the entire industrial area.

Apart from the fact that the report from the Committee was called as back as in the year 2017 the reports given by the Divisional Commissioner and RIICO which do not speak out in context of the deficiencies pointed out by the Committee and the proposed action to be taken in that regard, we deem it appropriate to have an update report of the status, compliance and action to be taken in respect of the effluents generated and discharged by textile and dyeing industries at Pali. Moreover, the same is being allowed to flow in river Bandi through tankers. We would request eminent Scientists to visit Pali, its industrial areas and river Bandi as well as Nehda dam and CETPs:

1. Dr. A.P. Singh, Professor and Dean, BIITS Pilani at Pilani, Rajasthan
2. Mr. A.B. Akolkar, Former Member Secretary, CPCB
3. Dr. A.B. Gupta, Professor, NIIT, Jaipur

Each Member of the Committee shall be paid remuneration of Rs. 1 lakh. They shall also be reimbursed the expenses borne by them in terms of logistics, photography etc. The said amount shall be presently paid by State PCB. The Collector, Pali shall provide all assistance to the Commissioners in respect of Departments including industries, RIICO, Revenue etc., if required. The Commissioner of Police, Jodhpur shall provide all necessary assistance in respect of security

and safety of the Commissioners. The report be submitted by 15th January, 2019.

List this matter on 18th January, 2019.

A copy of this order be sent to the Members of the Committee, Collector, Pali and Commissioner of Police, Jodhpur, through email forthwith.

Raghuvendra S. Rathore, JM

Dr. Satyawan Singh Garbyal, EM

December 21, 2018
sn

Upto November 2018

R- 2

RAJASTHAN STATE POLLUTION CONTROL BOARD
COMPARATIVE STATEMENT
Analysis Results of Nehda Dam

Parameters	Nehda Dam					
	1/7/2018	10/8/2018	20/08/2018	11/9/2018	18/10/2018	5/11/2018
pH	7.98	8.58	8.38	8.61	8.58	8.64
Chemical Oxygen Demand (COD) [mg/l]	269	136.8	152	94.83	217.6	313.98
BioChemical Oxygen Demand (BOD) (3days at 27° C) [mg/l]	44	20	23	9.98	25.76	29.7
Total Suspended Solids [mg/l]	57	183	33	136	46	51
Fixed Dissolved Solids [mg/l]	6321	6624	5009	4008	4376	4116

2946

TECHNICAL DATA FOR UNIT 2



TECHNICAL DATA OF CETP UNIT-02

Sr.No.	Particulars	Specification
01	**Raw effluent channel**	Quantity 1
02	**Screen chamber**	Quantity 1 no Size 1.0 W x 5.0 SWD Volume 15.2 m3
03	**Raw waste water pump house**	Quantity 3 Nos. (2W+1S) Size 10 dia x 1.6 SWD x 5.0 m total depth Volume 80.4 m3 Detention time (hrs) 0.32 Pump type centrifugal Pump Capacity 300 m3 Pump Head 10 mtr. Pump motor 25 hp
04	**Equalization tank**	Quantity 1 no Size 32 m x 16.0 x 3.5 m SWD + 0.8 FB volume 1792 m3 Detention time 6.3 hrs Oxy-Booster -01
05	**Equalization Transfer pump house**	Quantity 1 Working + 1 standby Pump type centrifugal Pump Capacity 400 m3 Pump Head 10 mtr pump motor 40 hp
06	**Flash Mixer**	Quantity 1 no Size 2 x 1.6 x2.5 m SWD + 0.5 FB volume 6.4 m3 Detention time 1.8 min Motor 2 hp
07	**Clariflocculator**	Quantity 1 no Size 25 m dia x 3.04 m SWD + 0.5 FB Size (Flocculation zone) 7.8 m dia volume 1472 m3 Detention time 30 min for flocculation & 2.5 hrs for setting

CETP FOUNDATION PALI

08	**Primary Clarifier**	Bridge Motor 1 No. Motor 5 hp Flocculator Motor 2 Nos. Motor 3 hp
09	**Aeration tank**	Quantity 3 nos Size 50.0 m x15 x 3.5 m D + 0.8 FB volume 7875 m3 Detention time 18 hrs Slow speed surface aerator Quantity 9 nos Motor rating 40 hp / 1440 rpm Oxy-Booster -03 ,
10	**Secondary Settling tank**	Quantity 1 no Size 25.0 m dia x 3.0 m SWD+0.5 FB volume 1472 m3 Detention time 2.5 Secondary Clarifier Bridge Motor 1 No. Motor rating 5 hp
11	**Return sludge pump house**	Quantity 1 no Size outer dia 7.5 m dia x 4.6 m SWD inner dia 4.5 m dia volume 34.5 m3 Pumps Quantity 1 Working + 1 standby pump motor 10 hp @ 1440 rpm Quantity 1 no Size 4.5 m dia x 4.4 m SWD + 0.5 FB volume 56.5 m3 Detention time 4 Hr.
12	**Chemical dosing system**	**FeSo4 solution tank** Quantity 1 no Size 3.5 x 3.5 x2.5 m SWD + 0.5 FB volume 30.60 m3 Detention time 8 Hr **Dosing Agitator** Quantity 1 No. Motor Rating 2 hp **Lime Slurry tank** Quantity 2 nos Size 3.5 x 3.5 x2.5m SWD + 0.5 FB

CETP FOUNDATION * PALI *

		volume 30.60 m3 Detention time 8.Hr **Lime Agitator** Quantity 2 Nos. (1w+1s) motor 2 hp 14.3 **Polyelectrolyte solution tank** Quantity 1 no Size 2.0 x 2.0 x2.5 m + 0.5 FB volume 10 m3 Detention time 8 Hr **Polyelectrolyte dosing Tank Agitator** Quantity 1 No. Motor 2 hp
13	**Centrifuge**	Quantity 3 Location unit-01/02 Motor rating 20 hp
14	**Tertiary Treatment**	Quantity 6 no for Carbon Quantity 6 for sand Size : 1500 mm Dia ,2500 mm length Pumping : 20 Hp X2 Pumping : 10 Hp X 1(Stand by)

CETP FOUNDATION PALI

2950

R-4

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2059-2061
Order No : 2017-2018/PLG/1025 **Date:** 19/06/2017

Unit Id : 775

M/s Pali Water Pollution Control Treatment and Research Foundation

Mandia Road Pali Marwar , Tehsil:Pali
District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 14/01/2017 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Common Effluent Treatment Plant (Cetp)-Unit-II plant** situated at **Mandia Road Pali Marwar Pali Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/04/2017** to **31/03/2022** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
Treated Water of textile industries	Service	8.40 MLD

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	8400.000	NIL	8,400.000 To be taken to CETP VI for final treatment

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:32:50 +05:30

32

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2059-2061

Order No : 2017-2018/PLG/1025 Date: 19/06/2017

Unit Id : 775

5 That the CETP-II will be operated strictly in terms of order dated 26.5.2017 of Hon`ble NGT in the matter of MA No.1117/2016 in Original Application No.32/2014 and after primary treatment, the effluent will be fed it into CETP No.VI for final treatment. At no stage, treated /partially treat effluent will be discharged from CETP No.II.

6 The primary treated effluent will be transported to CETP-VI through closed conduit pipeline only. Further, all the outlets, except the outlet through which the primary treated effluent will be transported through pipeline to CETP-VI, will be closed.

7 That CETP No.II, III & IV will be operated as per the roster approved by the RSPCB, State of Rajasthan, RIICO and the CETP Trust to permit industries operating in different clusters in Pali so that at no stage the total effluent load at CETP-VI exceeds 12 MLD. Proper flow measuring arrangements will be installed and kept in operation all the time to monitor the quantity of effluent received at various CETPs, transferred to CETP-VI and treated through it.

8 That CETP Trust will develop robust mechanism for ensuring compliance of the directions of Hon'ble NGT issued vide order dated 26.05.2017.

9 That Trust will provide air and waste water tapings towards booster, interconnection work and distribution line/network in the equalization tank within a period of 15 days.

10 That dozing pumps will be installed for metered dozing of chemicals for physico-chemical treatment within a period of one month.

11 That dozing arrangements for additional chemical for color removal will be installed within a period of one month.

12 That the Trust will ensure that pipeline work in remaining area of the Mandiya Road Industrial Area is completed latest by 31.08.2017.

13 That laying of pipeline in RIICO industrial area Phase-I and Phase-II shall be completed by 30.11.2017 as per the action plan submitted by the CETP Trust.

14 That only those units connected with CETP-II will be allowed to be made operational which are having valid consent to operate under the provisions Water and Air Acts from the State Board.

15 That the CETP Trust will ensure that the member units install and make operational the SCADA based flow meter with PLC panel before their re-commissioning.

16 That flow being received from member units at CETP-II, III and IV will be monitored through SCADA system.

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:32:50 +05:30

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2059-2061

Order No : 2017-2018/PLG/1025 **Date:** 19/06/2017

Unit Id : 775

17 **That online effluent quality monitoring system at all the CETPs will be kept operational and will be connected with the State Board and CPCB servers for close monitoring of the effluent quality. The sensors of the online monitoring system will be calibrated from time to time and report shall be submitted to District Monitoring Committee.**

18 **That web cameras will be installed on discharge point of CETPs and towards pervious discharge points towards River Bandi so as to ensure that treated effluent is discharged only from CETP-VI.**

19 **That CETP-II, III and IV will not be made fully functional without compliance with of all the observations as observed by the joint inspection committee in the inspection report dated 5.10.2016 and without further directions by Hon'ble NGT in the matter.**

20 **That CETP Trust will undertake all the measures required for effective implementation of the rotational closure action plan submitted by the Trust and as approved during the meeting held on 13/06/2017 under the chairmanship of Additional Chief Secretary, Department of Environment, GoR.**

21 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act.**

22 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

23 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Signature Not Verified
Digitally signed by DR VIJAI SHISHAL
Date: 2017.06.19 17:32:50 +05:30

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2059-2061

Order No : 2017-2018/PLG/1025 **Date:** 19/06/2017

Unit Id : 775

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[PLG]

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Pali- With directions to ensure the compliance of consent conditions.

2 Master File.

Group Incharge[PLG]

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:32:50 +05:30

K-5

2954

TECHNICAL DATA FOR UNIT 3



36

TECHNICAL DATA OF CETP UNIT-03 (9.080 MLD)

Sr.No.	Particular	Specification
	Screen chamber	Quantity 1 no Size 9.5 x 1.6 x 1.0 SWD + 0.6 FB Volume 15.2 m2 Mechanical Screen Quantity 02 Size (Approx) 8 m x 0.75 m Mesh size 8 mm
	Raw waste water pump house	Quantity 2 Working + 1 standby Pump type centrifugal pump Pump motor 40 hp
	Tilted plate separator	Quantity 1 no Size 5m x 5m x 4m
	Equalization tank	Quantity 2 no 01. Size 19.5 m dia x 3.8 m depth Working depth / volume 3.5 m/ 1037 m3 02. Size 27.0 m dia x 3.0 m SWD + 0.8 FB volume 1717 m3
	Equalization Transfer pump house	Quantity 1 Working + 1 standby Pump type Horizontal centrifugal Pump motor 40 hp
	Flash Mixer	Quantity 1 no Size 2 x 2.3 x2.0 m volume 9.2 m3
	Clariflocculator	Quantity 1 no Size 27.0 m dia x 3.0 m D volume 1590 m3
	Primary clarifier / Flocculator Zone	Quantity 1 no Bridge motor 5 hp Flocculator Quantity 1 no Size 7.0 m dia x 2.0 m D volume 124 m3
	Aeration tank	Quantity 3 nos Size 45.0 m x15 x 3.2 m D

CETP FOUNDATION PALI

		volume 6480 m3 9 nos Aerators of 40 HP each
	Secondary clarifier	Quantity 1 no Size 27.0 m dia x 3.0 m D volume 1717 m3
	Return sludge pump house	Quantity 1 Working + 1 standby Pump type Horizontal centrifugal pump pump rating 280 m3/hr @ 7 m pump motor 15 hp @ 1440 rpm
	Sludge holding tank	Quantity 1 no Size 13.5 m dia x 2.5 m D working depth / volume 2 m / 284 m3
	Chemical sludge pump house	Quantity 1 Working + 1 standby Pump type centrifugal pump SHM Pump Capacity 25 m3/hr @ 20 m pump motor 15 hp @ 2880 rpm
	Centrifuge	Quantity 2 W + 1S Type Solid bowl centrifuge Make Humboldt Quantity 2 W + 1S Motor 30 hp
	Lime Slurry tank	Quantity 2 Nos. Size 3.5 x 3.5 x2.0 m SWD + 0.5 FB volume 24.5 m3 **Lime Dosing Tank Agitator** Quantity 2 Nos. (1W + 1S) motor 3 hp
	FeSo4 solution tank	Quantity 1 no Size 3.5 x 3.5 x3.0 m volume 30 m3 **FeSo4 solution tank Agitator** motor 3 hp
	Polyelectrolyte solution tank	Quantity 1 no Size 2.0 x 2.0 x2.0 m volume 8 m3 motor 3 hp Motor rating 1 hp/ 1440 rpm

CETP FOUNDATION PALI

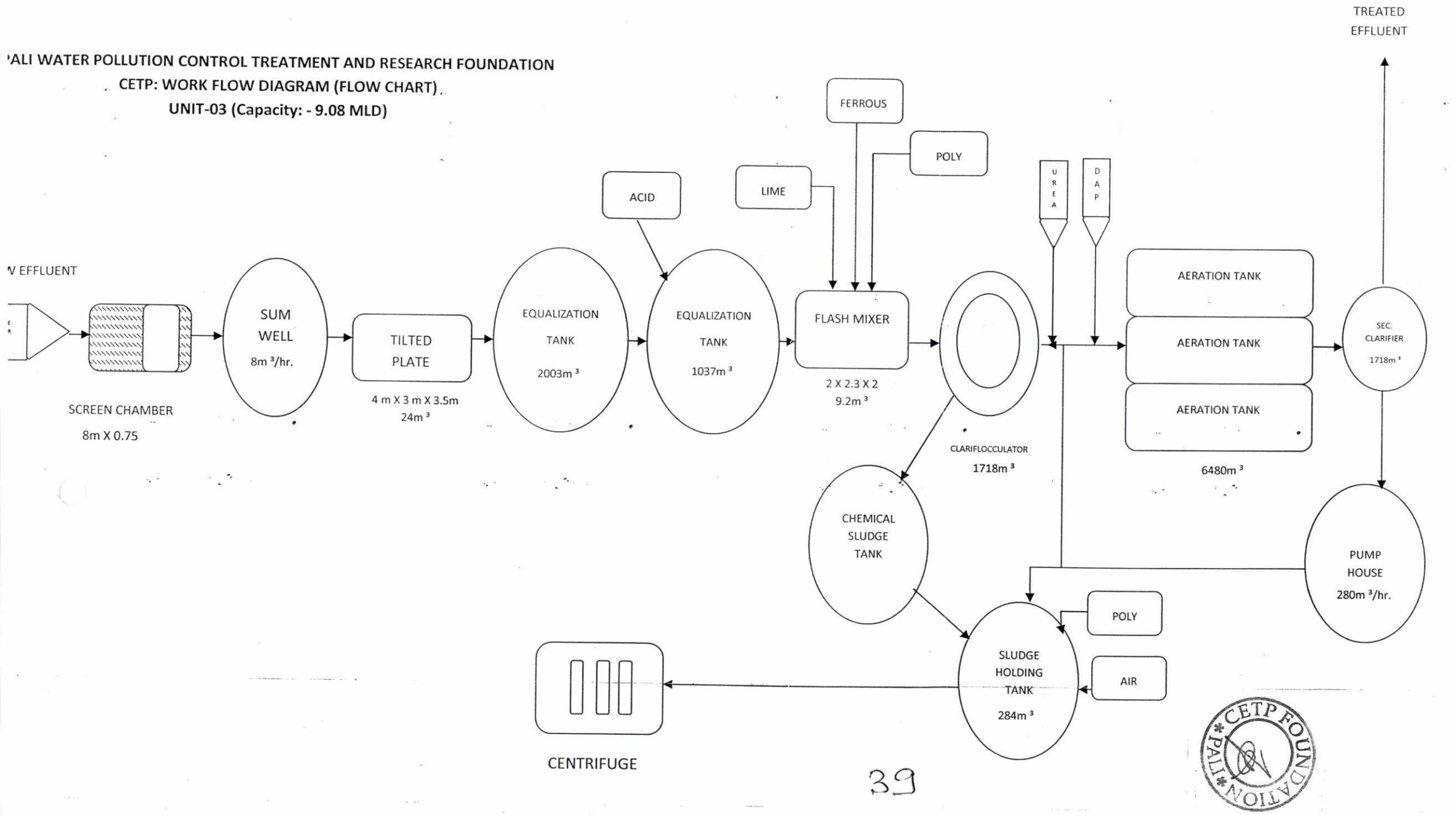
	Chemical lift	Lift type Open Cage Hoist Lift platform 1250 x 1250 x 1800 mm Capacity 1500 kg Lift height (overall) 8m max. (Actual to suit site) Hoist motor 3 hp/ 1440 rpm



'ALI WATER POLLUTION CONTROL TREATMENT AND RESEARCH FOUNDATION

CETP: WORK FLOW DIAGRAM (FLOW CHART)

UNIT-03 (Capacity: - 9.08 MLD)



CETP FOUNDATION PALI

2959

R-6

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2056-2058

Order No : 2017-2018/PLG/1024 **Date:** 19/06/2017

Unit Id : 775

M/s Pali Water Pollution Control Treatment and Research Foundation

Mandia Road Pali Marwar , Tehsil:Pali
District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 14/01/2017 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Common Effluent Treatment Plant (Cetp)-Unit-III plant** situated at **Mandia Road Pali Marwar Pali Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/04/2017** to **31/03/2022** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
Treated water of Textile Industry	Service	9,080.00 KLD

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	9080.000	NIL	9,080.000 To be taken to CETP VI for final treatment

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:31:07 +05:30

40

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2056-2058

Order No : 2017-2018/PLG/1024 Date: 19/06/2017

Unit Id : 775

5 That the CETP-III will be operated strictly in terms of order dated 26.5.2017 of Hon`ble NGT in the matter of MA No.1117/2016 in Original Application No.32/2014 and after primary treatment, the effluent will feed it into CETP No.VI for final treatment. At no stage, treated /partially treat effluent will be discharged from CETP No. III.

6 The primary treated effluent will be transported to CETP-VI through closed conduit pipeline only. Further, all the outlets, except the outlet through which the primary treated effluent will be transported through pipeline to CETP-VI, will be closed.

7 That CETP No.II, III, & IV will be operated as per the roster approved by the RSPCB, State of Rajasthan, RIICO and the CETP Trust will permit industries operating in different clusters in Pali in such a way that at no stage, the total effluent load at CETP- VI exceeds 12 MLD. Proper flow measuring arrangements will be installed and kept in operation all the time to monitor the quantity of effluent received at various CETPs, transferred to CETP-VI and treated through it.

8 That CETP Trust will develop robust mechanism for ensuring compliance of the directions of Hon'ble NGT issued vide order dated 26.05.2017.

9 That Trust will provide assembly of recirculation pumps with permanent structure and permanent lines at the equalization tank for proper mixing within 15 days time.

10 That dozing pumps will be installed for metered dozing of chemicals for physico-chemical treatment within a period of one month.

11 That dozing arrangements for additional chemical for color removal will be installed within a period of one month.

12 That the Trust will ensure that pipeline work in remaining area of the Mandiya Road Industrial Area is completed latest by 31.08.2017.

13 That laying of pipeline in RIICO industrial area Phase-I and Phase-II shall be completed by 30.11.2017 as per the action plan submitted by the CETP Trust.

14 That only those units connected with CETP-II will be allowed to be made operational which are having valid consent to operate under the provisions Water and Air Acts from the State Board.

15 That the CETP Trust will ensure that the member units install and make operational the SCADA based flow meter with PLC panel before their re-commissioning.

16 That flow being received from member units at CETP-II, III and IV will be monitored through SCADA system.

41

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:31:07 +05:30

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2059-2061

Order No : 2017-2018/PLG/1025 **Date:** 19/06/2017

Unit Id : 775

17 **That online effluent quality monitoring system at all the CETPs will be kept operational and will be connected with the State Board and CPCB servers for close monitoring of the effluent quality. The sensors of the online monitoring system will be calibrated from time to time and report shall be submitted to District Monitoring Committee.**

18 **That web cameras will be installed on discharge point of CETPs and towards pervious discharge points towards River Bandi so as to ensure that treated effluent is discharged only from CETP-VI.**

19 **That CETP-II, III and IV will not be made fully functional without compliance with of all the observations as observed by the joint inspection committee in the inspection report dated 5.10.2016 and without further directions by Hon'ble NGT in the matter.**

20 **That CETP Trust will undertake all the measures required for effective implementation of the rotational closure action plan submitted by the Trust and as approved during the meeting held on 13/06/2017 under the chairmanship of Additional Chief Secretary, Department of Environment, GoR.**

21 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act**.

22 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

23 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:32:50 +05:30

42

Head Office (PLG)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/2059-2061
Order No : 2017-2018/PLG/1025 Date: 19/06/2017
Unit Id : 775

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[PLG]

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Pali- With directions to ensure the compliance of consent conditions.
2 Master File.

Group Incharge[PLG]

43

Signature Not Verified
Digitally signed by DR VIJAI SINGHAL
Date: 2017.06.19 17:32:50 +05:30

K-1
2961

TECHNICAL DATA FOR UNIT 4

CETP FOUNDATION PALI

44

2962

TECHNICAL DATA OF CETP UNIT-04 (12.000 MLD)

Sr.No	Particulars	Specification
01	Receiving chamber	
		Quantity 1 Size 2.18 m x 2.35 m x 6.0 m LD **Manual Screen** Quantity 2 Nos. Size 3.5 m x 1.0 m x 1.0 m LD **Screen Inlet Gate** Quantity 2 Nos
02	Raw waste water pump house	Quantity 1 Size 10.70 dia x 1.725 SWD x 5.5 m total depth Inner dia:- 6.0 m dia
03	Raw Effluent Pump	Quantity 3 Nos. (2W+1S) Pump Capacity 500 m3 Pump Head 10 mtr Motor Rating 40 hp **Dewatering Pump** Quantity 1 No. Pump Type submersible Motor Rating 2 hp
04	Oil and Grease tank	Quantity 1 Size 9.8m x 10 m x 1.0 m LD
05	Equalization tank -1	Quantity 1 no Size 30 m dia x 3.0 m SWD + 0.8 FB volume 4000 m3
06	Equalization tank -2	Quantity 1 no Size 30 m dia x 3.0 m SWD + 0.8 FB volume 4000 m3
07	Equalization Transfer pump house	Quantity 2 (1w+1s) Size 250 x250 Pump Capacity 500 m3 Pump Head 5 mtr pump motor 15 hp
08	Flash Mixer	Motor 2hp
09	Clariflocculator	Quantity 1 no Size 25.0m dia x 3.0 m SWD + 0.5 FB Size (Flocculation zone) 10.4 m dia x 2.0 m SWD **Clariflocculator** Motor Rating 0.75 hp Flocculaor Motor Quantity 2 Nos. Motor Rating 2 hp

CETP FOUNDATION * PALI *

45

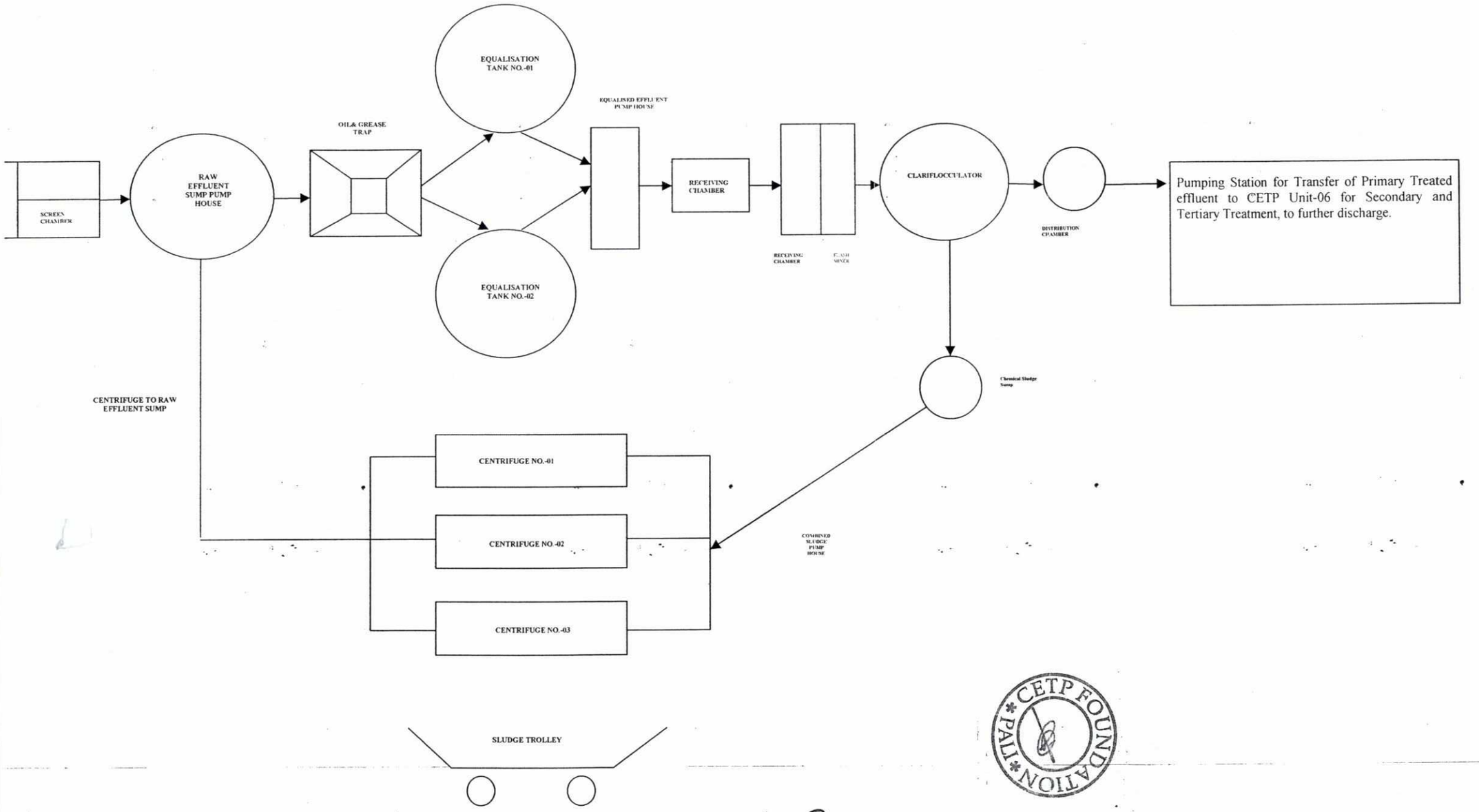
10	**Aeration tank**	Quantity 3 nos Size 30.0 m dia x 3.2 m D + 0.8 FB **Aeration Tank** Aerator with Blower 12 Nos. (3 Bay) Aerator Motor Rating 30 hp Blower Motor Rating 2 hp
11	**Recirculation Pump for Aeration Tank**	Quantity 173 m3 Pump Head 12 mtr Motor Rating 15 hp **Dewatering Pump** Quantity 1 No. Motor Rating 2 hp
12	**Secondary Clarifier**	Quantity 1 no Size 38.80 m dia x 3.0 m SWD+0.5 FB Motor Rating 0.75 hp
13	**Biological sludge pump house**	Quantity 1 no Size outer dia 9.0 m dia x 4.6 m SWD inner dia 6.0 m dia **Pumps** Quantity 3 (2w+1s) pump motor 15 hp
14	**Sludge Thickener**	No. of thickeners 1 No. Size of each unit 7.4 m Dia Liquid depth 3.5 m Thickener Bridge Motor Motor Rating 2 hp No. 1 No. Size Outer :- 12 m Dia Inner :- 6.0 m dia Liquid depth 3.5 m
15	**Centrifuge**	Quantity 3 Nos. Motor rating 30 hp
16	**Centrifuge feed pump**	No. of pump 3 nos Capacity of pump 20k
17	**Chemical Dosing System Dosing tanks and Pumps**	**Ferrous Tank Agitator** Quantity 2 Nos. Motor Rating 2 hp **Lime Slurry tank** Quantity 3 **Lime Tank Agitator** Quantity 2 Nos. Motor Rating 2 hp **Polyelectrolyte solution tank** Quantity 4 **Dosing Pump** Quantity 3

CETP FOUNDATION PALI

		Polyelectrolyte Tank Agitator Quantity 2 Nos. Motor Rating 2 hp
18	**Thickener**	No. of thickeners 1 No. Size of each unit 7.4 m Dia Liquid depth 3.5 m
19	**Transfer Pumping Station**	Quantity -02 Pump of 100 Hp Standby Pump of 30 Hp

Primary Treated Effluent of CETP Unit-04 (about 4.00 MLD) is transferred to CETP Unit-06 for re-treatment and Tertiary Treatment.

CETP FOUNDATION * PALI *



CETP FOUNDATION PALI

48

G NO:-04 FLOW DIAGRAM OF UNIT -04 (CAPACITY -12 MLD, PUNAYATA ROAD, PALI

2966
R-8

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/3820-3822
Order No : 2015-2016/PLG/1001 **Date:** 26/11/2015
Unit Id : 775

M/s Pali Water Pollution Control Treatment and Research Foundation

Mandia Road Pali Marwar , Tehsil:Pali
District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 19/02/2015 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Common Effluent Treatment Plant (CETP)-Unit-IV plant** situated at **Mandia Road Pali Marwar Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/10/2015** to **30/09/2018** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
Treated Water	Activity	12.00 MLD

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	12000.000	NIL	12,000.000 Into River

49

2967

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/3820-3822
Order No : 2015-2016/PLG/1001 **Date:** 26/11/2015

Unit Id : 775

5 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **Into Inland Surface Water .** The main parameters for regular monitoring shall be as under

52

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/3820-3822
Order No : 2015-2016/PLG/1001 **Date:** 26/11/2015
Unit Id : 775

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Total Residual Chlorine	Not to exceed 1.0 mg/l
Ammonical Nitrogen (as N)	Not to exceed 50 mg/l
Total Kjeldahl Nitrogen (as N)	Not to exceed 100 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Arsenic (as As)	Not to exceed 0.2 mg/l
Mercury (As Hg)	Not to exceed 0.01 mg/l
Lead (as Pb)	Not to exceed 0.1 mg/l
Cadmium (as Cd)	Not to exceed 2.0 mg/l
Total Chromium (as Cr)	Not to exceed 2.0 mg/l
Copper (as Cu)	Not to exceed 3.0 mg/l
Zinc (as Zn)	Not to exceed 5.0 mg/l
Selenium (as Se)	Not to exceed 0.05 mg/l
Nickel (as Ni)	Not to exceed 3.0 mg/l
Cyanide (as CN)	Not to exceed 0.2 mg/l
Fluoride (as F)	Not to exceed 2.0 mg/l
Sulphide (as S)	Not to exceed 2.0 mg/l
Phenolic Compounds (as C6H5OH)	Not to exceed 1.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Sulphates	Not to exceed 1000 mg/l
Boron (As B)	Not to exceed 0.2 mg/l

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/3820-3822
Order No : 2015-2016/PLG/1001 Date: 26/11/2015

Unit Id : 775

% Sodium	Not to exceed 0 mg/l
Dissolvd Solids (Inorganic)	Not to exceed 2100 mg/l
Chemical Oxygen Demand	Not to exceed 250 mg/l

6 That this consent to operate is valid for operation of one CETP (Unit-IV) of 12.00 MLD capacity only at Punayata Industrial Area, Pali. For any change in number & its capacity, the unit has to seek fresh consent to operate.

7 That no untreated effluent shall be discharged into river Bandi.

8 Treated effluent shall also be utilized for plantation using HRTS (High Rate Transpiration System) technique and accordingly arrangement shall be made.

9 That the Trust will maintain complete record of the effluent treated, chemicals consumed etc. and will send monthly report to R.O. Pali.

10 That the sludge generated from the CETP will be stored under the covered shed & will be disposed of as per the provisions of the Hazardous Waste (Management and handling) Rules, 2000.

11 That unit shall comply with the provisions of Hazardous Waste (Management, handling & Transboundary Movement) Rules, 2008 as amended time to time.

12 That the trust shall ensure providing adequate and closed conduits for proper collection and conveyance of the effluent generated from the individual /member units to the CETP and keep it in proper working order so as to prevent overflow of untreated effluent through open drains.

13 That the trust shall not allow any connectivity to new unit to establish and operate in the industrial area unless the CETP has enough capacity to treat the trade effluent of such unit.

14 That no untreated effluent shall be bypassed and the trust shall ensure that quantity of effluent received at the CETP is within the treatment capacity of the CETP

15 The stream of effluent emanating from each participant industry shall be equipped with the recording flow measuring device and sampling points, both at inlet and outlet of treatment works. The records of the measurement shall be maintained for each inlet and outlet on daily basis and the records shall be submitted to the Board & Regional Office on monthly basis.

16 That the management of CETP shall maintain the register of the daily consumption of chemicals, energy and lime etc and the records shall be submitted to the Board & Regional Office on monthly basis

17 That the unit shall not allow making any obstacles to any natural water flow i.e. natural nallah/stream carrying rain water to any water body.

S 2

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/3820-3822
Order No : 2015-2016/PLG/1001 **Date: 26/11/2015**
Unit Id : 775

18 **That this consent to operate shall be subject to compliance of any direction or order passed by Court of Law in the matter.**

19 **The CETP Trust shall ensure and enforce the condition that its member units shall operate at and appropriately reduced capacity so that CETP is able to maintain the prescribed standards of discharge of treated wastewater.**

20 **That the scheme for up gradation of the existing CETP IV along with zero liquid discharge as submitted by the Trust shall be implemented in 16 months' time as committed by the Trust. Further, the work of up gradation shall be commenced maximum within 6 months from the date of release of funds by MoEF.**

21 **That the Trust shall complete the work of installation of Tertiary Treatment Plant within six months from the date of issue of this consent irrespective of release financial assistance from GoI.**

22 **That the Trust shall submit quarterly progress report regarding implementation of the up gradation program.**

23 **That no untreated effluent shall be bypassed and the Trust shall ensure that reduced quantity of the effluent is received at CETP which is within the treatment capacity of the CETP.**

24 **That all the hazardous waste generated shall be scientifically handled/stored and disposed at the common hazardous waste treatment and disposal facilities.**

25 **That online continues monitoring system at the CETP will be installed at the earliest as per the time schedule prescribed by CPCB.**

26 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act**.

27 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

28 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that,

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Plan)/Pali(Pali)/1(1)/2015-2016/3820-3822
Order No : 2015-2016/PLG/1001 **Date:** 26/11/2015

Unit Id : 775

non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[PLG]

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Pali with directions to monitor the compliance of consent conditions.
2 Master File.

Group Incharge[PLG]

SON 18.1.2019

R-9

RSPCB Regional Office,Pali (Status of the textile units existing at Pali,Rajasthan).								
Sr. No.	Name of the Industrial Area	Number of the textile units	Units having ETP-ZLD		CETP Member Units are having effluent generation less then 50 KLD	Primary treatment plants status		Area Connected to CETP with Capacity
			Number of unit	Number of ETP-ZLD plant		CETP Member Units are having effluent generation 50-100 KLD	CETP Member Units are having effluent generation more than 100 KLD	
1	Mandia Road Industrial Area,Pali,Rajasthan.	282	3	2(02 units one common plant)	212	34 (PTP installed in 25 units)	33 (PTP installed in all 33 units)	CETP Unit 2, Capacity- 8.40 MLD
2	Punayata Industrial Area, Pali,Rajasthan.	226	4	3(02 units are having one common plant)	174	34 (PTP installed in 22 units)	14 (PTP installed in all 14 units)	CETP Unit 4, Capacity- 12 MLD
3	RIICO Industrial Area,Pali,Rajasthan.	58	11	3 (07 unit one common plant, 03 other unit having one common plant)	35	3 (PTP installed in 02 units)	09 (PTP installed in all 09 units)	CETP Unit 3, Capacity- 9.08 MLD
4	Mahavir Udyog Vihar,Pali,Rajasthan.	4	0	0	4	0	0	
	Total	**570**	**18**	**8**	**425**	**71 , 49 units have installed PTP.**	**57 , All units have installed PTP.**	

Primarily treated waste water of CETP Unit no. 2, 3 & 6 joins CETP Unit No. 6 (Capacity 12 MLD). From CETP Unit no. 6 treated waste water is discharged to river Bandi.

As per roster plan, approved by the State Government CETP Unit 2, Unit 3 & Unit 4 are permitted to catter 5.47 MLD, 1.57 MLD & 3.8 MLD, respectively.

The State Board has further strengthen the discharge quantity from CETP Unit no. 6 as maximum 7.5 MLD.

55

29772

R 2973

TECHNICAL DATA FOR UNIT 6

CTP FOUNDATION PALI

2974

TECHNICAL DATA FOR UNIT 6

01	**Receiving Chamber**	
		No of unit 1
		Avg. flow 15 MLD
		HRT at Peak. flow 10 sec
		Volume 2 m^3
		Size of tank 0.4 m x 1.2 m
		Providing LD 0.5 m
		FB 0.5 m
02	**Coarse Screen Chamber**	
		No. of Screens 2Nos (1 w + 1 S)
		1Mechanical (Working)
		1Manual (Stand-by)
	Mechanical Screen	
		Inclination of Screens 75 Degrees
		Size of Screen Bars 8 mm thick
		Clear spacing between two bars 15 mm
		Liquid depth 0.35 M
		Free board 0.65 M
	Receiving Station units	
	Intake Sump	No. of Unit 1 no.
		Design Flow 30 MLD
		Sump Volume 1458.3 cu.m.
		HRT at peak flow 70 min.
		Size of Sump 28 m dia
		Liquid depth 2.5 M
		Free board 0.5 M
	Raw water transfer Pump house and pump	
	Pumps details	No of pumps 2Nos (1w + 1s) - 2 Nos. (2W + 1S) Capacity of each pump 300 m3 /hr. - 700 m^3/hr
	Pumps house details	
		size 7 m diameter
	Grit Chambers	
		No. of Units 1 no
		Average effluent Flow 15MLD

CETP FOUNDATION PALI

57

		Peak flow 30MLD
		Surface overflow rate 1200 m3/m2/Day
		Retention time in min. 86.40 min
		Size of each grit chamber 5 m x 5 m
		Liquid depth 1.2M
	Tilted plate separator	
		Quantity 1 no
		Size 8m x 8m x 2m
		Working volume 48 m3 approx MOC RCC M-25 Location Partially underground Quantity 1 No Location Within tilted plate separator
	Primary Clarifier (PST)	
		No. of Unit 1 no. Total avg. design flow 15 MLD Retention time 4 Hrs Size of tank 30 m dia. LD 3.0 m
	Equalization Tank	
		No. of Unit 1 no. Total avg. design flow 15 MLD Retention time 12 Hrs Size of tank 42 m dia. LD 5.5 m
	Transfer Pumps details	
		No of pumps 2Nos (1w + 1s) Capacity of each pump 700 m3 /hr.
	Clariflocculator	
		Surface loading rate 35 m3/m2/day Detention period in clariflocculator 2.5 hr Detention period in Flocculator 30 min Size 28m dia with inside 12.5 m dia Flocculator zone SWD 3.0m No. of Unit 1 no. Total avg. design flow 15 MLD
	SBR /Cyclic Activated Sludge Process Unit	
	SBR Basin	No of unit 4 Nos working Design Flow / unit 15MLD Minimum vol/tank 3300 M³ FB 0.5 m Size of each tank 23.5 m x 23.5 m Maxi. LD of tank 6 m
	Decanter	
		Nos. of Decanter 3 Nos 30 m3`/hour
	Clarified water tank	1.5 ML capacity
	Filter feed Sump & Treated water tank	
		No of unit 1 No Design Flow / unit 15MLD FB 0.5 m

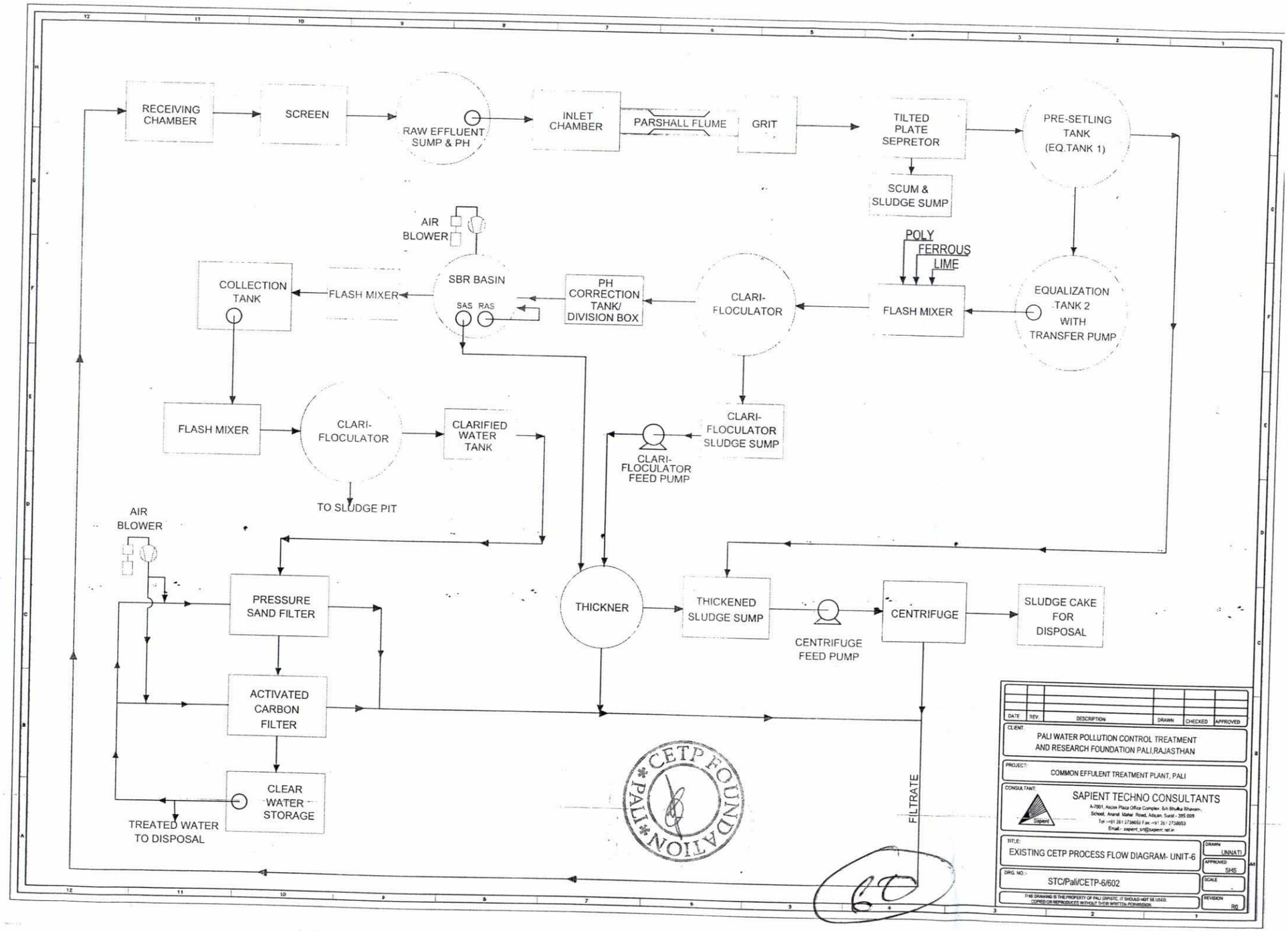
CETP FOUNDATION PALI

58

		Size of each tank 29.5 m dia Maxi. LD of tank 3 m
	Filter feed pump	
		Capacity of pump 125 m^3/hr Rate of filtration 10 m_3/m_2/hr Operating hours 15 hrs Size of filter 3.2 m dia x 6 m long
	Sludge Thickener	
		No. of thickeners 1working Inlet Sludge Concentration 26400 Size of unit 11 m Dia Liquid depth 3 m Bottom slope 1 in 6
	Sludge Mixing Blower Details	
		No. of Sump 1 No Volume 240 m3 Size of sump 10 m x 8 m Liquid depth 3 m HRT 4 hrs Nos. of Blower 2Nos (1w + 1s) Capacity 200 m^3/hr
	Centrifuge Feed Pump	
		No. of pump 3Nos (2w + 1s) Capacity of pump 60.4 M^3/hr - 30 m^3/hr Head 25 M

CETP FOUNDATION PALI

2977


RECEIVING CHAMBER
SCREEN
RAW EFFLUENT SUMP & PH
INLET CHAMBER
PARSHALL FLUME
GRIT
TILTED PLATE SEPRETOR
SCUM & SLUDGE SUMP
PRE-SETLING TANK (EQ.TANK 1)
AIR BLOWER
POLY
FERROUS
LIME
COLLECTION TANK
FLASH MIXER
SBR BASIN
SAS RAS
PH CORRECTION TANK/ DIVISION BOX
CLARI-FLOCULATOR
FLASH MIXER
EQUALIZATION TANK 2 WITH TRANSFER PUMP
FLASH MIXER
CLARI-FLOCULATOR
CLARIFIED WATER TANK
TO SLUDGE PIT
CLARI-FLOCULATOR FEED PUMP
CLARI-FLOCULATOR SLUDGE SUMP
AIR BLOWER
PRESSURE SAND FILTER
ACTIVATED CARBON FILTER
CLEAR WATER STORAGE
TREATED WATER TO DISPOSAL
THICKNER
THICKENED SLUDGE SUMP
CENTRIFUGE FEED PUMP
CENTRIFUGE
SLUDGE CAKE FOR DISPOSAL
FILTRATE
CETP FOUNDATION PALI
DATE REV. DESCRIPTION DRAWN CHECKED APPROVED
CLIENT: PALI WATER POLLUTION CONTROL TREATMENT AND RESEARCH FOUNDATION PALI,RAJASTHAN
PROJECT: COMMON EFFULENT TREATMENT PLANT, PALI
CONSULTANT: SAPIENT TECHNO CONSULTANTS
A-7001, Ascon Plaza Office Complex, B/h Bhutka Bhavan, School, Anand Mahal Road, Adajan, Surat - 395 009
Tel :+91 261 2736652 Fax :+91 261 2736653
Email : sapient_srt@sapient.net.in
TITLE: EXISTING CETP PROCESS FLOW DIAGRAM- UNIT-6
DRAWN UNNATI
APPROVED SHS
DRG. NO.: STC/Pali/CETP-6/602
SCALE
REVISION R0
THE DRAWING IS THE PROPERTY OF PALI [PRIVATE]. IT SHOULD NOT BE USED, COPIED OR REPRODUCED WITHOUT THEIR WRITTEN PERMISSION.

2978
R-11

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697
www.rpcb.nic.in

Registered

File No : F(MUID)/Pali(Pali)/5(1)/2012-2013/8247-8249
Order No : 2014-2015/MUID/2931 Date: 23/03/2015

Unit Id : 775

M/s Pali Water Pollution Control Treatment and Research Foundation

Mandia Road Pali Marwar , Tehsil:Pali
District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 09/02/2015 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Common Effluent Treatment Plant (CETP)-Unit-VI plant** situated at **Punayata Road, Industrial Aera Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **16/02/2015** to **31/01/2018** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
CETP	Product	12.00 MLD

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	12000.000	12,000.000	NIL Zero Discharge with Scientific arrangement for disposal of RO rejects to achieve the status of ZLD

61

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697
www.rpcb.nic.in
Registered

File No : F(MUID)/Pali(Pali)/5(1)/2012-2013/8247-8249
Order No : 2014-2015/MUID/2931 **Date:** 23/03/2015

Unit Id : 775

5 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **Into Inland Surface Water .** The main parameters for regular monitoring shall be as under

62

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697
www.rpcb.nic.in
Registered

File No : F(MUID)/Pali(Pali)/5(1)/2012-2013/8247-8249
Order No : 2014-2015/MUID/2931 Date: 23/03/2015

Unit Id : 775

Parameters	Standards
Total Suspended Solids	Not to exceed 100 mg/l
pH Value	Between 5.5 to 9.0
Oil and Grease	Not to exceed 10 mg/l
Total Residual Chlorine	Not to exceed 1.0 mg/l
Ammonical Nitrogen (as N)	Not to exceed 50 mg/l
Total Kjeldahl Nitrogen (as N)	Not to exceed 100 mg/l
Biochemical Oxygen Demand (3 days at 27°C)	Not to exceed 30 mg/l
Arsenic (as As)	Not to exceed 0.2 mg/l
Mercury (As Hg)	Not to exceed 0.01 mg/l
Lead (as Pb)	Not to exceed 0.1 mg/l
Cadmium (as Cd)	Not to exceed 2.0 mg/l
Total Chromium (as Cr)	Not to exceed 2.0 mg/l
Copper (as Cu)	Not to exceed 3.0 mg/l
Zinc (as Zn)	Not to exceed 5.0 mg/l
Selenium (as Se)	Not to exceed 0.05 mg/l
Nickel (as Ni)	Not to exceed 3.0 mg/l
Cyanide (as CN)	Not to exceed 0.2 mg/l
Fluoride (as F)	Not to exceed 2.0 mg/l
Sulphide (as S)	Not to exceed 2.0 mg/l
Phenolic Compounds (as C6H5OH)	Not to exceed 1.0 mg/l
Chlorides	Not to exceed 1000 mg/l
Sulphates	Not to exceed 1000 mg/l
Boron (As B)	Not to exceed 0.2 mg/l
% Sodium	Not to exceed 0 mg/l

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697
www.rpcb.nic.in
Registered

File No : F(MUID)/Pali(Pali)/5(1)/2012-2013/8247-8249
Order No : 2014-2015/MUID/2931 Date: 23/03/2015

Unit Id : 775

Chemical Oxygen Demand	Not to exceed 250 mg/l

6 That the CETP trust, Pali shall install Reverse Osmosis (R.O.) Plant of adequate capacity supported with scientific arrangement for disposal of RO rejects to achieve the status of ZLD with in 10 months and ensure compliance of E.C. conditions and consent conditions, failing which your Bank Guarantee (Rs 500000/ -) shall be forfeited.

7 That the trust shall obtain all necessary permission from concern authorities (RIICO) and district administration Pali for operation of the plant.

8 That no untreated effluent shall be discharged into river Bandi.

9 That Trust shall strive to install Reverse Osmosis (R.O.) plant of adequate capacity and treated effluent shall be recycled and shall be used by the member units to achieve the Zero Liquid Discharge (ZLD).

10 That the CETP Trust shall issue direction to all the member units for proportionate reduction in their operations and effluent discharge so as to keep the quantity of combined effluent within the reduced operating capacity of the CETP for achieving the prescribed standards as per Environment Protection Act 1986.

11 That the Trust will maintain complete record of the effluent treated, chemicals consumed etc. and will send monthly report to R.O. Pali.

12 That the sludge generated from the CETP will be stored under the covered shed & will be disposed of as per the provisions of the Hazardous Waste (Management and handling) Rules, 2000.

13 That unit shall comply with the provisions of Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008 as amended time to time.

14 That the trust shall ensure providing adequate and closed conduits for proper collection and conveyance of the effluent generated from the individual /member units to the CETP and keep it in proper working order so as to prevent overflow of untreated effluent through open drains.

15 That the project proponent shall comply with all the conditions of Environmental Clearance imposed by SEIAA, Jaipur, Rajasthan vide letter no. 09-10 dated 09/09/2011.

16 That Oil & Grease removal system will be further improved as per the guidance of Regional Officer, Pali.

17 That the trust shall not allow any connectivity to new unit to establish and operate in the industrial area unless the CETP has enough capacity to treat the trade effluent of such unit.

18 That no untreated effluent shall be bypassed and the trust shall ensure that quantity of effluent received at the CETP is within the treatment capacity of the CETP.

64

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697
www.rpcb.nic.in
Registered

File No : F(MUID)/Pali(Pali)/5(1)/2012-2013/8247-8249
Order No : 2014-2015/MUID/2931 **Date:** 23/03/2015

Unit Id : 775

19 **The stream of effluent emanating from each participant industry shall be equipped with the recording flow measuring device and sampling points, both at inlet and outlet of treatment works. The records of the measurement shall be maintained for each inlet and outlet on daily basis and the records shall be submitted to the Board & Regional Office on monthly basis.**

20 **That this consent to operate is valid for operation of one CETP-VI of 12.00 MLD capacity only at Punayata Industrial Area, Pali. For any change in number & its capacity, the unit has to seek fresh consent to Establish**

21 **That the management of CETP shall maintain the register of the daily consumption of chemicals, energy and lime etc and the records shall be submitted to the Board & Regional Office on monthly basis.**

22 **That the unit shall not allow making any obstacles to any natural water flow i.e. natural nallah/stream carrying rain water to any water body.**

23 **That if the project cost exceeds Rs. 26.01 Crores, the unit shall take/obtain modification in consent after paying fee as applicable.**

24 **That the trust shall install filter press to reduce moisture content to make able the cement industry for co processing of the sludge generated from CETP.**

25 **That the trust shall ensure that all the member units should not discharge waste water more than the quantity of waste water allowed by the trust.**

26 **That the trust shall ensure that each member unit shall install individual primary treatment plant and follow the standards of inlet to CETP.**

27 **That this consent to operate shall be subject to compliance of any direction or order passed by Court of Law in the matter.**

28 **That the trust shall install online effluent quality monitoring system at the outlet of CETP to monitor the discharge standards of treated water.**

29 **That the CETP trust Pali shall ensure compliance of MoEF, GoI letter dated 13/01/2010 through which moratorium has been imposed on various industrial areas of Pali on the basis of assessment of Comprehensive Environmental Pollution Index(CEPI)**

30 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act.**

31 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

65

Rajasthan State Pollution Control Board
4, Institutional Area, Jhalana Doongari, Jaipur-302 004
Phone: 0141-5159600,5159695 Fax: 0141-5159697
www.rpcb.nic.in
Registered

File No : F(MUID)/Pali(Pali)/5(1)/2012-2013/8247-8249
Order No : 2014-2015/MUID/2931 **Date:** 23/03/2015

Unit Id : 775

32 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Pali requested to verify the compliance of CTO and EC conditions and forward the detailed inspection report for further necessary action within 06 months.
2 Master File.

Group Incharge

CETP VI

R-12

RAJASTHAN STATE POLLUTION CONTROL BOARD
COMPARATIVE STATEMENT
Analysis Results of CETP, Pali Unit VI

Date of Collection	Inlet effluent quality for CETP as prescribed under the Environment (Protection) Rules, 1986	10.07.2018	17.07.2018	19.07.2018	31.07.2018	04.08.2018	14.08.2018	20.08.2018	28.08.2018	06.09.2018	27.11.2018	11.12.2018	Moef & CC Notification Dated 01.01.2016 for treated effluent quality standard into inland surface water For CETP	01.07.2018	10.07.2018	17.07.2018	19.07.2018	23.07.2018	31.07.2018	04.08.2018	14.08.2018	20.08.2018	28.08.2018	06.09.2018	25.09.2018	16.10.2018	27.11.2018	11.12.2018
		Inlet of Unit-VI												*Final Outlet of Unit-VI*														
pH	5.5-9.0	7.86	8.62	7.57	8.4	8.78	7.72	7.33	8.1	8.79	8.86	8.95	6.0-9.0	7.53	7.72	7.50	7.56	7.44	8.62	7.51	7.52	7.70	7.79	7.82	7.94	7.53	7.5	7.58
Total Suspended Solids mg/l	—	546	225	420	398	360	412	177	316	512	212	593	100	**126**	**217**	**55**	**88**	**69**	35	27	46	42	28	51	**258**	**138**	84	68
Chemical Oxygen Demand (COD) mg/l	—	2063	2553	1977	1169	1333	1788	752	1641	1613	1364	1597	250	**492**	**706**	**482**	**350**	**322**	107	128	**329**	**296**	219	209	**1446**	**714**	**616**	**837**
Bio-Chemical Oxygen Demand (BOD) (3days at 27° C) mg/l	—	341	416	361	246	276	312	210	382	390	328	390	30	**96**	**107**	**98**	**71**	**62**	21	26	**64**	**62**	**48**	**52**	**320**	**126**	**156**	**212**
Oil & Grease	20	24	26	22	15	16	23	9	15	19	12	13	10	4.5	7.5	4.5	3.5	3.5	1.0	1.0	2.5	3.0	2.0	2.0	5.0	4.5	2.5	2.0
Sulphides as S	—	22.4	19.8	22.7	12.6	16.4	20.8	8.2	14.8	20.0	10.8	12.6	2.0	**3.8**	**9.2**	**5.2**	**4.1**	**3.2**	1.2	1.5	**3.8**	**4.6**	**2.7**	**3.6**	**15.6**	**7.6**	**3.4**	**4.2**
Copper as Cu	3.0	0.824	0.340	NT	0.535	0.475	0.363	0.338	0.376	1.480	0.610	NT	3.0	0.107	0.005	NT	NT	0.054	NT	NT	0.064	0.070	NT	0.131	NT	0.259	0.027	NT
Zinc mg/l	15.0	0.683	NT	0.427	3.520	4.230	0.265	0.100	0.182	1.670	0.348	NT	5.0	0.892	NT	NT	NT	**13.6**	0.669	0.385	0.199	0.091	0.057	1.050	0.167	0.128	0.156	0.24
Nickel as Ni	3.0	NT	NT	NT	NT	0.128	0.026	0.067	0.075	0.114	0.173	0.020	3.0	NT	NT	NT	NT	NT	NT	0.061	0.020	0.065	0.004	0.016	0.084	NT	NT	NT
Cadmium as Cd mg/l	1.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	0.05	**0.053**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Lead as Pb	1.0	0.015	NT	1	NT	NT	0.053	0.103	NT	0.135	NT	NT	0.1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	0.061	NT	NT	NT	NT
Total Chromium as	2.0	0.080	NT	0.16	NT	NT	0.107	0.084	0.093	0.287	0.03	NT	2.0	0.18	NT	NT	NT	NT	NT	NT	0.060	0.042	NT	NT	0.041	0.127	NT	NT
Iron as Fe	—	18	3	22	10	4	8	5.784	3	76	12	0.155	3.0	0.512	0.049	0.343	0.165	NT	0.212	0.921	0.323	0.274	0.135	NT	1.91	1.48	0.291	0.14

2984

Date of Collection	Inlet effluent quality for CETP as prescribed under the Environment (Protection) Rules, 1986	10.07.2018	17.07.2018	19.07.2018	31.07.2018	04.08.2018	14.08.2018	20.08.2018	28.08.2018	06.09.2018	27.11.2018	11.12.2018	Moef & CC Notification Dated 01.01.2016 for treated effluent quality standard into inland surface water For CETP	01.07.2018	10.07.2018	17.07.2018	19.07.2018	23.07.2018	31.07.2018	04.08.2018	14.08.2018	20.08.2018	28.08.2018	06.09.2018	25.09.2018	16.10.2018	27.11.2018	11.12.2018
		Inlet of Unit-VI												*Final Outlet of Unit-VI*														
Fixed Dissolve Solid mg/l	—	8134	7441	7652	6060	6204	6878	4467	7870	8386	8813	6687	2100*	9181	9807	5558	5636	6944	5414	5672	6507	6958	5424	6302	7468	7801	8330	7339
Fluoride as F [mg/l]	—	4.09	1.68	3.79	3.68	4.04	4.12	2.19	2.43	2.34	2.64	2.73	2	1.24	**2.38**	1.83	**2.64**	**2.14**	1.74	**3.03**	**1.88**	**2.08**	1.82	1.75	1.13	1.28	1.82	1.97
Chloride as Cl [mg/l]	—	2710	2080	2610	2610	2280	2230	1420	2370	1560	2350	2490	1000	**2110**	**3240**	**2470**	**2090**	**2180**	**2460**	**2590**	**2540**	**2540**	**1910**	**2320**	**2710**	**2780**	**2750**	**3190**
Phosphate (Total) as P	—	21	35	32	23	28	24	10	16	20	8	7	5	**9.5**	**7.5**	3.5	3.0	0.5	0.5	0.8	3.0	**6.5**	2.5	2	1.0	1.5	4.5	3.0
Ammonical Nitrogen as N [mg/l]	—	37.0	42.5	20.0	13.0	14.0	17.5	12.5	30.5	24.0	17.5	20.0	50	13.5	12.5	6.5	11.0	8.0	5.0	6.0	9.0	7.0	6.0	6.5	13.5	6.5	8.5	11.0
Total Kjeldahl Nitrogen	—	74	75	42	28	31	39	28.4	45	40	36	39	50	28	27	14	26	21	11	14	21	16	12	12	24	13	19	24
Sulphate as SO_4 [mg/l]	—	917	920	982	880	1047	1297	680	804	950	1056	926	1000	861	**1108**	892	764	**1168**	408	540	782	654	782	818	**1018**	982	949	847

NT : Not Traceable

Note: Bold characters indicate values exceeding the prescribed standards.

68

2985

2986

R-13

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali
Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897
Order No : 2017-2018/Pali/5664 **Date:** 27/06/2017

Unit Id : 16937

M/s Nitesh Industries

F-184, RIICO Industrial Area, Punayata , Tehsil:Pali District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 22/12/2016 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **textile plant** situated at **F-184, RIICO Industrial Area, Punayata Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **19/06/2017** to **30/04/2022** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
DESIZED AND MERCERIZED CLOTH	Product	100.00 THAN/DAY

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That this consent is being issued for **mercerizing, desizing** with following water polluting machines

SNo	Name of Machine	No of Machines
1	Desizing Padding Machine	01
2	Mercerizing Machine	01

69

Validity unknown
Digitally signed by RAJEEV PAREEK
Date: 2017.06.27 13:51:29 +05:30

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali

Phone: 02932-231616

Registered

File No : **F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897**

Order No : **2017-2018/Pali/5664**

Unit Id : 16937 **Date:** **27/06/2017**

5 That there shall not be any increase either in number / size/ capacity of the above machines or waste water discharge without obtaining prior consent to establish from the State Board i.e for any modification / alteration/ expansion, fresh consent to establish & sonsent to operate shall be required.

6 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	3.000	NIL	3.000 Into RIICO Drain Leading to CETP

7 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **At the inlet of Common Effluent Treatment Plants** . The main parameters for regular monitoring shall

Validity unknown
Digitally signed by RAJEEV BAREEK
Date: 27/06/2017 13:51:29 IST

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali
Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897
Order No : 2017-2018/Pali/5664
Date: 27/06/2017
Unit Id : 16937

Parameters	Standards
Oil & Grease	Not to exceed 20 mg/l
pH Value	Between 5.5 to 9.0
Total Chromium (as Cr)	Not to exceed 2.00 mg/l
Copper (as Cu)	Not to exceed 3.00 mg/l
Lead (as Pb)	Not to exceed 1.00 mg/l
Nickel (as Ni)	Not to exceed 3.00 mg/l
Zinc as Zn	Not to exceed 15.00 mg/l
Temperature °C	Not to exceed 45° C
Phenolic Compounds (as C6H5OH)	Not to exceed 5.0mg/l
Ammonical Nitrogen (as N)	Not to exceed 50 mg/l
Boron (As B)	Not to exceed 2.0 mg/l
Fluoride as F	Not to exceed 15 mg/l
Selenium (as Se)	Not to exceed 0.05 mg/l

71

Validity unknown
Digitally signed by RAJEEV KUREEL
Date: 2017.06.27 13:51:29 +05:30

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali

Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897

Order No : 2017-2018/Pali/5664 Date: 27/06/2017

Unit Id : 16937

8 a. That this consent is valid for machinery i.e. Desizing Padding Machine-01no. & Mercerizing Machine-01 no.

b. That this consent to operate is being issued considering capital cost of project as Rs. 25.59 lacs.

c. That this consent is issued to the unit on the basis of documents submitted by the applicant, if any discrepancies is found in the document/facts submitted by the unit then the consent shall be treated as revoked without any further notice and the unit shall be liable for action in accordance with provisions of law.

d. That no additional plant & machinery shall be installed without obtaining prior consent to establish from the State Board.

e. That production capacity permitted under this consent shall not increased without obtaining prior consent to establish from the State Board.

f. That the rotational closure declared by the CETP Trust and State Board from time to time shall be complied and industry shall be operated on such reduced capacity/discharge as decided by the CETP Trust/State Board so as to avoid any overload with the CETP's.

g. That this Consent to operate shall be liable to be revoked by the State Board in the event of termination of membership of the industry by the CETP Trust or in the event of closure or non-operation of the CETP of which the industry is a member, provided, this condition shall not apply where the unit has established or proposes to establish its own effluent treatment plant with the prior consent of the State Board under the provisions of the Water Act, 1974.

h. That this consent shall be valid subject to valid consent to operate with the CETPs of which the industry is a member.

i. That issuance of this consent is subject to the compliance of the direction(s) of Hon'ble National Green Tribunal (NGT) issued vide order sheet dated 26.05.2017 in M.A. no. 1117/2016 (in O.A. no. 32/2014) and in O.A. no. (32/2014 and 33/2014) w.r.t. the pollution problem of Pali; at any stage/circumstances, if it is found that direction(s) are not complied by the industry, the consent shall be treated as revoked without any further notice.

72

Validity unknown
Digitally signed by RAJEEV SHREE
Date: 2017.06.27 13:51:29 +05:30

Regional Office Pali
Rajasthan State Pollution Control Board
SA-6, Mandia Road, Industrial Area, Pali
Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897
Order No : 2017-2018/Pali/5664
Date: 27/06/2017
Unit Id : 16937

9 a. That the quantity of trade effluent discharge from the entire industry shall not exceed to 3.0 KLD (i.e. well within the discharge allowed by the CETP Trust at Pali) under any circumstances.

b. That total water consumption of the industry shall not exceed from 4.5 KLD and water meters shall be installed to measure the quantity of water consumption for different purposes. Also record of daily water consumption shall be maintained properly.

c. That the adequate primary treatment arrangements shall be provided, maintained and operated properly by the industry so as to meet the standards prescribed under schedule-I of the Environment (Protection) Rules, 1986 as amended for inlet effluent quality for Common Effluent Treatment Plant (CETP). The effluent shall be discharged through one outlet into drain/pipeline leading to Common Effluent Treatment Plant (CETP).

d. That the industry shall not discharge any treated/untreated effluent within and outside the premises except into RIICO drain through one outlet leading to CETP after proper treatment to achieve standards prescribed for inlet of CETP as notified under E(P) Act, 1986.

e. That effort shall be made to minimize the quantity of waste water generation.

f. That the industry shall maintain separate energy metering device for primary effluent treatment plant.

g. That domestic waste water shall be disposed off through soak pit after proper treatment in septic tank.

h. That the industry shall maintain a tamper proof GPRS based flow measuring device at the final outlet of the industry in proper condition so as to make the discharge measurable and verifiable and daily record of the same shall be maintained.

i. That the industry shall not abstract any ground water without prior permission from the Central Ground Water Authority (CGWA).

j. That the industry shall construct & maintain rain water harvesting/recharge system.

10 a. That the industry shall not install/operate any Air Pollution Source without obtaining prior consent to establish/operate from the Board.

b. That the industry shall not use any type of wood as fuel.

73

Validity unknown
Digitally signed by
RAJEEV PAREEK
Date: 2017.06.27
13:51:29 +05:30

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali

Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897

Order No : 2017-2018/Pali/5664

Date: 27/06/2017

Unit Id : 16937

11 a. That all the other conditions imposed vide Board's consent to operate letter no F(Tech)/Pali (Pali)/114(1)/2010-2011/3775-3778 dated 21.07.2014 shall be complied with by the industry.

b. That the industry shall comply with the provisions of Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016 and daily record of sludge generation & it's disposal shall be maintained.

c. That the industry shall submit analysis report of primary treated effluent and ambient/stack monitoring reports on quarterly basis from laboratory recognized by RSPCB/CPCB/MOEF&CC or from RSPCB on payment basis.

d. That the unit shall apply for renewal of this consent at least 120 days in advance prior to expiry date of this consent letter else additional fee shall have to be deposited in accordance with the Rajasthan Water & Air (Prevention & Control of Pollution) (Amendment) Rules 2016.

e. That the grant of consent does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force rests with the industry/ unit/ project proponent.

f. That the industry shall submit quarterly point wise compliance of all the conditions mentioned herein above.

g. That the direction of Hon'ble Rajasthan High Court and Hon'ble National Green Tribunal (NGT) issued from time to time in the matter of pollution problem of Pali shall be complied with by the industry.

h. Issuance of this consent would be subject to post audit of pollution control Measures (PCMs) and Consent conditions. In case, it is found during post inspection, the industries have flouted conditions of the consent / authorization / or inadequate PCM, the consent will be revoked and directions for closure will be issued under section 33A of the Water Act, 1974 & under section 31A of the Air Act, 1981 without any further notice in accordance to RSPCB Head office order F.12(PSC-1)/RSPCB/PSC/17 to52 Dated 03.05.2016.

i. That the industry shall not add/increase/expand/alter/modify/change/replace in capacity & size of Plant/Production Capacity/Project Cost/Plant and machinery/Process/Water Consumption quantity/Waste Water discharge quantity without obtaining prior consent to establish/operate from the State Board.

j. That the industry shall deposit water cess charges as per norms of the Water (Prevention and Control of Pollution)Cess Act, 1977 & amended till date.

74

Validity unknown
Digitally signed by RAJEEV SHREE
Date: 2017.06.27 13:51:29 +05:30

Regional Office Pali
Rajasthan State Pollution Control Board
SA-6, Mandia Road, Industrial Area, Pali
Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/114(1)/2010-2011/894-897
Order No : 2017-2018/Pali/5664
Unit Id : 16937 **Date:** 27/06/2017

12 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act.**

13 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

14 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Yours Sincerely

Regional Officer[Pali]

Copy To:-

1 SEE & Group Incharge (Textile),RSPCB,Jaipur.
2 Chairman, Pali Water Pollution Control Treatment and Research Foundation (CETP Trust) Mandia Road Industrial Area, Pali .
3 Master File.

Regional Officer[Pali]

75

Validity unknown
Digitally signed by RAJEEV PAREEK
Date: 2017.06.27 13:51:29 +05:30

R-2993

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali
Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/54(1)/2010-2011/3818-3819
Order No : 2015-2016/Pali/2886

Date: 20/01/2016

Unit Id : 13328

M/s Golden Felt Finishing

4, Busi Ki Gali , Tehsil:Pali
District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 and under section 21(4) of Air (Prevention & Control of Pollution) Act, 1981.

Ref: Your application for Consent to Operate dated 10/09/2015 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) and under section 21 of the Air (Prevention & Control of Pollution) Act, 1981, (hereinafter to be referred as the Air Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Textile (Orange Catagory) plant** situated at **F-54, Punayata Industrial Area Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **01/10/2015** to **30/09/2020** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
FINISHING OF CLOTH	Product	1,500.00 THAN/DAY

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That the sources of air emmissions along with pollution control measures and the emission standards for the prescribed parameters shall be as under:

Sources of Air Emmissions	Pollution Control Measures	Prescribed	
		Parameter	Standard
D.G.SET (01 no.)(62.5KVA)	ACOUSTIC ENCLOSURE , WITH ADEQUATE STACK HEIGHT		

76

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali

Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/54(1)/2010-2011/3818-3819

Order No : 2015-2016/Pali/2886

Unit Id : 13328 **Date:** 20/01/2016

		CO	3.5 g/kW hr
		Particulate Matter	0.3 g/kW hr
		NOx+HC	4.7 g/kW hr
		Smoke limit (Light Absorption Coefficient in meter inverse)	0.7
Steam Boiler (01 no.)(0.8TPH)	Dust Collector , WITH ADEQUATE STACK HEIGHT	Particulate Matter	1200.0 mg/Nm3

5 That this consent to operate is being issued for Blanket Felt Finishing Machine-03 nos., Gota Felt Finishing Machine-03 nos., Steam Boiler (0.8 TPH)-01, & D.G.Set (62.50 kVA)-01.

6 That the management shall provide adequate stack height and acoustic enclosure with D.G.Set (62.50 kVA).

7 That the management shall provide adequate stack height and pollution control measures with Steam Boiler (0.8 TPH).

8 That the management shall provide safe and adequate infrastructure facility at the stack attached with Steam Boiler (0.8 TPH)-01.

9 That this consent to operate is being issued for the capital investment of Rs 47.95 Lac.

10 That the industry shall not add/increase/expand/alter/modify/change/replace in capacity & size of Plant/Production Capacity/Project Cost/Plant and machinery/Process without obtaining prior consent to establish/operate from the State Board.

11 That the management shall not install/operate any additional machinery without taking prior consent from the State Board.

12 That the issue of this consent does not bestow any legal right. The industry is required to seek requisite clearance/license/permit/NOC required under statutory obligation stipulated under the laws of central government/state government/court orders.

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali

Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/54(1)/2010-2011/3818-3819

Order No : 2015-2016/Pali/2886

Date: 20/01/2016

Unit Id : 13328

13 That this consent to operate is valid for finishing of cloth with existing production capacity only.

14 That the management shall submit stack emission monitoring & Ambient Air Monitoring within 15 days from the issue of this letter, without fail.

15 That the industry shall comply with the all the other conditions of Board's consent to operate order no. F(Tech)/Pali(Pali)/54(1)/2010-2011/368-369 dated 27.09.2012.

78

Regional Office Pali
Rajasthan State Pollution Control Board
SA-6, Mandia Road, Industrial Area, Pali
Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/54(1)/2010-2011/3818-3819
Order No : 2015-2016/Pali/2886
Unit Id : 13328
Date: 20/01/2016

16 That the Management shall ensure compliance of following specific conditions without fail:-

a) That the industry shall construct rain water harvesting structure within the industrial premises.

b) That the industry shall maintain the ZERO DISCHARGE STATUS within and outside the industrial premises.

c) That the industry shall not extract ground water from any means in the premises without taking prior permission from the CGWA viz. concerned authority in this regard.

d) That the domestic waste water shall be treated through soak pit/septic tank and Zero discharge status shall be maintained.

e) That the industry shall comply with the standards as prescribed vide MOEF notification no. GSR 826 (E) dated 16.11.2009 and CPCB notification no. B-29016/20/90/P.C.I.-I dated 18.11.2009 subsequent amendments with respect to the National Ambient Air Quality standards:-

Pollutant	Concentration in Ambient Air	Time Weighted Average
PM10	100 µg/M^3	24 Hours
PM2.5	60 µg/M^3	24 Hours
SO2	80 µg/M^3	24 Hours
NOx	80 µg/M^3	24 Hours
CO	4 mg/M^3	08 Hours

f) A Sign Board showing the name, address and capacity of the industry as well as validity of the consents should be displayed at the entrance of the site.

g) That the industry shall comply with the standards as prescribed vide MOEF notification no. S.O. 123 (E) dated 14.02.2000 and subsequent amendments with respect to the National Ambient Air Quality standards in reference to Noise:-

Area Code	Category of Area/Zone	Day Time	Night Time
Limits in dB(A) Leq*			
(A)	Industrial area	75	70

h) That this consent is liable to be revoked, if any complaint regarding Pollution is received and found correct after verification and in case Unit fails to comply with the Guidelines & Specific Conditions laid down by the State Board as and when applicable for the abatement of pollution.

i) That this consent is valid subject to the fulfillment of the entire statutory requirement in other laws/acts/rules as applicable.

j) That this consent is issued to the unit on the basis of documents submitted by the applicant, if any discrepancies is found in the document/facts submitted by the unit , then the consent shall be treated as revoked without any further notice and

Regional Office Pali

Rajasthan State Pollution Control Board

SA-6, Mandia Road, Industrial Area, Pali

Phone: 02932-231616

Registered

File No : F(Tech)/Pali(Pali)/54(1)/2010-2011/3818-3819

Order No : 2015-2016/Pali/2886

Date: 20/01/2016

Unit Id : 13328

the unit shall be liable for action in accordance with provisions of law.

17 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act and under section 21(6) of the Air Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Air Act & Water Act.**

18 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

19 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act and Air Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under the relevant provisions of the said Act(s).

Yours Sincerely

Regional Officer[Pali]

Copy To:-

1 Master File.

Regional Officer[Pali]

R-2998

Head Office (TCD)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/PALI(PALI)/6(1)/2008-2009/5682-5685

Order No : 2018-2019/TCD/6269

Date: 24/12/2018

Unit Id : 2401

M/s Shree Padmadwati Dyeing

F-72, RIICO Industrial Area, Punayata, Pali , Tehsil:Pali District:Pali

Sub: **Consent to Operate** under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.

Ref: Your application for Consent to Operate dated 06/12/2018 and subsequent correspondence.

Sir,

Consent to Operate under the provisions of section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974 (hereinafter to be referred as the Water Act) as amended to date and rules & the orders issued thereunder **is hereby granted** for your **Shree Padmawati Dyeing plant** situated at **F-72, RIICO Industrial Area, Punayata, Pali Pali Tehsil:Pali District:Pali** , Rajasthan, subject to the following conditions:-

1 That this Consent to Operate is valid for a period from **24/12/2018** to **30/11/2023** .

2 That this Consent is granted for manufacturing / producing following products / by products or carrying out the following activities or operation/processes or providing following services with capacities given below.

Particular	Type	Quantity with Unit
DYED CLOTH	Product	600.00 THAN/DAY

3 That this consent to operate is for existing plant, process & capacity and separate consent to establish/operate is required to be taken for any addition / modification / alteration in process or change in capacity or change in fuel.

4 That this consent is being issued for **dyeing** with following water polluting machines

SNo	Name of Machine	No of Machines
1	Dyeing Jigger	08
2	Jet Dyeing Machine	03

81

Signature Not Verified
Digitally signed by ASHOK KUMAR GUPTA
Date: 2018.12.24 12:52:30 +05:30

Head Office (TCD)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/PALI(PALI)/6(1)/2008-2009/5682-5685

Order No : 2018-2019/TCD/6269

Date: 24/12/2018

Unit Id : 2401

5 That there shall not be any increase either in number / size/ capacity of the above machines or waste water discharge without obtaining prior consent to establish from the State Board i.e for any modification / alteration/ expansion, fresh consent to establish & sonsent to operate shall be required.

6 That the quantity of effluent generation along with mode of disposal for the treated effluent shall be as under:

Type of effluent	Max. effluent generation (KLD)	Recycled Qty of Effluent (KLD)	Disposed Qty of effluent (KLD)and mode of disposal
Trade Effluent	102.000	NIL	102.000 In to pipeline leading to CETP

7 That the trade effluent shall be treated before disposal so as to conform to the standards prescribed under the Environment (Protection) Act-1986 for disposal **At the inlet of Common Effluent Treatment Plants** . The main parameters for regular monitoring shall

Parameters	Standards
Oil & Grease	**Not to exceed 20 mg/l**
pH Value	**Between 5.5 to 9.0**
Total Chromium (as Cr)	**Not to exceed 2.00 mg/l**
Copper (as Cu)	**Not to exceed 3.00 mg/l**
Lead (as Pb)	**Not to exceed 1.00 mg/l**
Nickel (as Ni)	**Not to exceed 3.00 mg/l**
Zinc as Zn	**Not to exceed 15.00 mg/l**
Temperature °C	**Not to exceed 45° C**
Fluoride as F	**Not to exceed 15 mg/l**

82

Signature Not Verified
Digitally signed by ASHOK KUMAR GUPTA
Date: 2018.12.24 12:52:30 +05:30

3000

Head Office (TCD)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/PALI(PALI)/6(1)/2008-2009/5682-5685

Order No : 2018-2019/TCD/6269

Date: 24/12/2018

Unit Id : 2401

8 a. That this consent is valid for machinery i.e. 03- Jet Dyeing machine, 08- Dyeing Jiggers, 01- Adan, 15- trolleys and 01- Interlock sewing machine.

b. That this consent to operate is being issued considering capital cost of project as Rs. 103.88 lacs.

c. That this consent is issued to the unit on the basis of documents submitted by the applicant, if any discrepancies is found in the document/facts submitted by the unit then the consent shall be treated as revoked without any further notice and the unit shall be liable for action in accordance with provisions of law.

d. That no additional plant & machinery shall be installed without obtaining prior consent to establish from the State Board.

e. That production capacity permitted under this consent shall not increased without obtaining prior consent to establish from the State Board.

f. That the rotational closure declared by the CETP Trust and State Board from time to time shall be complied and industry shall be operated on such reduced capacity/discharge as decided by the CETP Trust/State Board so as to avoid any overload with the CETP's.

g. That this Consent to operate shall be liable to be revoked by the State Board in the event of termination of membership of the industry by the CETP Trust or in the event of closure or non-operation of the CETP of which the industry is a member, provided, this condition shall not apply where the unit has established or proposes to establish its own effluent treatment plant with the prior consent of the State Board under the provisions of the Water Act, 1974.

h. That this consent shall be valid subject to valid consent to operate with the CETPs of which the industry is a member.

i. That issuance of this consent is subject to the compliance of the direction(s) of Hon'ble National Green Tribunal (NGT) issued vide order sheet dated 26.05.2017 in M.A. no. 1117/2016 (in O.A. no. 32/2014) and in O.A. no. (32/2014 and 33/2014) w.r.t. the pollution problem of Pali; at any stage/circumstances, if it is found that direction(s) are not complied by the industry, the consent shall be treated as revoked without any further notice.

43

Signature Not Verified
Digitally signed by ASHOK KUMAR GUPTA
Date: 2018.12.24 12:52:30 +05:30

Head Office (TCD)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/PALI(PALI)/6(1)/2008-2009/5682-5685

Order No : 2018-2019/TCD/6269

Unit Id : 2401 Date: 24/12/2018

9 a. That the quantity of trade effluent discharge from the entire industry shall not exceed to 102.00 KLD (i.e. well within the discharge allowed by the CETP Trust at Pali) under any circumstances.

b. That total water consumption of the industry shall not exceed from 130.00 KLD and water meters shall be installed to measure the quantity of water consumption for different purposes. Also record of daily water consumption shall be maintained properly.

c. That the adequate primary treatment arrangements shall be provided, maintained and operated properly by the industry so as to meet the standards prescribed under schedule-I of the Environment (Protection) Rules, 1986 as amended for inlet effluent quality for Common Effluent Treatment Plant (CETP). The effluent shall be discharged through one outlet into drain/pipeline leading to Common Effluent Treatment Plant (CETP).

d. That the industry shall not discharge any treated/untreated effluent within and outside the premises except through one outlet via tankers/conduit leading to CETP after proper treatment to achieve standards prescribed for inlet of CETP as notified under E(P) Act, 1986.

e. That effort shall be made to minimize the quantity of waste water generation.

f. That the industry shall maintain separate energy metering device for primary effluent treatment plant.

g. That domestic waste water shall be disposed off through soak pit after proper treatment in septic tank.

h. That the industry shall maintain a tamper proof GPRS based flow measuring device at the final outlet of the industry in proper condition so as to make the discharge measurable and verifiable and daily record of the same shall be maintained.

i. That the industry shall not abstract any ground water without prior permission from the Central Ground Water Authority (CGWA).

j. That the industry shall construct & maintain rain water harvesting/recharge system.

10 That the industry shall comply with the provisions of Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016 and daily record of sludge generation & it's disposal shall be maintained.

11 That the industry shall submit analysis report of primary treated effluent and ambient/stack monitoring reports on quarterly basis from laboratory recognized by RSPCB/CPCB/MOEF&CC or from RSPCB on payment basis.

Signature Not Verified
Digitally signed by ASHOK KUMAR GUPTA
Date: 2018.12.24 12:52:30 +05:30

3002

Head Office (TCD)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/PALI(PALI)/6(1)/2008-2009/5682-5685

Order No : 2018-2019/TCD/6269 **Date: 24/12/2018**

Unit Id : 2401

12 **That the grant of consent does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force rests with the industry/ unit/ project proponent.**

13 **That the industry shall comply with the consent conditions and orders of Hon'ble NGT, failing which bank guarantee of Rs. 56250/- shall be forfeited without any notice in the matter.**

14 **That the industry shall submit quarterly point wise compliance of all the conditions mentioned herein above.**

15 **That the direction of Hon'ble Rajasthan High Court and Hon'ble National Green Tribunal (NGT) issued from time to time in the matter of pollution problem of Pali shall be complied with by the industry.**

16 **That the industry shall comply the standards specified in Gazette Notification no. G.S.R. 35(E) dated 10.10.2016 under Schedule I of Environment (Protection) Rules, 1986. [Available at http://www.cpcb.nic.in/Industry-Specific -Standards / Effluent .pdf]. This consent shall stand automatically withdrawn if the industry fail to comply the standards.**

17 That, not withstanding anything provided hereinabove, the State Board shall have power and reserves its right, as contained **under section 27(2) of the Water Act** to review anyone or all the conditions imposed here in above and to make such variation as it deemed fit for the purpose of **Water Act.**

18 That the grant of this **Consent to Operate** is issued from the environmental angle only, and does not absolve the project proponent from the other statutory obligations prescribed under any other law or any other instrument in force. The sole and complete responsibility to comply with the conditions laid down in all other laws for the time-being in force, rests with the industry/ unit/ project proponent.

19 That the grant of this **Consent to Operate** shall not, in any way, adversely affect or jeopardize the legal proceeding, if any, instituted in the past or that could be instituted againt you by the State Board for violation of the provisions of the Act or the Rules made thereunder.

This **Consent to Operate** shall also be subject, besides the aforesaid specific conditions, to the general conditions given in the enclosed Annexure. The project proponent will comply with the provisions of the **Water Act** and to such other conditions as may, from time to time , be specified, by the State Board under the provisions of the aforesaid Act(s). Please note that, non compliance of any of the above stated conditions would tantamount to revocation of **Consent to Operate** and project proponent / occupier shall be liable for legal action under

Signature Not Verified
Digitally signed by ASHOK KUMAR GUPTA
Date: 2018.12.24 12:52:30 +05:30

3003

Head Office (TCD)

Rajasthan State Pollution Control Board

4, Institutional Area, Jhalana Doongari, Jaipur-302 004

Phone: 0141-5159600,5159695 Fax: 0141-5159697

Registered

File No : F(Tech)/PALI(PALI)/6(1)/2008-2009/5682-5685

Order No : 2018-2019/TCD/6269

Date: 24/12/2018

Unit Id : 2401

the relevant provisions of the said Act(s).

This bears the approval of the competent authority.

Yours Sincerely

Group Incharge[TCD]

Copy To:-

1 Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Pali to ensure the compliance of consent conditions.
2 Chairman, Pali Water Pollution Control Treatment and Research Foundation (CETP Trust) Mandia Road Industrial Area, Pali .
3 Master File.

Group Incharge[TCD]

86

Signature Not Verified
Digitally signed by ASHOK KUMAR GUPTA
Date: 2018.12.24 12:52:30 +05:30

R-16300 (F)

Final Report
On
Study Of Health & Environment Impact

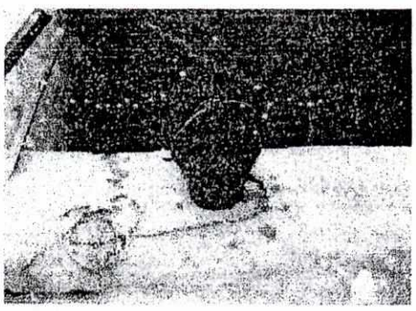
Due to

Pollution from Textile Units in
Pali, Balotra, Jasol & Bithuja

PART 1 : MAIN REPORT

Submitted to:

DEPARTMENT OF ENVIRONMENT,
GOVERNMENT OF RAJASTHAN, JAIPUR



By

Environment Management Group
NATIONAL PRODUCTIVITY COUNCIL
New Delhi

(June 2010)

I
सूचना के अधिकार अधिनियम
2005 के अन्तर्गत जारी प्रमाणित प्रति.
(धारा 1 से 2 16 तक) +2
राज्य लोक सूचना अधिकारी
पर्यावरण विभाग
राजस्थान

87

3605

ACKNOWLEDGEMENT

We are extremely thankful to the Department of Environment (DoE), Government of Rajasthan (GOR) for entrusting the project to the National Productivity Council (NPC). We are very grateful to **Dr. V.S.Singh,** Secretary & Chairman RSPCB, **Shri S.Prasad**, OSD & Additional Secretary, **Dr.D.N.Pandey**, Member Secretary RSPCB for extending their support and offering invaluable guidance the execution of project.

We are grateful to M/s Central Ground Water Rajasthan & M/s Rajasthan Ground Water Department, Jodhpur; PHED Jodhpur, Pali and Balotra; for providing Past Ground Water Quality Data and to M/s RIICO, CETP Management at Pali & Balotra, DIC office at Pali & Balotra, Pollution Control Board at Pali & Jodhpur for providing inventory of industries located in Pali, Balotra, Jasol and Bithuja area.

We are also grateful to SDM Balotra and Pali for helping us in getting available land record data from Tehsil office and soil characteristic, crop production and productivity data from their concerned Agriculture Departments.

We are also extending our gratitude to the management of hospitals of Pali & Balotra for providing full cooperation during Health related studies.

We are obliged to the Pollution Control Board Officials at Jaipur, Pali and Jodhpur for their constant support during conduction of field studies and collection of secondary data from different departments, associations, CETP Management and local administration.

We express our sincere thanks to Kastgar Association of Pali and Balotra who had guided us during field visit to collect samples from affected areas and medical health check up of people in their areas.

Last but not the least, we are thankful to all those who have been associated with this study either directly or indirectly.

NPC STUDY TEAM

Sl. No.	Name	Designation	Position
1.	Mr. M. J. Pervez	Group Head	Project Co-ordinator
2.	Mr. Rajat K. Gupta	Ex- Deputy Director	Project Leader
3.	Mr. K. K. Sinha	Ex- Deputy Director	Team Member
4.	Ms. Shukla Pal	Deputy Director	Team Member
5.	Mr. Dinesh Runiwal	Asst. Director	Team Member
6.	Mr. Amit Kumar Rai	Asst. Director	Team Member
7.	Mr. S. K. Jain	Lab. Chemist	Team Member

NPC Secretarial Assistance

Sl. No.	Name	Designation	Position
1.	Mr. Jagdish Kumar	Section Officer	Office- Co-ordination
2.	Mrs. H.K.Sarna	Stenographer	Typing Assistant
3.	Mr. Raj Kumar	Stenographer	Typing Assistance
4.	Mr. S. K. Sharma	Junior Assistant	Typing Assistance

Expert Services

Sl. No.	Name of Expert/ Organization	Designation/ Deptt.	Area of Expertise
1.	Dr. T. K. Joshi	Retd. Government Doctor	Health related studies
2.	Dr. I. C. Gupta	Retd. HOD, CAZRI, Jodhpur	Agriculture
3.	Environment Information Centre (EIC)	A initiative of Ministry of Environment & Forest	Land Use and Land Cover Map through Satellite Imagery

CONTENTS

Executive Summary 1

I.	Inventorisation Of Industries	1
II.	Waste Management Practices	3
III.	Profile & Demarcation Of Study Area	6
IV.	Preparation Of Landuse Map	9
V.	Sampling & Current Contamination Assessment	10
VI.	Preparation Of Zone Maps	13
VII.	Damage Assessment : Based On Secondary Data	14
VIII.	Secondary Data Limitation	16
IX.	Damage Assessment: Based On Satellite Imageries	18
X.	Health Assessment Study	19
XI.	Economic Damage Assessment	21
XII.	Compensation Modalities	24
XIII.	Recommendations	26

Chapter - 1 1

Study Background 1

1.1	Background	1
1.2	Study Objective	1
1.3	Scope Of The Study	1
1.4	Methodology	2

Chapter - 2 1

Inventorisation Of Industries 1

2.1	Introduction	1
2.2	Industrial Scenario: Pali	1
2.3	Industrial Scenario: Balotra, Jasol And Bithuja	3

Chapter - 3 1

Textile Production Process 1

3.1	Introduction	1
3.2	Major Processes	1
3.3	Environmental Concerns	2
3.4	Study Area Specific Waste Characteristics	4
3.5	Solid Waste Generation:	6

Chapter - 4 1

Waste Management Practices 1

4.1	Wastewater Management	1

3008

4.2	Existing Cetp's	2
4.3	Specific Wastewater Generation	11
4.4	Solid/ Hazardous Wastes Generation & Management	14

Chapter - 5 1

Profile & Demarcation Of Study Area 1

5.1	Town Profile	1
5.2	Hydro-Geological Profile	3
5.3	Profile Of Surface Water Bodies (River Luni & Bandi)	5
5.4	Demarcation Of The Study Area	9

Chapter - 6 1

Landuse Pattern Of Study Area 1

6.1	Data & Methodology Adopted	1
6.2	Land Use Pattern: Pali	3
6.2.1	Preparation Of Time 1 Data Set: 1990	3
6.2.2	Preparation Of Time 2 Data Set: 2005	5
6.3	Land Use Pattern: Balotra, Jasol & Bithuja	7
6.3.1	Preparation Of Time 1 Data Set: 1990	7
6.3.2	Preparation Of Time 2 Data Set: 2005	9

Chapter - 7 1

Sampling & Current Contamination Assessment 1

7.1.	Sampling Locations:	1
7.2.	Sample Collection Procedure	9
7.3.	Parameters And Method Of Analysis	9
7.4.	Contamination Assessment	12
7.4.1	Pali: Contamination Levels	12
7.4.2	Balotra, Jasol, Bithuja: Contamination Levels	28

Chapter - 8 1

Preparation Of Zone Maps 1

8.1.	Zone Maps: Pali	1
8.2.	Zone Maps: Balotra, Jasol & Bithuja	17

Chapter - 9 1

Damage Assessment 1

9.1	Damage Assessment: Based On Secondary Data	2
9.1.1	Damage Assessment: Pali	2
9.1.2	Damage Assessment: Bithuja, Balotra & Jasol	5
9.1.3	Secondary Data Limitation	7
9.2	Damage Assessment: Based On Satellite Imageries	8

Chapter - 10 ..... *1*
Health Assessment Study 1

10.1 Environmental Pollution & Its Impact On Public Health 1
10.2 Environmental Health Investigation Methodology 1
10.3 Study Findings 2
10.4 Visits To Textile Units In Pali To Assess Health, Safety & Working Environment 10
10.5 Conclusions & Recommendations 11

Chapter - 11 ..... *1*
Economic Damage Assessment 1

11.1 Scope Of Damage Assessment 1
11.2 Establishing Contamination In The Study Area 2
11.3 Methodology & Assumptions 2
11.4 Economic Damage Assessment 4
11.4.1 Economic Damage Assessment: Pali Study Area 4
11.4.2 Economic Damage Assessment: Barmer Study Area 5

Chapter - 12 ..... *1*
Compensation Modalities 1

12.1 Compensation To The Farmers 1
12.2 Issues Involved 1

Chapter - 13 ..... *1*
Recommendations 1

13.1 Pollution Control Board 1
13.2 Industries 1
13.3 CETP Socities 2
13.4 Farmers 3
13.5 District Administration 3
13.6 Soil Remedial Measures 4

Table 4: Salient Features of CETP Units at Balotra, Jasol & Bitghuja

Particulars	CETP 1, Balotra	CETP 2, Balotra	CETP Jasol	CETP Bithuja
Industrial Areas Served	Balotra Industrial Area Phase 1 to 3		Jasol Industrial Area	Bithuja Industrial Area
Year of Establishment	2000	2006	2004	2006
Treatment Capacity (m^3/d)	6000	12000	2500	18000
Type of Treatment	Physico-Chemical Followed by ASP			Oxidation Pond
Designed By	NEERI	TERI	NEERI	TERI
Capital Cost (Rs. Crores)	2.95	6.97	2.89	11.5
Final Disposal Mode	River Luni			

Wastewater Generation Profile

The wastewater generation profile of industries operating in Pali, Balotra, Jasol & Bithuja is expressed per unit of finished cloth and given in **Table 5**:

Table 5: Waste Water Generation Profile

Process	Mahaveer Udyog Nagar	Mandia Road Industrial Area	Industrial Area Phase I & II
Bleaching & Causticising	0.010 – 0.012	0.012 – 0.021	0.013 – 0.022
Bleaching, Causticising & Dyeing	0.012 – 0.013	0.013 – 0.022	0.014 – 0.025
Bleaching, Causticising, Dyeing & Printing	0.013 – 0.016	0.015 – 0.024	0.015 – 0.027
Causticising & Dyeing	0.011 – 0.013	0.014 – 0.022	0.011 – 0.020
Causticising & Printing	0.010 – 0.011	0.011 – 0.019	0.009 – 0.017
Causticising, Dyeing & Printing	0.010 – 0.012	0.013 – 0.018	0.012 – 0.019
Dyeing	0.008 – 0.011	0.012 – 0.018	0.009 – 0.015
Printing	0.007 – 0.010	0.009 – 0.015	0.007 – 0.014
Dyeing & Printing	0.008 – 0.010	0.010 – 0.016	0.008 – 0.014

It can seen that the wastewater generation figures for Dyeing & Printing operations as per NEERI study are varying in the range of *8 to 16 L/ meter of Cloth* considering all the industrial areas. Similarly, the RSPCB study values for wastewater generation are falling in the range of *7 to 11 L/ meter of Cloth* for dyeing and printing operations.

Therefore, both the studies points to the fact that over a period of time there has not been a significant change in the technological profile of the textile units in the region as the wastewater generation figures are varying in **7 -16 L/ meter of cloth** depending upon the water availability in the industrial area and type of cloth being processed.

wastewater generating from unauthorized industries should reach Luni River after getting treated at CETP Bithuja.

- There is no sewage treatment plant at Balotra, Jasol & Bithuja which allows the untreated domestic wastewater to join Luni River without treatment.
- There are 2 CETPs in Balotra, and 1 CETP in Jasol & Bithuja each. The waste water after treatment in the CETPs is discharged to Luni River.

Common Practices

- The textile processing units have not implemented any onsite / offsite water recycling measures and nearly 75% water used in the processing of gray cloth is reflected as waste water barring losses in drying operation.
- There is no sewage treatment plant either at Pali or Balotra, Jasol & Bithuja which allows the untreated domestic wastewater to join nearby river without treatment.
- Industries operating in approved industrial areas are member of CETP (Existing or Proposed).

CETPs at Pali

During NPC's visit in May 2006, only Unit Nos.1 & 3 was in operation and unit 2 was shut down and entire waste water was being discharged without any treatment to the River Bandi.

Similarly, During NPC's visit in October 2006, only Unit No.1 was in operation and rests of the two units were shut down.

Table 3: Salient Features of CETP Units at Pali

Particulars	CETP 1	CETP 2	CETP 3
Industrial Areas Served	Industrial Area Phase-I , Industrial Area Phase-II, Mandia Road Industrial Area		Mahavir Udyog Nagar, Industrial Area at Punaita Road
Year of Establishment	1983	1997	1999
Treatment Capacity (m^3/d)	5200	8400	9000
Capital Cost (Rs. Crores)	0.38	7.75	
Type of Treatment	Physico-Chemical Followed by ASP		
Designed By	NEERI		
Final Disposal Mode	River Bandi		

CETPs at Balotra, Jasol & Bithuja

During NPC's study (May & October 2006) all the CETPs (2 in Balotra & 1 in Jasol) were in operation.

The inventory of textile processing units operating in Pali, Balotra, Jasol & Bithuja up to 2005-06 is placed at **Annexure-A.**

Table 1: Number of units in Pali

Location	No. of Units
Industrial Area Pali Phase-1	8
Industrial Area Pali Phase-2	63
Mandia Road Industrial Area	278
Non-confirming areas	261
Total	**610**

(Source: RSPCB)

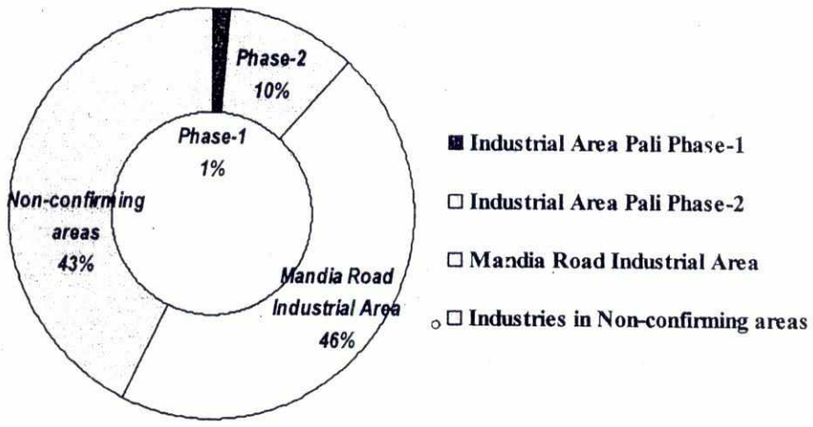


Fig 1: Industrial Area wise Distribution of Industries at Pali

Balotra, Jasol & Bithuja

As per the secondary data received for 2005-06, the total no. of industries operating at Balotra, Jasol and Bithuja are 575. The area wise breakup of units same are given below in **Table 2**

Table 2: Number of Units operating in Balotra, Jasol and Bithuja

S.No.	Location	No. of Units (CETP Trust)
1	Ist Phase, Balotra	128
2	IInd Phase, Balotra	118
3	IIIrd Phase & Extension, Balotra	127
4	Jasol	86
5	Bithuja	116
Total		**575**

(Source: CETP Trust - Balotra, Jasol & Bithuja)

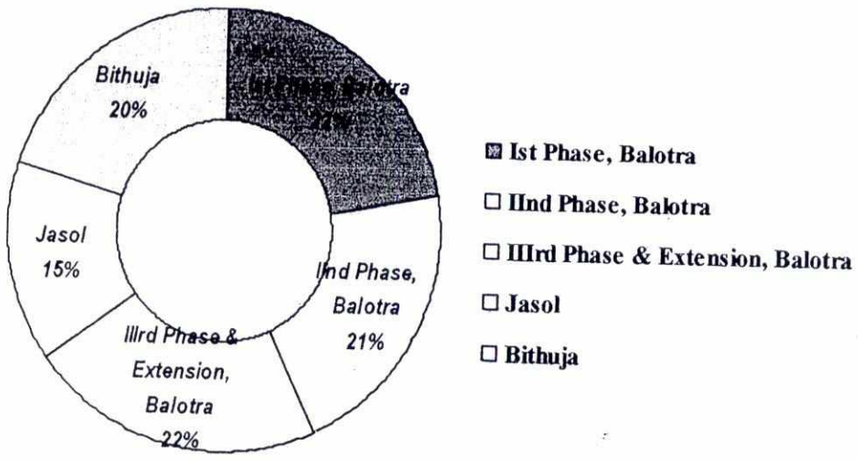


Fig 2: Industrial Area wise Distribution of Industries at Balotra, Jasol and Bithuja

II. WASTE MANAGEMENT PRACTICES

The current practices followed at Pali, Balotra, Jasol & Bithuja for wastewater management are as briefed below:

Pali

- During the recent visit in July'2008, NPC consultants were informed that Pali CETP Trust had made 7 groups of units which follow a two day closure on rotational basis to ensure that untreated wastewater overflow doesn't reach Bandi River.
- An ultrasonic flow meter has been installed at overflow gate of CETP I&II which measures the overflow into Bandi River. The reported overflow from CETP I&II was 0.023 & 0.020 MLD on 09th & 10th July, 2008 respectively which is reduced to 0.00 MLD on 24th July'2008, when the NPC team had visited the CETP.
- It was also reported to NPC team that Municipal Council, Pali has invited Notice Inviting Tender (NIT) for the construction of drain from Subhash Nagar to Gandhi Nagar for segregation of city sewage from industrial effluent.
- There are 3 CETPs in Pali and a new 12MLD CETP at Punayata Industrial area, Pali is proposed.
- There were 262 industries operating in the non conforming areas in Pali until April'2008 which used to discharge their waste water directly into the river Bandi, but RSPCB has completed their closure following a High Court Order dated 11.04.2008. Therefore, wastewater coming out from non-confirming area is nil due to closure of textile processing units.

Balotra, Jasol & Bithuja

- CETP's are in operation at Balotra, Jasol. It has been planned by the local authorities that though Bithuja does not have an authorized industrial area, the untreated

Pali, Balotra, Jasol & Bithuja are well-known centers of textile processing (dyeing & printing). Presently, there are around 610 and 575 (small & medium scale) industries located in the industrial areas of Pali and Balotra, Jasol & Bithuja respectively. These units have been operating for last three decades and contributed to the economy of the region. They are responsible for bringing prosperity to Pali and Barmer districts, as there is no other major industrial activity in the region. These industries have played a critical role in the economic development of the region, people and community, but on the contrary, the same industries have been blamed for adverse environmental and health impacts in the region.

There have been complaints from the nearby residents about the continuously worsening quality of ground water, river water and soil leading to reduced crop yield. The discharge of partially treated and /or untreated wastewater over the last three decades from these industries (primarily using obsolete technologies and variety of chemical, a significant portion of which ends up in the waste water) on the land and the river channel is suspected to have caused the environmental damage in the region.

Following the PIL (Public Interest Litigation) on the environmental damages caused, the honorable High court of Rajasthan has directed the Department of Environment, Government of Rajasthan to conduct an investigation to estimate the damages caused environment and health by adverse impacts of textile processing wastewater.

In order to assess the environmental and health impact of these textile industries, Department of Environment, Govt. of Rajasthan had entrusted the study on assessment of damage caused to the environment and health of public by textile units in Pali and Balotra, Jasol & Bithuja to National Productivity Council.

In order to assess the environmental impact of these textile industries, Department of Environment, Govt. of Rajasthan entrusted National Productivity Council to undertake the study with the following objectives

"To study and prepare comprehensive report on the damages caused to the environment and public health due to pollution caused by the textile units in Pali district, and Balotra, Jasol & Bithuja in Barmer district in terms of physical and economic components."

This report describes findings of the study executed by NPC

I. INVENTORISATION OF INDUSTRIES

The inventory of textile units is prepared on the basis of secondary information received from Rajasthan State Pollution Control Board (RSPCB Regional Offices) and CETP Trust at Pali and Balotra, Jasol & Bithuja up to 2005-06. The list of industries is compiled and validated randomly by walk through survey.

Pali

As per the information received up to 2005-06, the total no. of industries operating in Pali city is **610**. The area wise breakup of units is given below in **Table 1:**

3010

EXECUTIVE SUMMARY

93

Solid Waste Generation Profile

As per the study carried out by NEERI in 1993 at Pali, the solid waste generation at the CETPs is 844 mg/l or 0.844 Tons/ MLD of raw waste water. This solid waste is calculated on the basis of the above mentioned generation figure for CETP's operating in the study area at the time of study or reported by CETP / installed capacity and is presented below in **Table 6**.

Table 6: Expected Solid Waste generation at Pali, Balotra, Jasol & Bithuja

S.No.	CETP Name	Operating Capacity (MLD)	Installed Capacity (MLD)	Expected Solid Waste Generated (T/ day)
1	CETP Pali-1	3.87	5.4	3.27 – 4.56
2	CETP Pali-2	5.62	8.4	4.74 – 7.09
3	CETP Pali-3	5.75	9.0	4.85 – 7.6
Expected Total Sludge Generation at Pali				**12.86 – 19.24**
4	CETP Balotra-1	4.95	6	4.18 – 5.06
5	CETP Balotra-2	9	12	7.60 – 10.13
6	CETP Jasol	-	2.5	2.11
7	CETP Bithuja	18	30	15.19 – 25.32
Expected Total Sludge Generation at Balotra, Jasol & Bithuja				29.08 – 42.62

The quantum of CETP Sludge sent to Cement Industries (in and around Pali District) is given below **(*Source CPCB, Bhopal*)**:

Disposed to J.K.Lakshmi Cements: 1911.045MT
- During May 2004: 250 MT
- Oct' 2005 – Feb' 2006: 1579.66 MT
- August 2006: 81.385 MT

Disposed to Binani Cement: 1956.41 MT
(Sep. 2006 to Nov 2006)

III. PROFILE & DEMARCATION OF STUDY AREA

Profile of Pali Study Area:

Pali is located in the western part of Rajasthan in the Pali Marwar district. The summer season experiences temperature up to 46-47°C in May-June, whereas winters are moderately cool lowering the temperature to 4-5°C. The average rainfall in the district during July-October is 300 mm. Bandi River which is a tributary of Luni River is the major source of water for this region.

An integrated map for drinking water quality has been presented in the Groundwater Atlas based on maximum permissible limits of salinity, nitrate and fluoride. The map

indicates that the groundwater quality in Pali & Rohat blocks is not suitable for drinking or UNPOTABLE. The map is shown in Fig. No 3 below

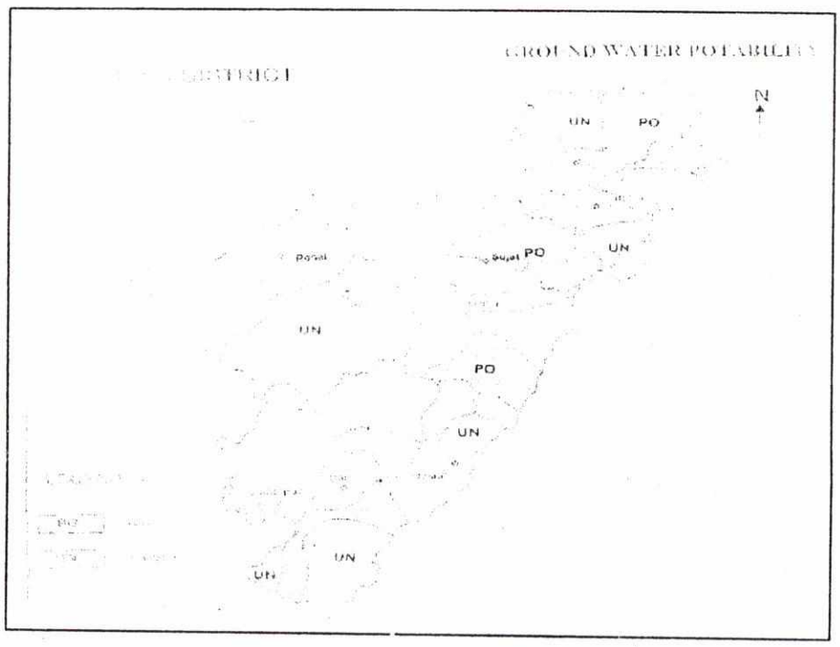


Fig 3: Potability Map of Pali District

Profile of Balotra, Jasol and Bithuja:

These industrial areas / towns are located in the eastern part of Barmer district. The temperature in Barmer varies between minimum of 9°C in January to the maximum of 45°C. The normal rainfall in the district of Barmer is about 275mm from July to September. Luni River and its tributaries Sukari, Sagi and Kari flow through Barmer district. These industrial areas/towns are located in the eastern part of Barmer district under the Pachpadra Tehsil. Luni River flows through these regions.

An integrated map for drinking water quality has been presented in the Groundwater Atlas based on maximum permissible limits of salinity, nitrate and fluoride. The map indicates that the groundwater quality in Balotra Block is not suitable for drinking or UNPOTABLE. The map is shown in Fig. No 4 below

While underlining the impact of natural salinity in the region as evident from above, it is also important to note that apart from textile processing there is no other major/ minor industrial cluster in the region which could impact the groundwater/ soil quality in the region.

Therefore, during the joint visit February'2008 the study team agreed that:

"Variations observed samples in quality of Groundwater & Soil in study area (impact zone) from the natural state of the area (control zone) could be considered as a reflection of the adverse impact of textile effluent on the environment, as the natural characteristics (groundwater & soil quality) of the entire study area are same".

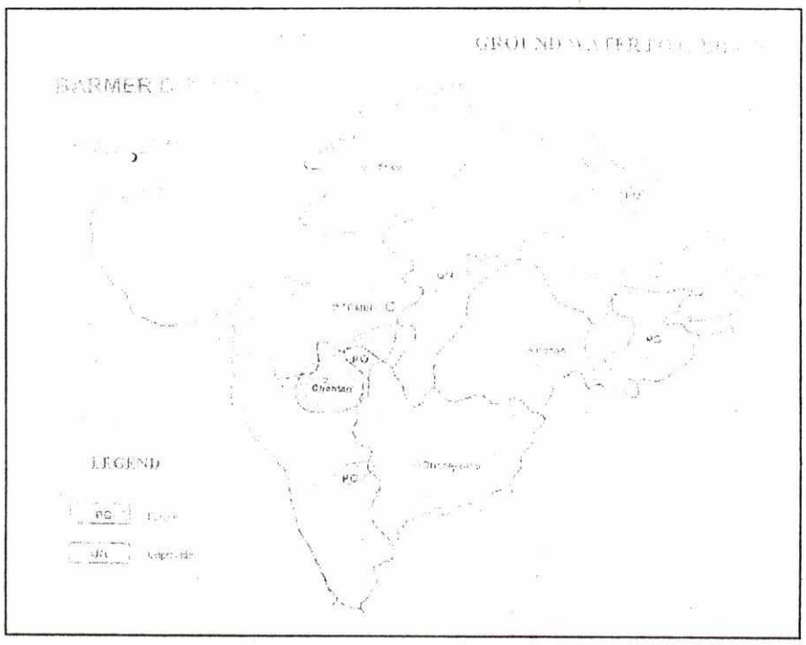


Fig 4: Potability Map of Barmer District

Demarcation of Study Area at Pali, Balotra, Jasol and Bithuja

For the purpose of identifying the extent of environmental damages in the region of Pali, Balotra, Jasol & Bithuja, on the basis of earlier studies and information, National Productivity Council (NPC) in consultation with Department of Environment (DoE) and Rajasthan State Pollution Control Board (RSPCB) has specified the following area to be studied in detail as per the following criteria:

- Up to 500m from the each bank for both the rivers i.e. Bandi at Pali and Luni at Balotra. The demarcation was agreed upon during the joint visit of representatives of DoE, Govt of Rajasthan, Rajasthan State Pollution Control Board (RSPCB) and National Productivity Council (NPC) in February, 2008.
- The stretch of Bandi river under study at Pali was fixed from "entry of the river into Pali city and upto the exit from Pali district" whereas at Balotra, Jasol and Bithuja, the stretch of Luni river was fixed from "Bithuja at upstream side to Tilwara on the downstream side covering Balotra, Jasol"

The maps showing demarcated area in both the study regions are presented in Chapter-5.

IV. PREPARATION OF LANDUSE MAP

The land-use pattern is prepared by considering satellite imageries of two sets of time period i.e. 1990 & 2005.

For 1990 data: Landsat TM imagery was used i.e. the satellite was "Landsat" and sensor was TM or Thematic Mapper. This image has a resolution of 28m.

For 2005 data: IRS-P6 LISS III imagery was used i.e. the satellite was IRS-P6 and sensor was "LISS III". This image has a resolution of 23.5m.

The study area considered for the purpose of assessing the economic value of the damages is 2.5 km on each side of Bandi and Luni River. The increased area has been considered for damage assessment keeping in view the technical constraint faced in image processing and minimizing the error in depiction of results as the satellite imagery appears as a very thin strip and with the near 30 m imagery resolution, its interpretation becomes difficult and error prone.

Land use Pattern of Pali

The areas falling under the respective classifications are presented in **Table 7**.

Table 7: Area statistics of land use

Sl. No.	Class Name	Area in 1990 (In Hectares)	Area in 2005 (In Hectares)
1	Water Body	470.64	781.41
2	Open/Barren Land	8850.42	12630.48
3	Agriculture	25207.56	20653.93
4	Degraded Vegetation	792.55	352.02
5	Scrub	2389.24	2494.84
6	River	284.44	119.25
7	Marshy Land	54.49	221.24
8	Settlement	774.44	1621.94
9	Sandy Area	17.25	9.25
10	River Bed	3140.55	3120.24
11	Marshy Vegetation	68.84	35.12
12	Stony Waste	100.98	124.66
13	Industrial Area	150.92	188.79
14	Miscellaneous	751.78	700.90
	Total	**43054.07**	**43054.07**

Land use Pattern of Balotra, Jasol & Bithuja

The areas falling under the respective classifications are presented in **Table 8.**

Table 8: Area statistics of land use

Sl. No.	Class Name	Area in 1990 (In Hectares)	Area in 2005 (In Hectares)
1	Water Body	24.85	11.81
2	Open/Barren Land	1906.68	5986.33
3	Agriculture	13543.94	10421.27
4	Degraded Vegetation	499.86	213.74
5	Plantation	29.57	24.64
6	Scrub	1781.18	1150.43
7	River	300.21	140.48
8	Settlement	584.33	939.39
9	River Bed	3597.54	3148.26
10	Sandy Area	1412.02	1489.13
11	Salt Affected Land	0.89	-
12	Miscellaneous	109.33	264.91
	Total	**23790.40**	**23790.40**

The maps showing demarcated area in both the study regions are presented in Chapter-6.

V. SAMPLING & CURRENT CONTAMINATION ASSESSMENT

Sampling

Pali

The sampling was carried out in three phases (May'2006, September 2006 & July '2008) at Pali. The detailed coverage of the sampling program is mentioned as below:

In the 1st phase a total of Twenty (20) samples are collected as mentioned below:

- Seven (7) Groundwater samples
- Six (6) Soil samples
- Two (2) Surface water samples
- Five (5) CETP samples-presented in Chapter-4

In the 2nd phase a total of Forty (40) samples

- Twelve (12) Groundwater samples
- Nineteen (19) Soil samples
- Seven (7) Surface water samples
- Two (2) CETP samples - presented in Chapter-4

In the 3rd phase a total of Twenty Two (22) samples are collected as mentioned below:

- Eleven (11) Groundwater samples
- Eleven (11) Soil samples

Balotra, Jasol & Bithuja

The sampling was carried out in three phases (May'2006, September 2006 & July '2008). The details coverage of the sampling program is provided as below:

In the 1st phase a total of Twenty Eight (28) samples were collected as mentioned below:

- Twelve (12) Groundwater samples
- Ten (10) Soil samples
- Six (6) CETP samples - presented in Chapter-4

In the 2nd phase a total of Forty Nine (49) samples were collected as mentioned below:

- Fourteen (14) Groundwater samples
- Twenty Two (22) Soil samples
- Eight (8) Surface water samples
- Five (5) CETP samples – presented in Chapter-4

In the 3rd phase a total of Ten (10) samples were collected as mentioned below:

- Five (5) Groundwater samples
- Five (5) Soil samples

The geographic details of the sampling points were noted with the help of a GPS Instrument to maintain the uniqueness of the sample and marking the sample on the map. The maps showing sampling locations are presented in Chapter-6. The details of samples collected for Phase 1, Phase 2 & Phase 3 covering both study areas is provided in **Annexure – B**

Contamination Assessment

PALI

Groundwater Quality Analysis

The analysis carried out by NPC indicates that the concentration of TDS, Sulphates, Chlorides, and Alkalinity & SAR is high in impact zone samples. Considering the characteristics of textile effluents as presented in Table 3.3 Chapter 3, it can be observed that textile wastewater discharge is also characterized by high TDS, Chloride, Sodium, Sulphate, SAR and Alkalinity. Therefore, the high concentration of the above mentioned parameters in impact zone samples as compared to control zone samples indicates the adverse impact of textile effluent discharge into river which gets seeped into the recharge wells at villages near to river bank.

Soil Quality Analysis

The Macro-nutrient analysis indicates that the study region is characterized by low values of Nitrogen and Potassium which are generally associated with saline soils. As the study region is also happened to be naturally saline the same is valid here also.

The study team observed that farmers in the downstream side of the river are using river water (virtually textile wastewater) for irrigation purpose. This has resulted in accumulation of heavy metals like Chromium, Lead and Nickel in the agricultural fields.

It can be inferred from the maximum concentration values of Chromium, Lead & Nickel that though the soil quality in the region as per soil quality criteria is below 50 mg/kg but on the other hand the practice of directly irrigating fields with effluents has resulted in bioaccumulation of heavy metals in the top layer of the soil which may pose serious danger to the environmental system of the study region. Moreover, Pali region is receiving good amount of rainfall from Past 2 years which lead to flooding of the area, resulting in wash out the contamination from soil and reducing the concentration of heavy metals in soil.

The comparison of chemical properties of soil between 1st & 3rd Phase Vs 2nd Phase of sampling indicates that raining & flooding in the region has helped the soil in improving its chemical composition for the use of agriculture. Since there was less rain in the region this time the soil has again started deteriorating in quality (as evident from 3rd phase sampling).

Surface Water Analysis

The TDS and TSS values are high in downstream section as compared to the upstream section and are exceeding the permissible limits at all the downstream locations. There is high variation in COD & BOD values of upstream and downstream sections which is due to the presence of chemicals, textile processing wastes (like cloth yarn) and addition of sewage at the downstream location. It was also observed that COD & BOD variation is significant in 1st phase & 2nd phase as lower concentration was observed in phase 2. The lower values in 2nd phase sampling are primarily due to the heavy rainfall and flooding which resulted in washing out of the contamination. The O&G values are found to be varying drastically in upstream & downstream section with downstream ones at the higher side and beyond the permissible limit.

The Lead (Pb) concentration values are below the permissible discharge value of 0.1 mg/l except for the samples PLI/SW/MID and PLI/SW/DS/SUKARLAI which are happened to be on the downstream side. Other heavy metals like Nickel, Copper, and Cadmium are found to be meeting the permissible discharge standards prescribed by the Central Pollution Control Board.

BALOTRA, JASOL & BITHUJA

Groundwater Quality Analysis

The analysis carried out by NPC indicates that the concentration of TDS, Sulphates, and Chlorides & SAR is high in impact zone samples. Considering the characteristics of textile effluents as presented in Table 3.3 Chapter 3, it can be observed that textile wastewater discharge is also characterized by high TDS, Chloride, Sodium, Sulphate, SAR and Alkalinity. Therefore, the high concentration of the above mentioned parameters in impact zone samples as compared to control zone samples indicates the adverse impact of textile effluent discharge into river which gets seeped into the recharge wells at villages near to river bank.

Soil Quality Analysis

The Macro-nutrient analysis indicates that the study region is characterized by low values of Nitrogen and Potassium which are generally associated with saline soils. As the study region is also happened to be naturally saline the same is valid here also.

The low values of electrical conductivity (measure of salinity) indicate that the soil is naturally deficient in macro. However, the soils deficient in available nitrogen & potassium can be managed through artificial fertilizers.

It can be inferred from the maximum concentration values of Chromium, Lead & Nickel that though the soil quality in the region as per soil quality criteria is below 50 mg/kg. But the practice of directly irrigating fields with effluents at some places has resulted in bioaccumulation of heavy metals in the top layer of the soil. Moreover, the region is receiving good amount of rainfall from Past 2 years which lead to flooding of the area, resulting in wash out the contamination from soil and reducing the concentration of heavy metals in soil.

The comparison of chemical properties of soil between 1st & 3rd Phase Vs 2nd Phase of sampling indicates that raining & flooding in the region has helped the soil in improving its chemical composition for the use of agriculture. Since there was less rain in the region this time the soil has again started deteriorating in quality (as evident from 3rd phase sampling).

Surface Water Analysis

The TDS and TSS values are high in downstream section as compared to the upstream section. The TSS values were exceeding the permissible limits at 3 places namely BI/SW/DS, JSL/SW/US & BAL/SW/TIL. The TDS values at the downstream section were exceeding the discharge standards at all the places. There is high variation in COD & BOD values of upstream and downstream sections which may be due to the presence of chemicals and addition of sewage at the downstream location.): The O&G values are found to be attaining or exceeding the permissible limits at all the locations in upstream & downstream section.

All the heavy metals like Lead, Chromium, Nickel, Copper, and Cadmium are found to be meeting the permissible discharge standards prescribed by the Central Pollution Control Board.

VI. PREPARATION OF ZONE MAPS

On the basis of the ground water and soil quality results obtained during the current study at Pali, the region is extrapolated into various zones & presented on the study area map IN Chapter 8, Figure 8.1 to 8.15.

On the basis of the ground water and soil quality results obtained during the current study at Balotra, Jasol & Bithuja, the region is extrapolated into various zones & presented on the study area map in Chapter 8, Figure 8.16 to 8.30.

VII. DAMAGE ASSESSMENT : BASED ON SECONDARY DATA

Damage Assessment based on secondary groundwater data

The parameters which are considered critical for deciding suitability for domestic consumption were EC, TDS, Sodium (Na), Chloride (Cl) as it provides inter-relationship with characteristics of textile industries discharge i.e. TDS, EC, Na and Cl as mentioned in Table 3.3, Chapter-3. The analysis is presented in Chapter-9 Section 9.1 and Annexure-C.

Pali

The chemical analysis of groundwater for **key wells** identified by Groundwater Department covered villages like Bumadara, Jawaria, Kerla, Chatelao, Sukarlai, Jetpur, Dholeriya Jagir, Nehra, Phekaria and Diwandi in the Pali study area.

On the basis of secondary data it can be said that the variation in EC & Chloride values across various locations along the Bandi River except at the upstream groundwater/ surface water location i.e. Bhumadra & Kerla, are well above the average control zone concentration levels. As per the irrigation water quality standards, the higher EC & Chloride concentration adversely impact the crop quality as well as the soil on which it is applied and may render the agricultural field unsuitable for agriculture over a period of time. Therefore, use of ground water for irrigation is not suitable particularly at Chatelao, Sukarlai, Nehra, Phekaria and Diwandi areas.

Balotra, Jasol & Bithuja

The chemical analysis of groundwater for key wells identified by Groundwater Department covered villages like Jasol & Bithuja in the Barmer study area.

Electrical conductivity (EC) at Bithuja has increased from year 1996 to 2005 but is treading below the average control zone concentration. Similarly, variation in the TDS, Sodium and Chloride concentration level is found to be less than control zone average TDS, Sodium and Chloride level. Though the concentration of various parameters is below or within range but there has been a continuous upward trend in the groundwater characteristics of the region. It is also important to note that wells in Bithuja area are a source of drinking water used by PHED, Govt. of Rajasthan for supplying water to the nearby areas due to the availability of good quality water.

Electrical conductivity (EC) at Jasol has increased from year 1996 to 2004and is above the average control zone concentration. Similar variation has been observed in the Chloride, TDS and Sodium concentration level which is above the control zone average concentration.

Damage Assessment based on secondary soil data

The assessment of damage to the soil involved identification and quantification the changes in the soil characteristics, assessing its impact on crop pattern and crop yield and ascertaining the loss of productive area left unusable due to textile industries discharge. Keeping in view the requirement for damage assessment, secondary data was asked from

Agriculture Department, Soil Investigation Labs etc. But it was informed that there is no comprehensive secondary database available with State Government Agencies on the soil characteristics variations over the years within the study area.

In absence of detailed soil quality data for the entire study area, the data available with soil testing laboratory was collected. The data received from soil testing laboratory covers only Electrical Conductivity values for those samples which are collected by farmers to assess the additional nutrients requirements in their field. The data available with Soil Testing Laboratory is placed at Annexure-C. The soil has been categorized based on Electrical Conductivity values as follows:

Category	Type	EC (m.mhos/cm)
A	Not affected	<5
B	Moderately affected	5 to 10
C	Severely affected	10 to 20
D	Very Severely	>20

Pali

The above data indicates that barring few locations most of the soil samples are in the range of moderately affected category based on the conductivity value (i.e. EC between 5 to 10 m.mhos/cm) and thus it may be inferred that the soil has been affected in the above referred farmer's plots.

Balotra, Jasol & Bithuja

The above data indicates that while most of the soil samples are in the range of not affected category based on the pH & conductivity values (i.e. pH between 7 to 8.5 & EC less than 5 mmho/cm), there are some zones in the study area that were found to be moderately affected.

Damage Assessment based on secondary agricultural data

To assess the impact on crop productivity and crop pattern, secondary data on crop production, irrigated land area for Rabi & Kharif season for last ten years was collected for Rabi & Kharif crops and the same is presented in **Annexure C**. The crop production and productivity data in both the cases i.e. Rabi & Kharif at both the places indicates a mixed trend which may be due to factors like:

- Choice of a particular crop for sowing by the farmer based on perceived future demand
- Abandonment of affected land due to direct use of textile industries effluent making it barren
- Adoption of improved agricultural practices

Pali

Rabi Crop: A decreasing trend is visible for Rabi season in terms of total irrigated land area from 1997-98 to 2005-06 during which the irrigated land area has reduced by 70 % (180600 Ha). It was observed during the joint visit of DoE Govt. of Rajasthan, RSPCB & NPC in February 2008 that farmers were using the surface water directly or water from recharge wells for irrigation.

Kharif Crop: A decreasing trend is visible for Rabi season in terms of total irrigated land area from 1997-98 to 2005-06 during which the irrigated land area has reduced by 75 % (27000 Ha). The land area uses and production for Cotton, Maize & Groundnut has declined sharply since 2001-02.

Balotra, Jasol & Bithuja

Based on the secondary data collected the trends observed for Rabi & Kharif crops there is an indication that irrigated land usages for the Rabi as well as Kharif crops are showing mixed trends. In-Balotra and Bithuja, no significant variation has been observed in the irrigated land usage while Jasol has exhibited large variation.

VIII. SECONDARY DATA LIMITATION

Groundwater

The secondary data presented above indicates that the concentration of parameters like EC, TDS, Chloride and Sulphate has steadily been on rise at some/ all the monitored locations. Since the observed parameters are above average control zone values, the increase in concentration over and above the natural condition of the area can be attributed to the industrial activity prevalent in the region. The observations during the joint field visit also strengthen this fact as the farmers/ villagers are observed to be directly irrigating their fields with surface water made up of textile effluent.

The secondary data collected from state government agencies helped in establishing a trend prevalent in the region which indicated that groundwater quality is impacted due to industrial activity in the region. But for assessment of damage, details with respect to the study area are needed which involve quantification of aquifer yield specific to the study area. Moreover, to assess damage to groundwater quality, certain key factors need to be considered which are mentioned below:

- Due to flow property, the groundwater pollution doesn't restrict to a localized pocket but it extends to a large area depending upon the size of the aquifer and underlying groundwater flow.
- Quantification of Aquifer yield is possible through a technical study in which groundwater modeling is carried out to find the level and flow direction of underlying water after providing inputs like runoff, rainfall, transpiration and exact boundary details of aquifer. The data generated through a modeling study then applies to a whole aquifer which covers many districts as a whole and is generally much bigger than a limited area (covering some villages) like the one under consideration in the present study.

3027

23

- Any contamination observed in an aquifer cannot be directly correlated with a localized activity like in present case the textile cluster at Pali or Balotra, Jasol & Bithuja. But the contamination at aquifer level reflects the compounded impact of all the potential pollution zones falling within the same aquifer.

Therefore, comparing the above facts vis-à-vis to study area, it was found that the secondary data on groundwater quality is not adequate in quality and quantity for assessing damages to the groundwater quality of the study area caused due to pollution from textile industries.

Soil Quality

The secondary data on soil quality collected from state government agencies is deficient in coverage and quality. The state government agencies do not maintain any database on soil characteristics underlining variations over the years. So it was not possible to assess physical and economic damage caused to the soil profile of the area on the basis of secondary data.

Therefore, keeping the secondary data constraint in mind, satellite imagery data was used for assessing physical and economic damages made to the soil quality over a period of time. The economic damage assessment has also been calculated on the basis of satellite imagery.

The damage assessment to soil profile on the basis of satellite imagery is presented in the following Section 9.2.

Agricultural Production, Productivity & Irrigated land area

The secondary data collected on agricultural production, productivity and irrigated land area usage is deficient in coverage and quality for establishing linkage with impact of textile effluent due to the following reasons:

- Agricultural production data is maintained at District level is quite large as compared to study area which is limited to 500m from both side of the river bank
- The productivity depends on production and land used for production which may vary in case of heavy rainfall or famine like situation. The productivity for any crop over the years may vary depending upon the perceived future market value product.
- The irrigated land area usage data is maintained village-wise at Tehsil offices. In case of current project, the study area is smaller than villages and may not cover the entire study area but a part of it.

Therefore, keeping the secondary data constraint in mind, satellite imagery data was used for assessing physical and economic damages made to the agricultural activity in the region over a period of time. The economic damage assessment has also been calculated on the basis of satellite imagery.

The damage assessment to the agricultural activity on the basis of satellite imagery is presented in Section 9.2.

IX. DAMAGE ASSESSMENT: BASED ON SATELLITE IMAGERIES

Based on the findings of Current Contamination Assessment, Chapter-7, the following observations have been made:

- Changes in groundwater parameters like TDS, EC, Na & Cl have been observed at both Pali study area and Barmer study area (Balotra, Jasol & Bithuja). As there are no other significant industrial activities in both the regions and the parameters have inter-relationship with the textile effluent, there is an indication that the groundwater quality may have been adversely impacted by the textile industries discharge.
- Ground water has been found contaminated with Fluoride (Fl) due to natural geology of the area.
- The ground water available naturally in the study area is not fit for potable use due to high concentration of TDS, Cl, Fl etc.
- The irrigated agricultural area in Pali district has decreased significantly (by about 70%, 1,80,000 hectares approximately).
- Heavy Metals like Cr, Pb, Cu, Zn, Cd, Fe etc have been detected at some places, which may have been contributed by textile industries discharge but there concentration is well below the safe limits as required by the drinking water standards.
- The current soil investigations indicate that the concentration of heavy metal contaminants like Chromium, Lead and Nickel were found to be present in soil but the concentration was low as per the Soil standards of Netherland. The presence of heavy metals in soil, though low in concentration, indicates that the soil quality is adversely impacted by the use of textile effluent for irrigation (as noticed during the joint team visit by DoE, Govt. of Rajasthan, RSPCB & NPC in February'2008).
- The past groundwater data indicate that quality of groundwater in impact zone has been on a continuous downtrend as compared to the control zone. It was also observed that in the past Pali does not have any other industry except Textile units.

The area considered for damage assessment is more than the earlier stipulated and agreed study area which is limited to 500m on either side of the rivers Luni & Bandi. **The increased area has been considered for damage assessment keeping in view the technical constraint faced in image processing and minimizing the error in depiction of results as the satellite imagery appears as a very thin strip and with the near 30 m imagery resolution, its interpretation becomes difficult and error prone.**

The damage assessment has been carried out on the basis of Change analysis carried out between the datasets of 1990 and 2005.

Change Analysis at Pali

S. No.	Class Name	% area occupied in 1990	% area occupied in 2005	% Change
1	Water Body	1.09	1.81	66.06%
2	Open/Barren Land	20.56	29.34	42.70%
3	Agriculture	58.55	47.97	-18.07%
4	Degraded Vegetation	1.84	0.82	-55.43%

S. No.	Class Name	% area occupied in 1990	% area occupied in 2005	% Change
5	Scrub	5.55	5.79	4.32%
6	River	0.66	0.28	-57.58%
7	Marshy Land	0.13	0.51	292.31%
8	Settlement	1.8	3.77	109.44%
9	Sandy Area	0.04	0.02	-50.00%
10	River Bed	7.29	7.25	-0.55%
11	Marshy Vegetation	0.16	0.08	-50.00%
12	Stony Waste	0.23	0.29	26.09%
13	Industrial Area	0.35	0.44	25.71%
14	Miscellaneous	1.75	1.63	-6.86%

Change Analysis at Balotra, Jasol & Bithuja

S. No.	Class Name	% area occupied in 1990	% area occupied in 2005	% Change
1	Water Body	0.1	0.05	-50.00%
2	Open/Barren Land	8.01	25.16	214.11%
3	Agriculture	56.93	43.8	-23.06%
4	Fallow Land	2.1	0.9	-57.14%
5	Degraded Vegetation	0.12	0.1	-16.67%
6	Scrub	7.49	4.84	-35.38%
7	River	1.26	0.59	-53.17%
8	Settlement	2.46	3.95	60.57%
9	Sand	15.12	13.23	-12.50%
10	Sandy Hill	5.94	6.26	5.39%
11	Salt Affected Land	0	0	-
12	Miscellaneous	0.46	1.11	141.30%

The above analysis indicates that there has been a vast change in land use pattern over the years. Due to urbanization all the fertile land has been converted to infertile and barren land. Further, the agricultural area has declined to a considerable level from 56.93% to 43.80%, an absolute loss of 3123 hectares in Barmer study area and 58.55 % to 47.97% , an absolute loss of 4554 hectares in Pali study area. The corresponding impact can also be seen in barren land which has increased significantly.

X. HEALTH ASSESSMENT STUDY

On the basis of the results of liver, kidney function tests, Bio-monitoring tests and detailed responses by the inhabitants of the area as explained above, a summary conclusions and recommendations have been prepared and presented below:

- The villagers/ residents have stopped using groundwater after finding it coloured and, smelly. They are using either municipal water or tanker supplied water for household purposes.
- Some complaints about skin irritation, gastro-intestinal upset, dyspepsia, indigestion etc. were received. While the gastro problems may be due to natural groundwater composition (high TDS, Calcium, and Sulphates), the skin disorders can be attributed to chromium becoming airborne. These aspects were corroborated with the experience of ENT specialist at Balotra.
- Lung performance as assessed by lung function testing revealed that in some cases there is a moderate decline in lung function which is due to tobacco and alcohol consumption.
- AST and ALT were mildly raised in some cases. As the AST values are found to be higher than the corresponding ALT values, the impact due to chemical toxicity is ruled out.
- The Blood Urea Nitrogen levels were raised only in 4 cases which may be due to general/ routine illness.
- The bio chemical estimation of lead, mercury and chromium has established that Lead and mercury levels were within standards. Chromium in urine was high in three cases which may be due chromium becoming air-borne and being inhaled as mentioned in Section 9.3, Skin Disorders.
- The analysis of secondary hospital data at Pali, Balotra, Jasol & Bithuja on diseases / disorders was found to be inconclusive in establishing relationship with pollution from textile units.
- Skin disorder like allergy may be occurring due contamination by chromium which is reflected in sampling results of wastewater & soil and corroborated by ENT specialist at Balotra hospital.
- The visit to the factories showed lack of occupational health and safety.
- The present investigation in the Balotra, Bithuja, Jasol, and Pali region was undertaken to assess the impact on the health of a population considered to be at risk.
- Apart from the complaint of Skin irritation/ disorder & gastro intestinal illnesses in some cases, no specific illness was brought to the attention of health study team.
- Based on the observation of the ENT specialist at Balotra hospital and high levels of chromium in 3 subjects, skin disorder can be attributed to chromium discharged from wastewater of textile units.
- The employers and workers need to be educated under the provisions of Factories Act (Chapter IV –A, and Schedule I of The Factories Act, 1948). The employers are responsible for providing occupational health care to workers. Therefore, it is recommended that on the pattern of the Combined Effluent Treatment Plant (CETP) for an industrial area, an Occupational Health & Safety Service Centre (OHSSC) may be set up in the premises of CETP.
- In order to prevent the inhabitants from health risks in future, there should be mass awareness campaign for the resident living in city or village about the usage of ground water.

- The occupational health and safety aspect has not been addressed by industry owners and the same requires immediate and concerted attention. There is need to educate employees and workers about the hazards and exposures that can cause life threatening diseases.

XI. ECONOMIC DAMAGE ASSESSMENT

The study area considered for the purpose of assessing the economic value of the damages is 2.5 km on each side of Bandi and Luni River. **The increased area has been considered for damage assessment keeping in view the technical constraint faced in image processing and minimizing the error in depiction of results as the satellite imagery appears as a very thin strip and with the near 30 m imagery resolution, its interpretation becomes difficult and error prone.**

Study Area

Pali: The study area in Pali is starting upstream at entry point to Pali town and downstream up to Diwandi village.

Balotra, Jasol & Bithuja: The study area at Balotra, Jasol & Bithuja is starting from Kumpawas in upstream to Sodhon ki Dhani in the downstream.

The total area covered in the above referred study area is 43,054 & 23,790 hectares in Pali and Barmer (Balotra, Jasol & Bithuja) respectively as mentioned in Chapter-9 "Damage Assessment".

Time Duration

For the economic loss assessment the duration of last 15 years i.e. from 1990 to 2005 has been considered.

Economic Loss Components

The components considered for economic loss due to adverse impact of textile effluent are:

- Groundwater
- Health and life of people & cattle
- Land loss
- Crop loss

Establishing Contamination in the Study Area

The current study on environmental and health impact assessment involved three phases as mentioned below which helped in establishing the contamination in the study area. The current contamination found in study region through sampling and analysis is linked with secondary data and change detection study from satellite imagery. Both the aspects were

than validated on the site by a team of DOE, RSPCB and NPC officials through local enquiry from villagers and visual observation. The study phases involved are mentioned blow:

- **Current Sampling & Analysis:** In Chapter-7 - Current contamination Assessment, observation on groundwater contamination has been made considering inter-relationship of key parameters like TDS, Chlorides, Sulphates and Sodium with textile effluent and it was found that groundwater quality is affected. It has also been found that the groundwater is not safe for irrigation purpose due to high SAR value. Similarly, heavy metals like were Chromium, lead are found to be present in soil though under permissible limits.

- **Satellite Imagery and Secondary Data Assessment:** The damage assessment done on the basis of satellite imagery and secondary data in Chapter-9 also established the high concentration of key parameters like TDS, Chlorides, Sulphates and Sodium in groundwater over and above the natural hydro-geological characteristics of the area. Similarly, the change analysis carried out through satellite imagery processing helped in establishing the fact that over a period of 15 years the soil and agricultural profile of the region has undergone significant change.

- **Field Observation:** It was observed during the joint visit that groundwater/ surface water is being used directly for irrigation purposes. The surface water was primarily made up of textile effluent during the sampling phases which contain heavy metals and other chemical contaminants. As per the Agricultural expert opinion, the prolonged use of such water for irrigation purpose may result in bio-accumulation of heavy metals and render the field barren over a long period of time.

Taking into account the three scenarios together, it can be understood that the contamination has started from draining untreated wastewater into the river bodies which seeped into the recharge wells near the river bank. As the primary occupation of downstream village residents is agriculture, the surface water/ groundwater was used for irrigation purpose which had adversely impacted the agricultural field and resulted in reduction of agricultural area over a period of time as evident from "Change Analysis" by Satellite imagery.

Methodology & Assumptions

The damage assessment is carried out by estimating the change in the value of the resource as an asset. In the present case study, the net present value of the land for agricultural purpose, loss of crop over the years to due reduction in agricultural land is estimated. This approach was deemed an appropriate basis for damage compensation to affected individuals because it provides an objective measure of the pollution damage in terms of foregone income. Thus, the measure of environmental damage is the foregone income of households from the activity affected by the pollution.

While assessing the economic value of damage to groundwater quality, certain key aspects are mentioned below:

- Due to flow property, the groundwater pollution doesn't restrict to a localized pocket but it extends to a large area depending upon the size of the aquifer and underlying groundwater flow.
- Quantification of Aquifer yield is possible through a technical study in which groundwater modeling is carried out to find the level and flow direction of underlying water after providing inputs like runoff, rainfall, transpiration and exact boundary details of aquifer. The data generated through a modeling study then applies to a whole aquifer which covers many districts as a whole and is generally much bigger than a limited area (covering some villages) like the one under consideration in the present study.
- Any contamination observed in an aquifer cannot be directly correlated with a localized activity like in present case the textile cluster at Pali or Balotra, Jasol & Bithuja. But the contamination at aquifer level reflects the compounded impact of all the potential pollution zones falling within the same aquifer.

Considering the above aspects, the damage assessment for groundwater at study area is not technically possible. Therefore, the Groundwater Component is not covered for damage assessment. Therefore, the economic loss assessment included the following aspects:

1. **Compensation towards diseases caused and lost lives of people and /or cattle in the region:** Keeping in view that administration had banned the potable use of the contaminated ground water and had informed the public about safe drinking water well, it is assumed that people / cattles of the region had not been subjected to prolonged consumption of the contaminated ground water. Moreover, it has been learned during the health study that local inhabitants have stopped the use of contaminated groundwater as soon as they felt that it is smelly, colored etc. Further, as there has been no disease / deaths reported in respect of the people and cattle in the region due to consumption of contaminated ground water, the economic loss on this account has not happened.
2. **Value of the agricultural land lost due to either discharge of textile effluent or using contaminated ground water for irrigation purposes leading to soil infertility and consequential loss:** The secondary data collected from various state agencies regarding the soil quality in the past do not yield any concrete result as mentioned in Section 9.1.3 Chapter-9. Therefore, the satellite imageries data and its interpretation on loss of agricultural land have been considered for the economic value of the damage caused due to loss of agricultural land. The rate of agricultural land was calculated on average basis as per the "Effective DLC Rate" at Pali & Balotra. The applicable rate was Rs. 74,060 per hectare & Rs. 1,01,140 per Hectare at Pali & Balotra, Jasol & Bithuja respectively.
3. **Opportunity cost for the crop**, which either could not be grown on the lost agricultural land or reduced crop yield due to soil contamination. In the absence of the soil contaminated area details in the study area, only crop loss due the agricultural land loss (data from satellite imageries) is considered. Further the land loss is considered to have occurred at the uniform rate. For assessing the crop loss per unit area of lost land following considerations have been made.
   - Only major crops of Rabi (Wheat, Mustard) and Kharif (Cotton & Maize) have been considered

- Yield has been considered as the weighted average yield of major Rabi & Kharif crops for the last ten years data available in respect of Pali district. In the absence of similar data in respect of Barmer district, same values have been considered for loss assessment in Barmer study area also.
- Composite price of Rs. 15000 and Rs. 6000 per ton of Rabi & Kharif crops has been considered as the time averaged prices.
- Kharif crop area has been considered as 15% of the Rabi crop area as per the last ten years data average in respect of Pali district and assumed to be same for Barmer district as well. Further the same ratio has been considered crop loss assessment also.

Table 9: Summary of Economic damages in the study areas at Pali and Balotra

Study Area	Loss Component	Physical Loss	Units	Economic Loss (Rs in Lacs)	Total Loss (Rs. In Lacs)
Pali	Land Loss	4554	Ha	3372.7	9890.05
	Rabi Crop Loss	41897	MT	6284.55	
	Kharif Crop Loss	3880	MT	232.8	
Barmer	Land Loss	3123	Ha	3158.6	7627.91
	Rabi Crop Loss	28731	MT	4309.65	
	Kharif Crop Loss	2661	MT	159.66	

Hence, the economic value of the damages caused by the textile processing industries in Pali and Barmer study area during the last 15 years is estimated at Rs. 9890.05 Lacs and Rs. 7627.91 Lacs respectively.

The total loss works out to be Rs. 17517.96 Lacs

XII. COMPENSATION MODALITIES

The Bandi & Luni are both rain fed rivers and it can be understood that they carry flow only in specific period in a year. This establishes the fact that except rainy/ monsoon season the agricultural activity would highly depend on either the wells or surface water in the river. It was observed during the joint visit of representatives from DoE Govt of Rajasthan, RSPCB & NPC in February 2008 that farmers along the river were using the wastewater directly into their fields in spite of knowing that "application of wastewater is adversely impacting the soil characteristics of the area and ultimately leaving the soil along the river as barren in extreme case". It is also worth mentioning here that since water is scarce in the region, it is not possible to carry out agricultural activity in the region in summer or non-rainy season had the textile wastewater not been there. It was noticed that during summer or non rainy season the agricultural activity in the control zone is barely minimum.

The earlier chapter's findings have clearly indicated that the textile industries in Pali and Barmer have caused damage to the ground water, and agricultural land. The extent of

damage is evident from the estimated economic damages for last fifteen years (indicated in the last chapter) to the tune of **Rs. 17517.96 Lacs.** As per the present status neither the Central nor State Government has specific guidelines for provision of compensation for damages caused due to environmental impacts. Therefore, to facilitate the process of paying damages to the local farmers/ residents it is recommended that special administrative measures may be taken considering the financial and social aspects related to damage caused to the environment.

Issues Involved

In the present study, for working out the modalities for compensation certain key administrative measures or steps would be required which will help in framing the basic approach to be followed for guidelines for modalities for compensation. There are certain issues that need to be resolved by Department of Environment, Government of Rajasthan, and Rajasthan State Pollution Control Board are mentioned below:

- **Limiting the coverage of Study Area**: The damage assessment on the basis of satellite imagery (presented in Chapter-11) has been carried out by considering area up to 2.5 km as compared to 0.5 km demarcated area from both sides of the river. **The increased area has been considered for damage assessment keeping in view the technical constraint faced in image processing and minimizing the error in depiction of results as the satellite imagery appears as a very thin strip and with the near 30 m imagery resolution, its interpretation becomes difficult and error prone.** Therefore, it has be decided at the level of highest authority that whether 2.5 km should be accepted for damage assessment or a separate project has to be started again for estimation of damages up to 0.5 km on both sides, if possible.

- **Accountability for damages**: It was observed during the joint visit that the people in downstream are purposefully using the wastewater flowing in river (surface water) directly for irrigation which is known to be contaminated. Therefore, it has to be decided whether the damages caused to the natural soil and groundwater profile of the area are to be considered as a "self-inflicted injury" by the farmers, or the textile units should be held responsible for the same. While deciding this aspect, the riparian rights of the farmers in downstream side of river has to be kept in mind as their livelihood entirely depends on agricultural activity. Another important thing to mention here is the "prevalent water scarcity in the region" which urges "responsible use" of water by the residents as well as industry owners.

Very Important

- **Cost Bearing:** Another issue to be resolved is that "Who will bear the cost of damages". In the present case since the textile industries at both the places i.e. Pali and Balotra, Jasol & Bithuja are "Polluter", it can be said on "Polluter Pays Principle" that the textile industries should bear the cost. But since all the industries in the region are small scale units operating at low margins, this cost burden may result in closure of units. Now in current scenario, the responsibility of collection and treatment of effluent lies with CETP Trust working under the control of District Collector and for any untreated discharge into river body happened after setting up of CETPs either due to less capacity or breakdown at plant level; CETP Trust also shares the responsibility.

- **Liability for Damages:** The legal provisions for fixing the liability for environmental damages in India are limited and if the liability is fixed, the provision permits only a nominal fine. Presently, the PIL is restricted to only seeking injunctive relief which means that the polluting party is stopped from continuing the activity. Therefore, in order to implement the objective of this study in spirit, necessary administrative measures may be taken by taking into account the administrative, financial and social aspects.

- **Mode of compensation:** The mode of compensation for damages should be administratively decided. The various options available to the government for utilising the compensation amount for the affected people include:
    - Building infrastructure for providing drinking water facilities
    - Provision of irrigation facilities to the farmers
    - Providing subsidy for fertilisers, electricity etc.
    - Directly payment to the farmers on the basis of agricultural land loss and expected income loss from the land over the years

Therefore, from the above mentioned points it can be stated that providing compensation to the affected population is an issue which involves several administrative aspects and asks for decision making at the level of Secretary, Department of Environment and Chairman, Rajasthan State Pollution Control Board (RSPCB). NPC will continue to provide its technical inputs on the basis of study carried out and administrative decisions taken at the end of Govt. of Rajasthan.

XIII. RECOMMENDATIONS

In addition to the assessment of damages, certain recommendations are suggested which are **voluntary** in nature for various stakeholders like industries, CETP societies, farmers and concerned government agencies. These measures are aimed at preventing any further damages to the environment and human health. The suggested measures to be taken by each individual stake holders are as indicated in further subsections.

Pollution Control Board

- ❖ Industries operating in non conforming areas should be asked to shift in the designated industrial areas having waste water treatment facility. This will help in checking the untreated discharge into river.
- ❖ CETP inlet and outlet effluent characteristics as prescribed by CPCB should be monitored. One of the necessary pre-treatment required at the industry level is to arrest the suspended solids. Similarly, the critical parameter to be monitored at CETP level is TDS.
- ❖ PCB should evolve a regular CETP monitoring schedule and an effective information management system to monitor the CETP performance.

- PCB should make it mandatory for CETP to undertake adequacy assessment at regular intervals to decide the need for additional capacity.
- The sludge generated from the CETPs is hazardous as per Hazardous Waste (Management & Handling) Rules 2003 and should be properly managed in line with Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008.
- The PCB should promote the concept of waste minimisation / cleaner production among the industries by way of awareness programs, demonstration studies, developing and prescribing resource consumption benchmarks and cleaner technologies for the region. This will help in reduction of volume of waste water and pollution load.

Industries

- Industries in non conforming areas to shift in the designated industrial areas connected to CETP immediately.
- It is recommended that industries should not discharge any waste water to rivers directly instead it should be through CETPs alone.
- To minimise the impact of the industrial effluent on the natural resources, it should be properly pre-treated at the source point (i.e. industry level) and should be safely drained out in the river bed only after treatment at CETP. For this purpose, physical and chemical treatment is required to be given within the industrial units to reduce the Total Suspended Solid (TSS) and COD value, while biological treatment followed by Tertiary Treatment (to reduce TDS value) should be provided at the common treatment facility. As such, individual industrial units may be required to provide minimal treatment and to obtain permission from the State Pollution Control Board (SPCB) for discharging the same into the public drain leading to Common Effluent Treatment Plant (CETP).
- All the industries should undertake waste minimisation / cleaner production assessment and implement WM/CP measures to improve productivity and reduce environmental load.
- Any expansion of processing capacity & quantum of wastewater discharge should be made in prior consultation with the respective pollution control Board and CETP Management.
- All industries should provide their processing capacity in detail indicating existing capacity of the plant, type of process being in use, estimated water consumption and wastewater generation.
- Industries should install pre-treatment units with flow monitoring devices at the discharging end to the common drain. The pre-treatment units should be installed to reduce the TSS & COD concentration as stipulated by the respective pollution control board.
- Industries should keep record of flow monitoring data, analysis results of the effluent after pre-treatment The record of flow monitoring data should be given to the CETP management at regular interval (as per defined by the CETP Management) for the estimation & crosscheck of the total hydraulic load reaching to the CETP. The analysis data should be given at regular interval to the Pollution

Control Board (as per stipulated by the Pollution Control Board) and CETP Management.

- When the CETP is not functioning, the decision or instruction given by the CETP Management for stopping the production process should be strictly followed to ensure no un-treated wastewater gets discharged into the river.

CETP Societies

- It is recommended all CETPs should undergo adequacy study, performance evaluation study and undertake upgradation to ensure that untreated wastewater is not sent to river directly.
- Separate drainage system should be constructed for there only for carrying domestic sewage. It must be ensured that industrial wastewater from textile units should not get mix with domestic sewage.
- The drainage system near CETP-III at Pali during study was observed to be neither fully lined nor covered allowing the mud & silt to get mix with the industrial effluent creating clogging of drainage system and high solid content in the wastewater. Therefore, all the drains should be made concrete lined and covered.
- The CETP Management should collect the sludge during cleaning of drain, sludge generated after treatment and dispose it off in secured landfill facility as per the Hazardous Waste (Management, Handling & Trans-boundary Movement Rules) 2008.
- The CETP management is recommended to put in at least basic laboratory infrastructure and record daily, the quantum of wastewater being received, treated raw water / treated water characteristics in respect of basic 5 parameters (i.e. pH, TSS, COD, BOD and Oil & Grease). Apart from 5 basic parameters, critical parameters like heavy metals and organics should be monitored on periodic basis
- The existing CETP should be upgraded to meet TDS requirement after putting Tertiary wastewater treatment facility. The plant should be equipped with Reverse Osmosis Plant to reduce the high TDS present in the treated wastewater.
- In case of non-functioning of CETP, the industries in the Industry region may be asked to stop production. However, the CETP management should take all preventive measures to operate the CETP in smooth & efficient manner.
- There should be dedicated alternative Power Supply arrangement to handle & run the CETP.
- The CETP Management should have power to give notice and take administrative action as per the procedure laid down by the CETP Management to the individual industries, in case they fail in paying cess which is required for CETP operation.

Farmers

- It is recommended that the farmers may be advised to not use the wastewater for irrigation in future.
- The soil remediation measures suggested (in further sections of the chapter) should be implemented.

District Administration

- District Administration (DA) should ensure that contaminated water is neither used for drinking nor for irrigation purposes.
- In the absence of enough water either for drinking / irrigation, it is recommended that DA should identify alternative sources of good quality water and ensure its availability to residents.
- As observed from the study that the recent heavy rains and the flood seems to have flushed out the salts and also the nutrients from the soil causing improvements in the soil quality from the contamination perspective. The DA should try convincing farmers to make use of the abandoned farms for agriculture after supplementing it with nutrients. The agricultural institutes may be asked to facilitate the farmers by way of advising nutrients requirements, crop selection etc.
- In all the industrial areas, pucca drain with proper gradient should be provided to carry wastewater up to the respective CETP. The storm water should not be allowed to mix into the drain carrying the industries effluent.
- There should be separate drainage system for carrying the storm water in the city area and they should be directly discharged either into the river or diverted to re-charge the ground water wells.
- There should be separate conveyance system for carrying domestic wastewater. There should be separate Sewage treatment plant to treat the domestic wastewater particularly in the Municipal Corporation Area or City area.
- The Government should provide fund for the management & treatment of domestic wastewater i.e. conveyance system, installation of Sewage Treatment Plant and storm water drain.
- People should be made aware of the repercussion of the drinking of contaminated water. An awareness program should be conducted for the poor & illiterate people in association with Gram Panchyat, PHED Department and Village representative.
- Agriculture Department should conduct awareness program for the farmers advising them about the method of agriculture to prepare soil & application of ground water for irrigation, the type of crops to be grown, importance of testing of soil and ground water samples, etc.
- The Agriculture Department can provide training to few groups of farmers about the present situation of agriculture condition and measure for getting better utilisation of their field and increase in yield.
- The health care facility should be extended to the village level for doing clinical examination of the villagers and provide proper advice & medicine to cure present disease arise specially due to the usage of contaminated water for drinking & agriculture purposes.

Soil Remedial Measures

These measures would towards the remediation / restoration of already contaminated soil.

Contaminated Soils

Under this section outlined are the soil remediation / decontamination measures drawn from report of Agriculture Expert, Dr. I. C. Gupta, Retd., HOD of CAZRI based on his & other CAZRI scientists involvement in number of research studies carried out on the subject in the region.

Natural Rainfall

The soil contamination in the region because of textile industries is because of the high quantity of salts which gets leached to ground water and then use of this contaminated highly saline water for irrigation purposes leads to salt deposits in soil and increased soil electrical conductivity, sodium absorption ratio, salinity etc.

Rainfall pattern during a year can completely change the saline water irrigation tolerance limits and plays a very significant role in the process of saline water irrigation by controlling salinisation-desalinisation cycle. This phenomenon is clearly evident from the past / historical soil analysis (and change detection using satellite imageries) indicating soil damage and loss of agricultural land whereas current soil investigation reports in the study area (after severe rainfall & floods in the region) indicates soil characteristics as good & very good, thus indicating that concentrated rainfall has caused the salts to leach out from the soil although causing the increased salt quantum in ground water.

However, since the ground water has already got severely contaminated and needs remediation, it is essential to manage rainfall by proper management of field which includes uniform levelling. bunding and cultivation before the monsoon season. By bunding and levelling the field, the rain water utilization can be increased by 2 to 2.5 times as compared to the unbunded fields.

Effective conservation of rainfall is important not only in the desalinisation of saline water irrigated soils but also in the desodification. Desalinisation of the profile was accompanied by simultaneous reduction of SAR. The surface soils of Na-Mg-Cl-SO_4 type before rainfall became Na-Ca-Cl-HCO3 type after rainfall, revealing thereby that these soils may not always need amendment for their management.

Application of Gypsum to soils

As the soils have been left for long periods or have been irrigated with contaminated waters, those have deteriorated to different degrees of severity. To regenerate the soils, it is necessary to start the process by treatment with gypsum. Although a light application of small doses (1-2 t/ha) of gypsum may be surface dressed on the soils in summer just before or coinciding with monsoon or first rain, the exact and full dose of gypsum requirement may however be got determined from Soil Testing Laboratory. For tolerant crops like wheat, mustard etc. application of gypsum @ 50% GR (Gypsum Requirement) will serve the purpose. Finer size gypsum (2-5 mm) is more effective.

Agronomic and cultural practices

Pre-sowing irrigation: Early sowing just after the cessation of the monsoon rains may be advantageous because salts will not get time to accumulate in the root zone. Obviously a pre-sowing irrigation will be very beneficial where sufficient time has elapsed between the

last rainfall and sowing date of the rabi crop. This practice also assures the availability of sufficient moisture in the root zone. It is also important to add here that crop tolerance limits with respect to salinity of irrigation water hold good only when germination and emergence are successfully established.

Planting practices: Obtaining a satisfactory stand of furrow irrigated crops on saline soils or where saline water is used for irrigation is a serious problem. One alternative is to use seeds at higher rate than the normal. The other alternative consists of appropriate adjustment in planting. Procedures can be adopted to ensure that the soil area around the germinating seeds is lowest in salinity. This can be done by selecting suitable planting practices, bed shapes and irrigation management.

If salinity is a problem, placing the seed in the centre of a single-row raised bed will put the seed directly in the salt zone whereas double row raised planting bed will keep the salt zone away from the seed. Still better salinity control can be achieved by using sloping beds with seeds placed on the sloping side and the seed row placed just above the water line Irrigation is continued until the wetting front has moved well past seed row.

Manures and fertilizers: The soil as analysed in the study area generally indicates low levels of macro nutrients. It is recommended that these be added with nitrogenous and phosphate and potassium based fertilizers. The fact that "Manures and fertilizers enhance the suitability of saline waters for irrigation" has been also recognized widely. Nitrogen use efficiency could also be improved by substituting a part of inorganic fertilizers requirement through organic sources.

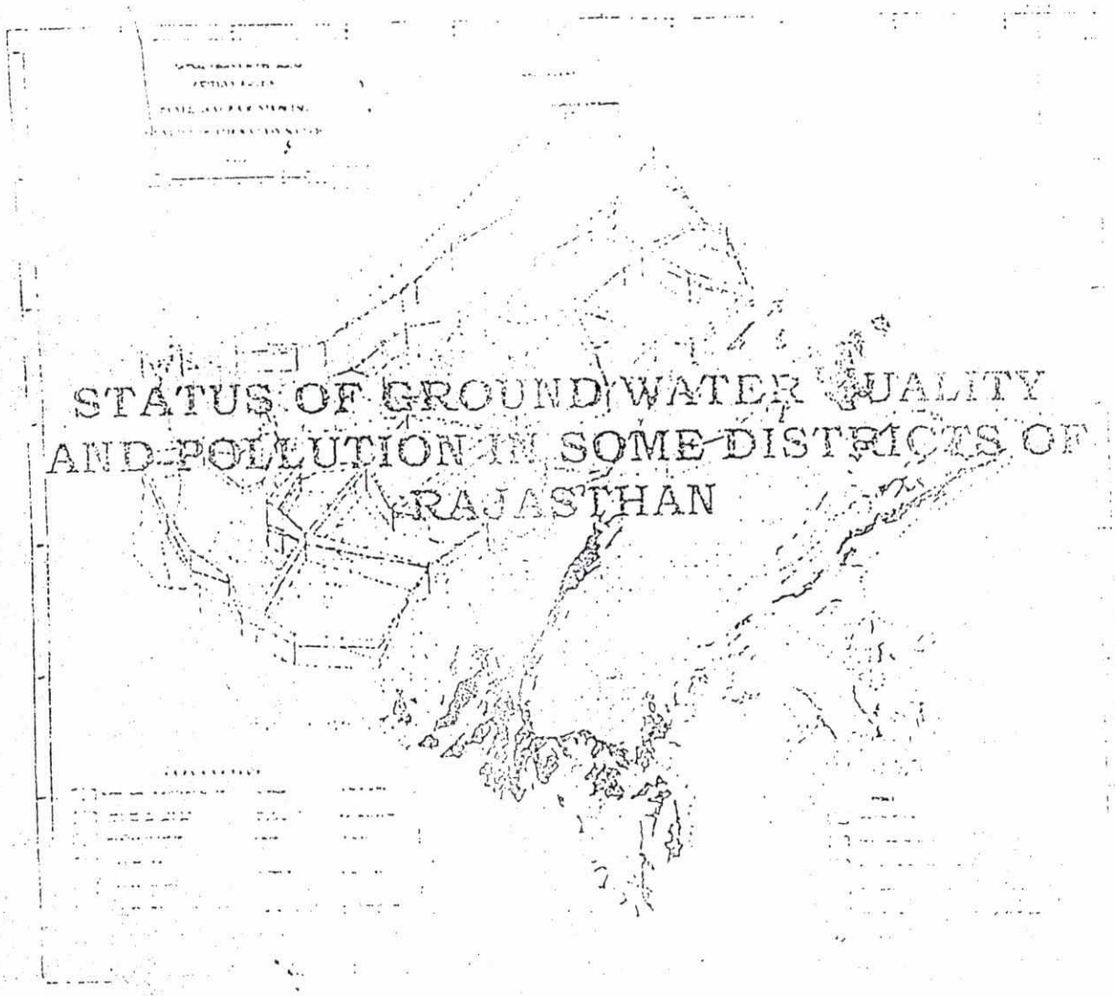
Green manuring is also one of the useful practices in the maintenance of saline water irrigated agriculture and therefore it could find an important place in crop production techniques. Application of gypsum and green manuring crops in combination also reported to increase the yield of wheat saline soil.

****

3042

R-17

CENTRAL GROUND WATER BOARD
MINISTRY OF WATER RESOURCE
GOVERNMENT OF INDIA



STATUS OF GROUND WATER QUALITY AND POLLUTION IN SOME DISTRICTS OF RAJASTHAN

WESTERN REGION
JAIPUR
2004

12

3043

9. PALI INDUSTRIAL AREA

9.1. Introduction

Pali district was selected as a critically polluted area out of the 22 sites selected throughout the country for ground water quality monitoring. The area lies in arid zone of western Rajasthan having very scanty rains and very low for ground water reserves. Moreover, the area under study is saline and the inhabitants experience scarcity of potable water and water for irrigation purposes. The problem was much more pronounced due to indiscriminate discharge of industrial effluent particularly textile industries from the unorganised sector. In the Pali town 800 hard processing textile units are discharging their effluent in to Bandi river which has created alarming situation in ground water quality deterioration of the area. In the area under study the source of rechargint of the ground water is the river. The influx of industrial effluent in to the Bandi has not only degraded the fresh water flow of the river but the wells located in vicinity are also being ruined. The riverine wells which at one time a source of fresh water for irrigation and domestic use, gradually developed salinity and finally were abandoned. The soil also, after application of the saline water gradually lost its fertility and turned completely barren with passage of time.

9.2. Location

Pali district is situated in South-West of Rajasthan and lies between 24°45' and 26°27' N Latutude and 72°48' and 74°24' E longitude. The project area lies along with the river Bandi to Phikaria and Garwara, NW direction of Pali Town at a distance of apporx. 40 km in Pali Tehsil of the District, covering an area of about 560 sq. km. It lies between 25°45'50" to 25°53'45" latitude and 72°57'30" to 73°19'30" longitude covering the villages Mandia, Rupawas, Dayal Pura, Puniata, Sukarlia, Chatelao, Kerla, Jetpur, Mandawas, Phikaria, Garwara and Bitu etc. the Pali Town is located at an altitude of 212 m (above mean sea level).

Pali tehsil has population of 329, 127 out of which 136,842 persons lives in the urban sector and remaining 192,285 in the 80 inhabited villages of rural area. The only town in this Tehsil is Pali having a Population of 136,842. The population density in the urban area has been worked out to be 1035 persons / sq. km and in the rural areas it was 96 persons / sq. km. the soil of the area was mostly sandy loam and the water table in general varied from 2.0 m to 15.0 m.

The forest reserves in the area are very poor due to scanty rainfall and scarce ground water reserves and comes under the subsidiary edaphic type of dry tropical forest. Khejra, Babul, Gular, Kair and Jamun are the main species found along the nullahas.

The district lies within drainage system of Luni river and its tributaries namely Jawai, Mahri, Bandi, Lilri, Guhia, Rahi and Raipur Luni. These steams are ephemeral in nature and flow only in direct response to precipitation. All tributaries of Luni flow in the area and form the western watershed of Aravallies except Luni river which originates from Pushkar Valley near Ajmer. Besides these, there are net work of small drainage channels emanating from hill ranges. All these rivers are coarse to medium textured and develop dentritic to sub-dendritic drainage pattern in the upper part, they gradually become almost parallel to sub-parallel in the middle and lower part. The general gradient of the streams varies from 2.28 meters / km to 1.5 meters / km. The river Bandi, Luni, Guhia, jawai and Lilri flow sizably in the monsoon and post monsoon season only upto Oct and Nov. month. There are mainly seasonal

and tanks in the district constructed for drinking and irrigation purposes. Jawai reservoir is the biggest which provides drinking water to Jodhpur city and few villages of Pali district including the Pali town. The other important surface water reservoirs are Raipur dam, Sardar Samand, Hemawas, Phulad, Chirpatia Sadri, Jograwas, Bhumadara, Lordia and Kharda etc., which are used for drinking as well as for irrigation of large tract of the land. Besides, these important reservoirs, there are a number of small tanks (Nadi) in the area which retain water during a part of the year and serve as a source of drinking water. In the area under study the major reservoirs are Hemawas, Lordia and Kharda. In Pali Tehsil number of dams / tanks are 14 covering live storage area in 3718.63 hectares with a cultivable command area in 16639 hectares and as against the designed irrigation in 11260 hectares and only 22.73% area are actually irrigated.

As per the land records the total area of the Pali Tehsil was 3,08,796 hectares out of which the total uncultivable area is 70897 hectares, total land suitable for irrigation was 2,37,809 hectares, and total irrigated area 20,544, respectively. Kharif and Rabi are the main crops, which are primarily rainfed and irrigated successively. In the urban sector there was only one town Pali, as mentioned above, where mainly textile industries crrying out the process of sizing, designing, mercerizing, dyeing, printing, silicating and washing of printed, cloth. In the Pali town itself 767 such industries are in operation in the unorganised sector Besides it a few chemical steel, paper and dye-intermediate industries are also working in the area.

The hydrogeological formation encountered in the area is younger alluvium which comprises of unconsolidated sand, gravel, silt and clay along the main river and channels of various streams in the area. These deposits are discontinuous and have limited thickness. Sand is mostly blown sand. The superficial cover of blown sand is light yellow to brown in colour, fine to medium, well rounded, mainly of quartz with some ferro magnesium minerals and felspar and well sorted by wind action. It is disintegrated product of older rocks present in the surrounding area.

Granite covers a portion around Pali town and village Mandia and towards village Gumati. The granite encountered in the area was weathered and fractured which was overlain by alluvium. The ground water movement in the formation was controlled by degree of weathering and secondary opening i.e., joints and fractures. The thickness of weathered and fractured zone varied considerably depending on topographic set - up.

In the north-eastern portion of the project area some traces of phyllite and state of Aravalli Super Group was encountered in the village Bhumadra and Utawan. These rocks are soft in nature, susceptible to erosion and weathering. The phyllite and schist encountered in the wells of Bhumadra was hard and compact with joints and cleavage partings are break up into angular fragments. The rocks are underlain by granite. At some places the hillocks of granite are also exposed. The direction of ground water flow was from Pali towards north-west to the village Phikaria and Garwara.

The depth of water level in the wells varied from 2.85 to 7.95 m. As the wells lie in the vicinity of the Bandi river and therefore the rate of recharge of the wells varied with the flow in the river Bandi. During the study period at some places lean flow was observed in the river it may be due to stagnant rain water added with the industrial and domestic effluent discharged from the Pali town.

As for industrial use of ground water the total requirement for all the industrial area of Pali is 41.833 MLD which includes 0.9 MLD water required for M/s. Maharaj Shree Ummaid Mill, a major textile unit. The domestic requirement of Pali town in the tune of 10.8 MLD was met out by Municipal Corporation from the surface water supply from Hamawas and Jawai dams.

In the area the ground water resources are very limited particularly since the precipitation is less as well experienced in last few years. This not only affects the potential of the ground water resources but the mean annual recharge was also adversely affected. In the study area, as the ground water resources are limited on one hand, the threat of pollution from the discharge of industrial domestic effluents and agricultural run off further aggravate the situation.

In the area the point sources of pollution are the discharge of domestic and industrial effluent, indiscriminate disposal of solid waste and sludge from the Pali town, which are soured off by the surface runoff into the Band river. Amongst the non point sources of pollution are basically agricultural run off and discharges from the small villages situated on the bank of river.

In the Pali town 767 textile processing unit are distributed throughout the town and the defined industrial area. The industries are located in Mandia Road Industrial Area Phase-III, industrial area Phase-I and II, Sindhi Colony, Ramdeo Road, Ramnagar, Mahavir Udyognagar, Pali city, Main Mandia road, Gandhi Nagar, Indranagar, Sojat Road, Bapunagar, Bajarang Badi, Sumerpur Road and Ramlila Maidan.

The waste water generated from textile industrial complex was the main industrial effluent. Besides, industrial wastewater domestic wastewater was also being mixed with the industrial effluent and mostly flowing through natural drains. As more then one third on industries are scattered in the city area, most of the untreated industrial wastewater is carried out through 10 major natural drains to the river Bandi.

Presently, the untreated wastewater from about 292 industries located in industrial area Phase I, Phase II, Sindhi colony (Ramnagar), Mahavir Udyognagar, Pali city, Main mandia Road (treated by combined effluent treatment plan of capacity 4.5 MLD) and Gandhi Nagar are discharged into a natural drain which is locally known as Gandhi Nagar drain. The drain also carried domestic wastewater from Pali city and partially treated effluent (industrial and domestic) from Maharaj Shree Ummaid Mills. The total quantity of effluent generated from the Pali town including domestic and industrial effluent worked out to be 36 MLD. The effluent was having high pH, COD, BOD, total dissolved solids, total suspended solids, chlorides, suphates, sodium, and percent sodium etc. Amongst the trace heavy metals the concentration of iron, chromium, and lead were high.

Presently the industrial effluent from the Main Mandia Road Industrial Area (MIRIA) was being treated by a Common Effluent Treatment Plant (CETP) of capacity 1.0 MGD, which is a physic-chemical and biological treatment system. The CETP is operated regularly by the Direct Environment Samiti but it has its own limitations of design, transportation system of industrial effluent, frequent power failure, fluctuation in characteristics of industrial effluent etc. The CETP being a biological system is not capable of reducing the inorganics i.e. dissolved solids, chlorides, sulphates, sodium etc. which cause ground water pollution problem to the

10 A

area.

The raw ground water available in the area has high electrical conductivity in the ranges of 10,000-31,000 us/cm, total dissolved solids in the range of 6000-20,000 mg/l and every high salinity. The subsequent discharge of industrial effluent to the Bandi river would add to the salinity and dissolved solids to the aquifer. The future growth of industrialization in the area would multiply the magnitude of the problem. Due to continuous discharge of industrial effluent in the Bandi river the organics and inorganics deposit to the bottom sediments of the river particularly during the non flow period. The problem area is extends beyond the study area upto the village Dewandi at a distance of 60 km in the NW direction of the Pali town.

The major point source pollution of the study area is the indiscriminate discharge of domestic and industrial effluent in the Band river. The river is a major source for recharging the aquifer in the area and, therefore, the monitoring stations were selected down stream of Pali town on both sides of the river in north-west direction.

9.3. Status of Ground Water Quality

Any stream carrying pollutants certainly has an impact on the ground water quality of the area since at also recharges the aquifer. Bandi river which may be called an effluent stream during non monsoon period also contribute a lot to ground water quality deterioration of the study area. The monitoring of the water quality in riverine wells clearly depict the effect. The salient features which highlight the quality charges occurred in polluted wells as summarized as below :

Colour and Odour

The industrial effluent blended with domestic wastewater of Pali town flowing in Bandi river is characterized by peculiar colour and odour is it comprised of different types of inorganic and organic salts, dyes, acids, alkalies, salts of sulphide. Colour of the effluent varied depending on the processes being adopted in different textile units. From the river bed in vicinity of Pali town the colour and typical odour in the Bandi river may be experienced. But due to discharge of the effluent in the river, the organics are settled down in the bottom sediments of the river and extent of such pollution load diminishes with distance in down stream particularly when the flow in the river is low. In the rainy season particularly with first and second monsoon the bottom sediments are flushed with flow of the river and the organic pollution load and inorganic salts are increased. Since the river bed is sandy coarse to fine and therefore it acts as a filter and the pollutants in suspension may not reach the wells away from the river bank. Some of the wells located on bank of the river showed colour.

Trace Heavy-Metals

As indicated by the characteristics of the combined effluents from the industrial area of Pali, the concentration level of iron, chromium, zinc, lead, manganese and copper were determined, as occurrence of such trace metals in ground water is obvious. In the well water the concentration of iron and chromium was not observed, this may be due to alkaline nature of the industrial effluents were such trace metals might have been deposited in the sediments of the recipient system. The concentration of lead was found in the wells of the Mandia, Jetpur, kerla and Jeoria to higher levels, similarly in some wells the conc. of zinc was also found higher.

9.4 Conclusions

The hydrogeological and hydrochemical studies carried out along Bandi river distinctly reveal the effect of pollution on ground water quality. The following are the main findings :

i. The Bandi river carried fresh water during monsoon period but its quality successively deteriorates with cessation of monsoon. During non-monsoon period, the river carries exclusively domestic wastewater and industrial effluent which is highly coloured, alkaline and rich in organics and other soluble salts. The salinity of water increased with increasing concentration of TDS, chloride, sulphates etc.

ii. The river bed being sandy, during monsoon season due to higher flow rate the self purification capacity of the river is high with respect to organic pollution load. However, there is no reduction in concentration of soluble salts, on the contrary their concentration goes on increasing due to surface evaporation in summer season.

iii. The flow of effluent of Bandi river has repercussionary effects on quality of water in riverine wells. There is considerable build up of salinity in ground water along the river from Pali to Garwara and Phikaria upto a distance of 40 kms in downstream of Pali town. TDS, sodium, chloride, sulphate and electrical conductivity are very high in the ground water.

iv. The water of the wells were not found suitable for potable purposes due to occurrence of high concentration of TDS and other parameters as mentioned at (iii) above.

v. The increase in sodium content in polluted wells has increased the SAR values of the ground water above 20. In all the wells the SAR concentration was found more than the value. High SAR values in polluted water alongwith high salinity have rendered the wate quality unsuitable for agriculture also. The soils irrigated by these waters have become hard, impermeable and unfertile. The yields of agricultural corps have also reduced remarkably.

The pollution of Bandi river and ground water has ghus affecte socioeeenomic conditions of riverine population and unless checked further, the loss done to rual economy and human health may surpass the grains of industrial development. The pollution of ground water is a slow but intrinsic process and it may take years together and lot of efforts to regain the natural quality of the ground water.

9.5 Recommendation

i. The period assigned for the study was very short and only one post monsoon season could be covered. Therefore, to study the seasonal variations it may be continued for atleast one year.

ii. In the study area since the control zone could not be covered and if it continues the villages in upstream of Pali town may also be included. The number of monitoring stations may also be enhanced by reducing the frequency from monthly to quarterly and thus the sampling points could be 18 in place of 6.

iii. To cover the organic pollutional load parameter COD may be introduced. In case the facility for analysis for pesticides is not available with Board. They shall be monitored with help of central laboratory of CPCB.

iv. The quality of river Bandi be monitored at various points to study the self purification capacity of the river system.

v. The new combined effluent treatment plants be constructed and existing and new CETPS be operated satisfactory to reduce the organic pollution load. In the effluent treatment system devices like reverse osmosis process be also introduced for reuse or recycle of the treated effluent.

vi. The inplant modifications systems be intriduced in the manufacturing process by the industries to reduce the pollution load.

vii. Diverting of the treated effluent through channel to Guhiya river at nay point best suitable economically, in case reverse osmosis process was not adopted. This will provide opportunity for natural flushing out of salts from Bandi river and adjoining wells during monsoon period. As the Guhiya river already carries saline water and therefore diverting of the treated effluent from Bandi to it will no longer damage its water quality.

viii. Drilling of exploratory boreholes across different sections of Bandi river to ascertain horizontal and vertical extension of pollutants in ground water and also to monitor periodic variations in their concentration.

ix. In the Pali area non water polluting industries be promoted to have a proper balance in industrial development and environmental protection.

In the Matter of:

Original Application No. 32(THC) of 2014

(M.A. No.921/2018)
(CWP No. 9503/2012)

Kisan Paryavaran Sangaharsh Samiti, Jaipur
Vs
State of Rajasthan & Ors.

Report submitted in compliance of

order dated December 21, 2018



Fig. 1: Status of Bandi River at Jaitpura-Gadhwara Puliya on 12.01.2019

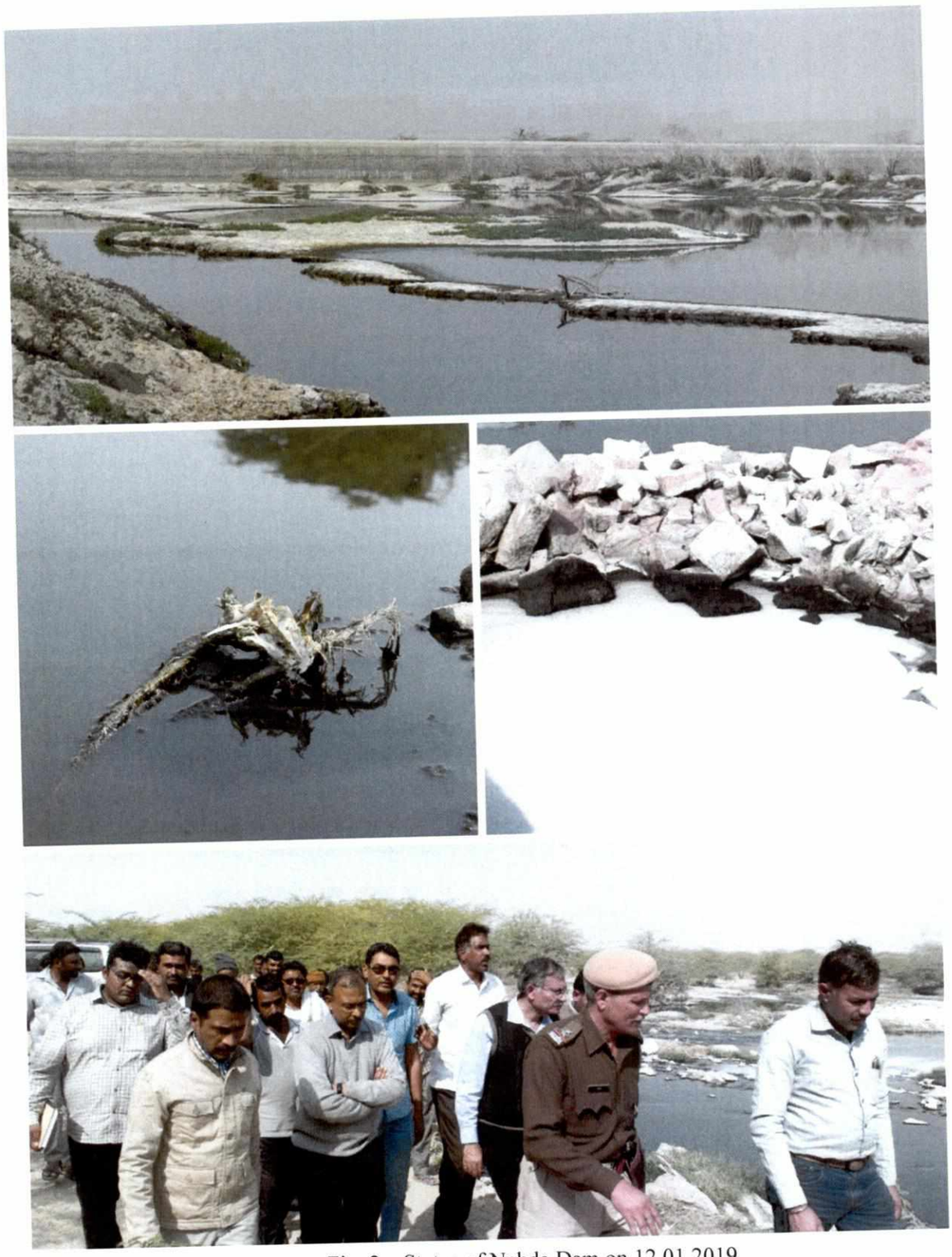


Fig. 2a: Status of Nehda Dam on 12.01.2019

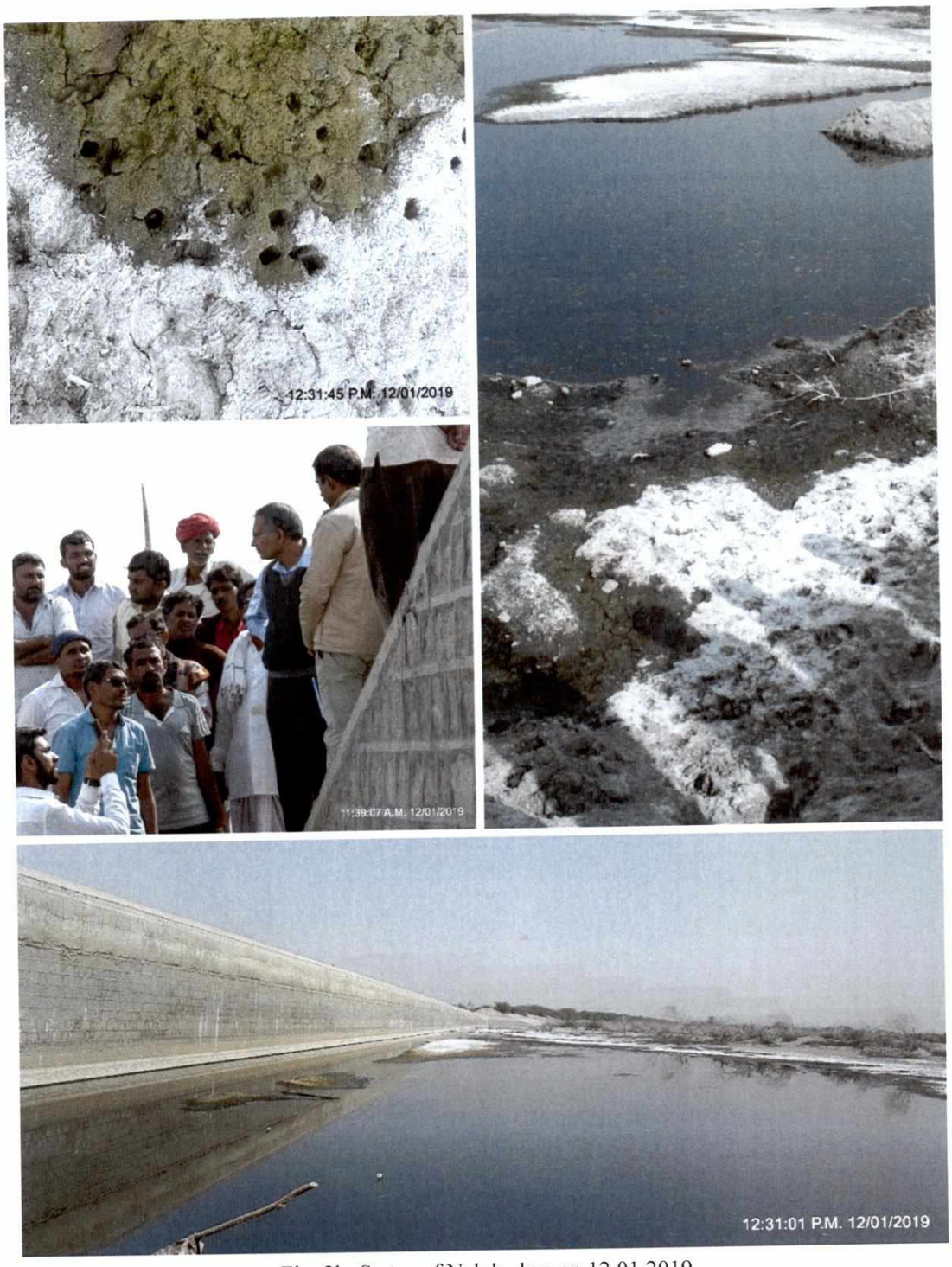


Fig. 2b: Status of Nehda dam on 12.01.2019

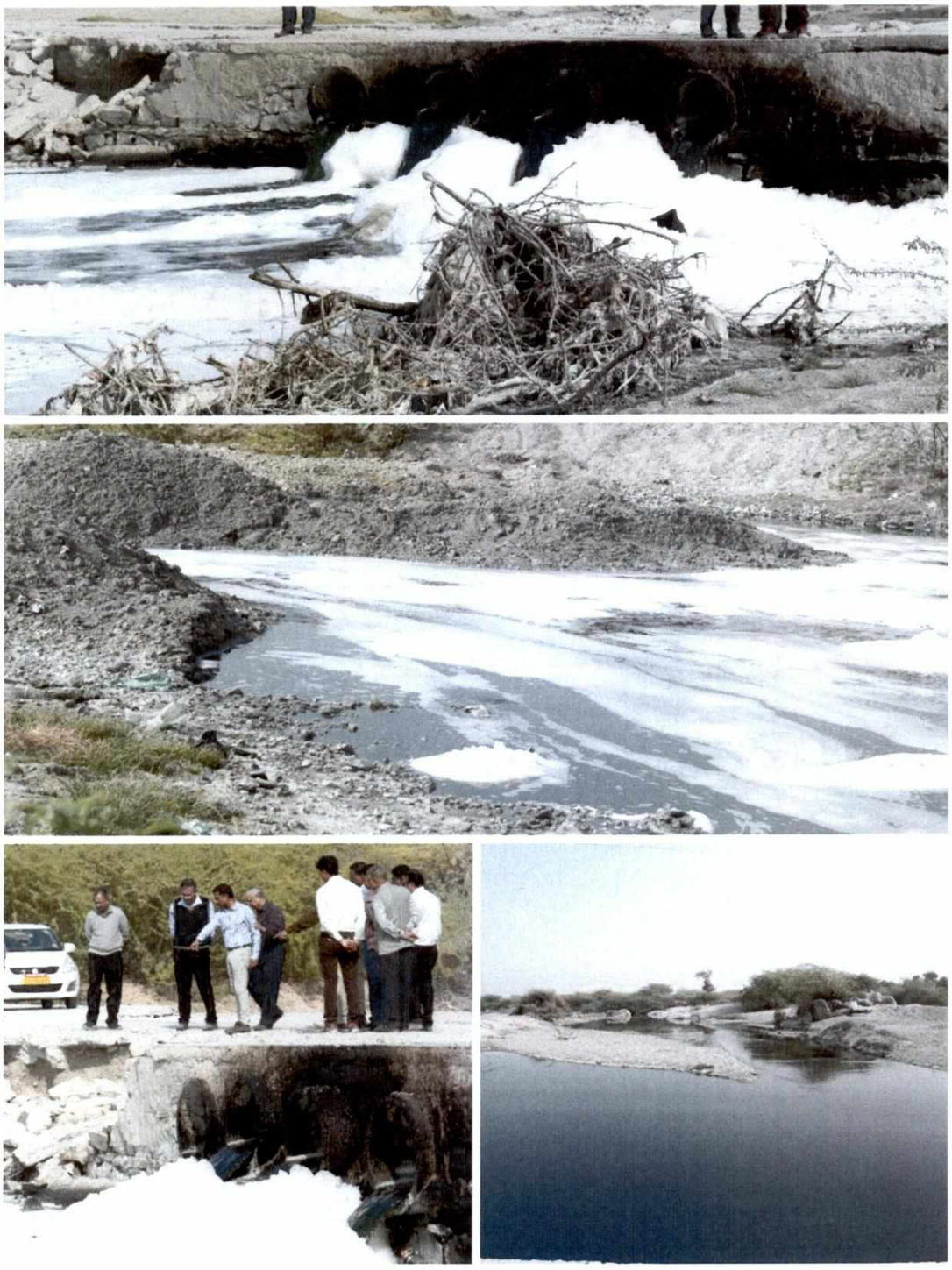


Fig. 3: Status of Bandi River at Jawadiya-Giradara Puliya on 12.01.2019



Fig. 4: Status of upstream stretch of river near bridge on 12.01.2019



Fig. 5: Status of CETP 1 on 12.01.2019



Fig. 6a: Status of CETP 2 on 12.01.2019 (Poor maintenance)

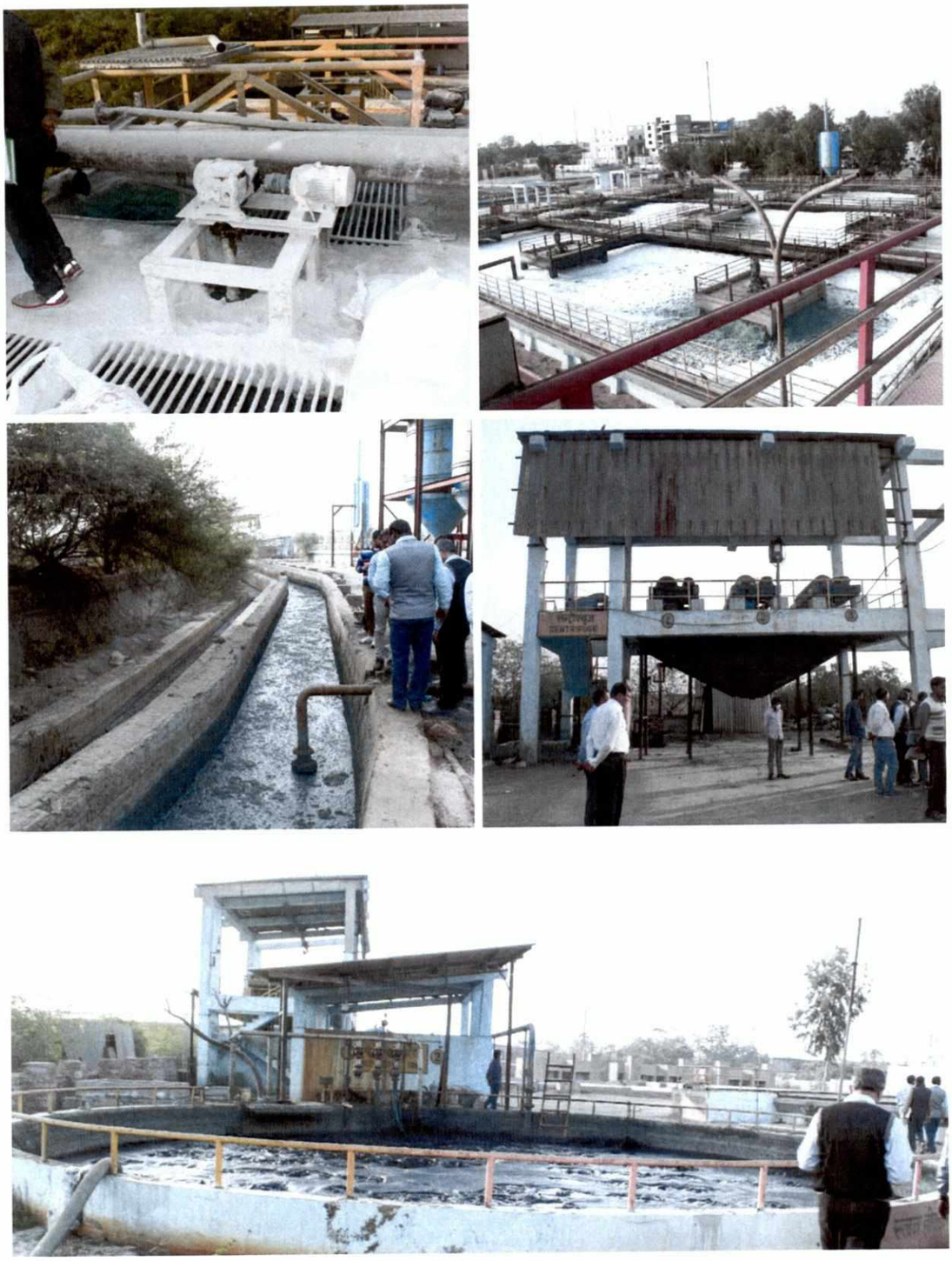


Fig. 6b: Status of CETP 2 on 12.01.2019 (Poor operation)



Fig. 7: Status of CETP 3 on 12.01.2019 (Not complete treatment)

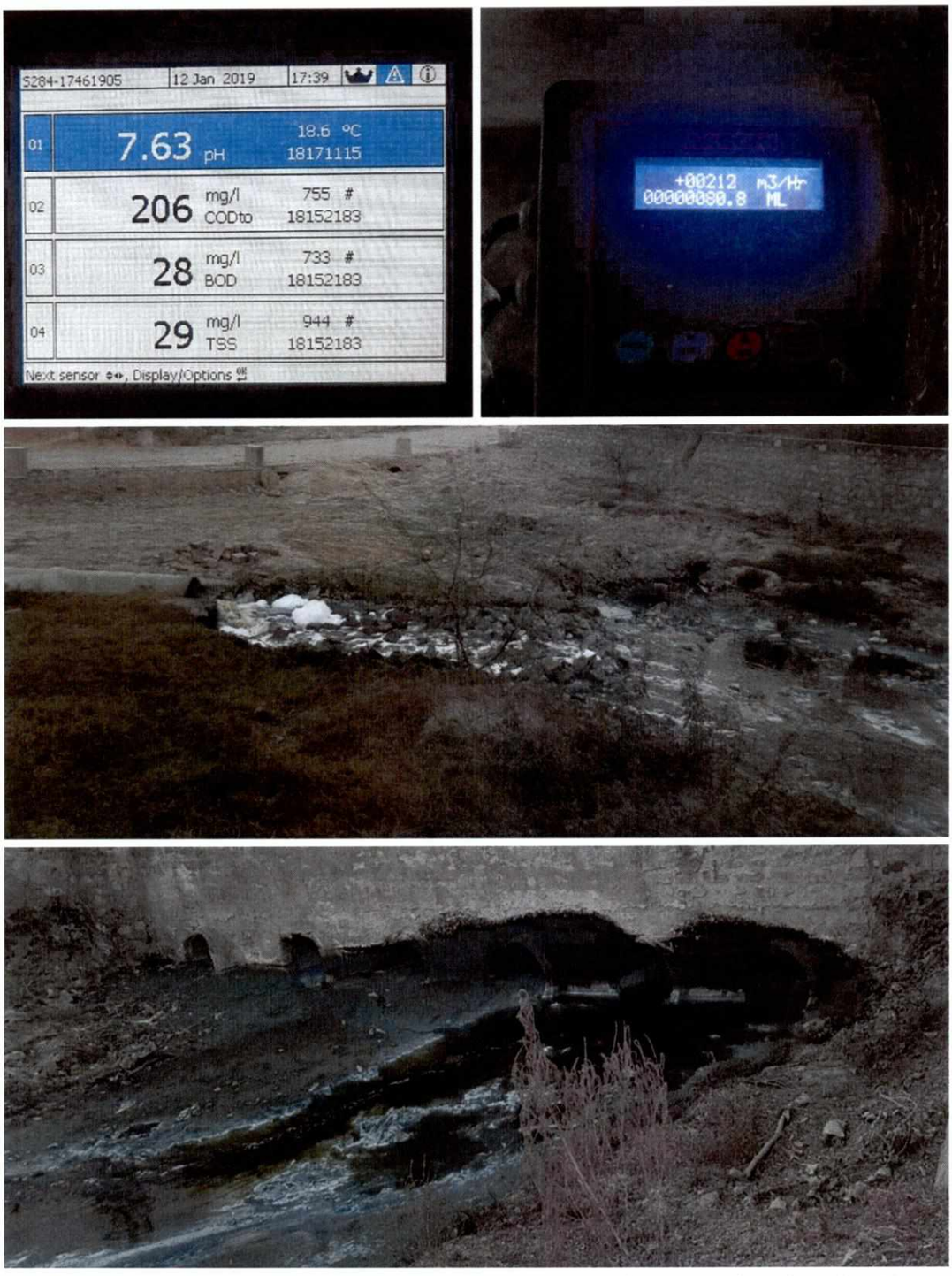


Fig. 8: Status of CETP 6 on 12.01.2019 (Disposal of final effluent into river from CETP)

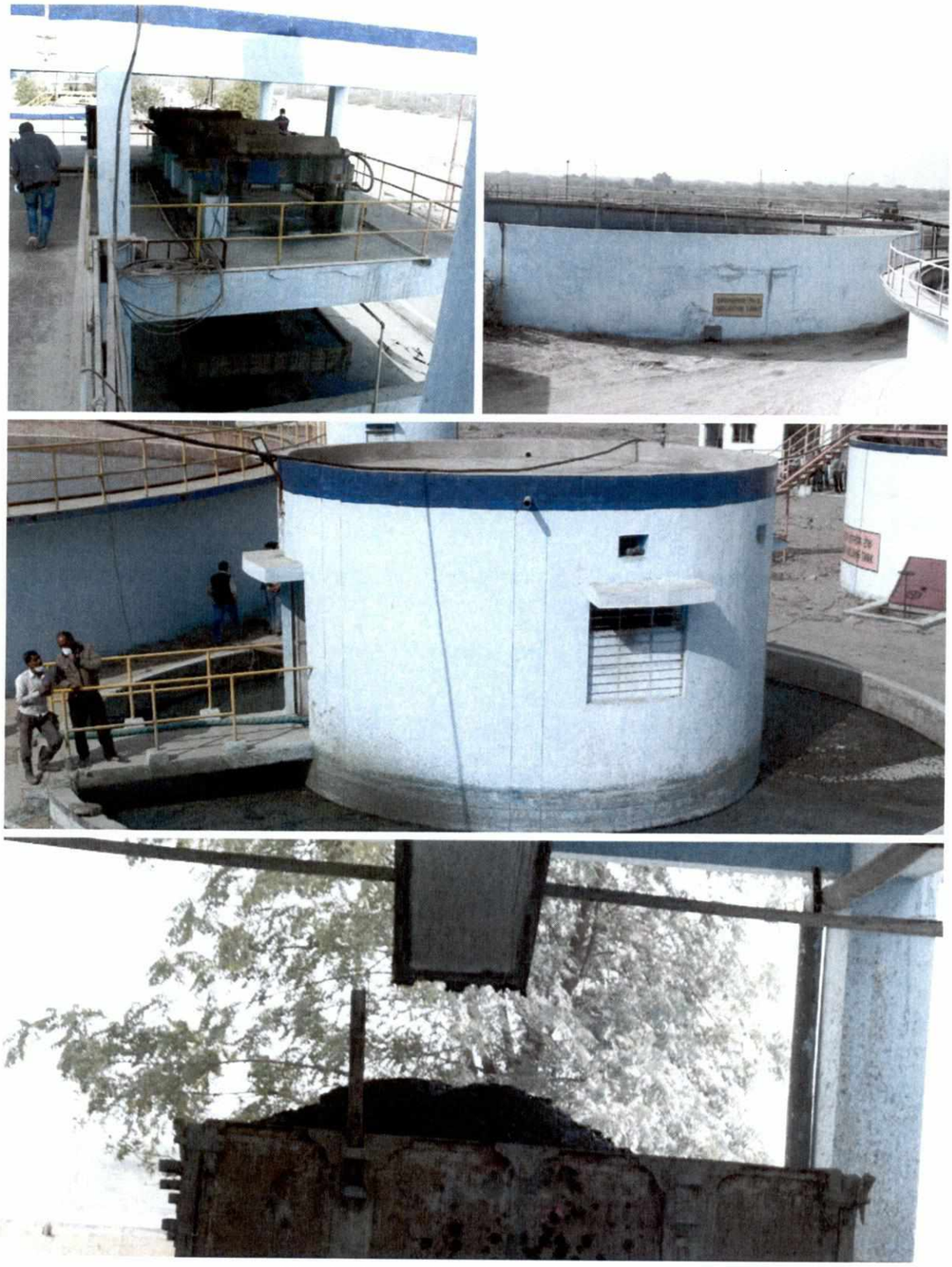


Fig. 9: Status of CETP 4 on 13.01.2019



Fig. 10: Status of Nitesh Industries on 13.01.2019

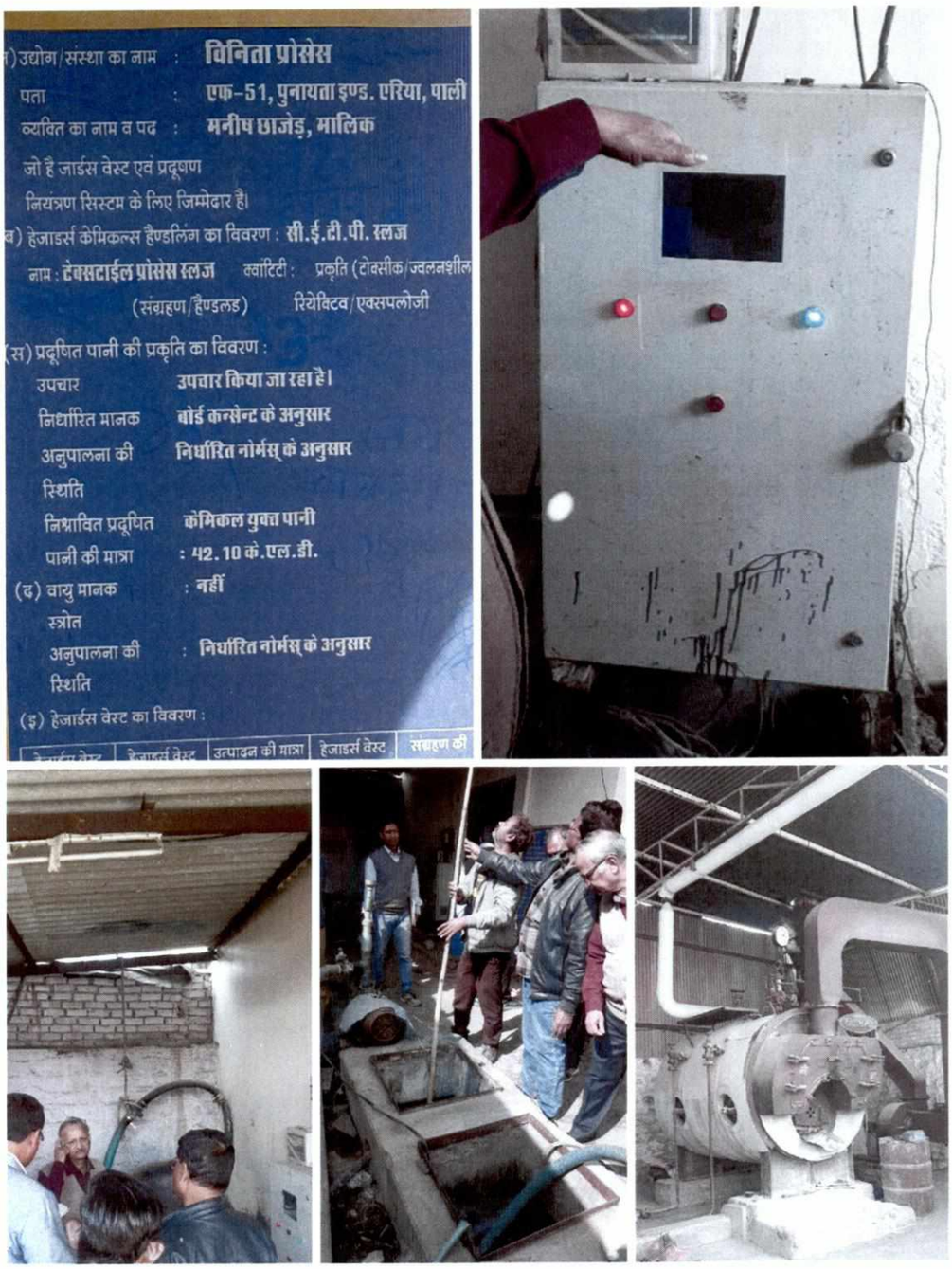


Fig. 11: Status of Vinita Process (Stream boiler using wood as a fuel) on 13.01.2019



Fig. 12: Status of Padmawat Dying on 13.01.2019



Fig. 13: Status of STP, Pali on 13.01.2019 (No flow meter at inlet as well as outlet)



Fig. 14: Status of Bandi River at NH bye-pass bridge on 13.01.2019