

Improvements in Pollution Management

Vapi Industrial Estate

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Background

Vapi is a highly successful industrial estate in Gujarat, India. Developed by Gujarat Industrial Development Corporation (GIDC) during 1967, it is located in Valsad District of Gujarat. The estate, spread on 1140 hectares of land in close proximity to National Highway No 8 and Delhi Mumbai Railway line, and accommodates about 1382 industrial units out of which 800 units are operational (Source: CPCB).

The area accommodates a number of chemical industries including manufacturers of pesticide, pharmaceuticals, dyes and dye intermediates, paints, and a sizeable number of paper and pulp industries.

The major affected rivers for discharge of effluents are the Damanganga and Kolak. These rivers flow almost parallel to the west, into the Arabian Sea, passing through Daman on the coast.

History

VIA and the surrounding town of Vapi suffered from pollution substantially in its early days, especially with regard to discharge of effluents, hazardous waste and air pollution. The Central Effluent Treatment Plant initially was found to be poorly performing, and came under much criticism from government reports, and from other non-government agencies.

VIA has seen dramatic changes in pollution management from 2000 onward, with a great deal of capital investment and local activities to reduce pollution of all types. These efforts have been generally successful, and are now seen as an example for others to follow. While more work needs to be undertaken; the improvements in pollution management are to be commended.

This report summarizes many of the changes undertaken, and details the results of those management strategies.

Effluent Management:

50 million liters per day (MLD) of effluent is generated throughout the Vapi Industrial area, and out of that 45MLD is collected through GIDC drainage system and treated at Common Effluent Treatment Plant (CETP). This plant has a current design capacity of 55 MLD. The CETP is situated in the south-west direction on the bank of river Damanganga, to which the treated effluent is discharged.

The Vapi CETP was constructed with the cost of \$9.2 million and further \$2 million is being spent to expand its capacity from 55 MLD to 70MLD and improve its performance. In the past decade the CETP has taken various steps both for expansion and to improve performance, so as to bring the discharge standards within the limit.

Recently, the CETP introduced a new technology (FACCO) in collaboration with CLRI, Chennai, to reduce Chemical Oxygen Demand (COD). This technology is in trials, and will be in full operation by the end of 2009. This technology is already installed in James Robinson (a member of VIA) and initial test results are positive.

In addition, other recent upgrade work done at Vapi CETP is that of tertiary treatment which is now operational. Testing and evaluation is in process.

Vapi CETP takes both sewage and industrial effluent from the drainage canal and thus gets a lot of inorganic and plastics which reduce the effectiveness of treatment at CETP. A new screen device costing \$110,000 has been installed at CETP inlet to screen the unwanted waste like plastics rubber and other floating non biodegradable waste. Earlier the operation was carried out manually which was not effective and laborious.

Efforts have been made over the past decade to ensure that all plants are connected to the CETP, and there is no direct release to the Damanganga.

The issue of an effluent disposal pipeline (from CETP, Vapi) to environmentally safe location at the Arabian Sea is under discussion scrutiny by CPCB, GPCB and PCC, Daman.

Hazardous Solid Waste Management:

Hazardous solid waste generated from the industries is disposed at secured landfill facility (TSDF) provided at GIDC Vapi. Incinerable hazardous waste is mostly disposed to other CHWTSDF at Surat and BEIL at Ankleshwar.



About 385,000 metric tons of waste is currently stored at the Vapi TSDF. According to Vapi Effluent and Waste Management Company officials, the site has the capacity to store waste for at least 10 more years, and more land is being acquired.

Vapi CETP is also piloting efforts in treatment of non hazardous waste using vermitechology; a technology which is proven useful for the bioconversion of paper pulp sludge and other bio-sludge. This material is currently disposed off in the open area and is one of the major concerns of Vapi Industrial Association.

Air Quality

Much effort has been made to reduce air emissions from all plants. Testing stations monitor air quality in the estate and the town itself, and results show that for the most part air quality is within standards set by the Central Pollution Control Board.

Internal Monitoring Activities

VIA has become vigilant and have acted spontaneously in some illegal dumping of hazardous waste. An illegal solid waste dump is analyzed and checked for the type of contamination to identify the responsible industry.

Few examples showing prompt VIA actions are:

- 1) Large volume about couple of thousands of tons of Gypsum mixed with Pthylocynin Blue were dumped on the banks of Damanganga river, under the bridge. On analysis of the sample and identifying the source, It was found that it belong to Jai Synth Dyes & Chemicals. Information was given to industry to collect it back and material was suitably disposed off in both a cement industry kiln and some in TSDF
- 2) Claint Chemicals, which had been closed down, were manufacturing Aluminum Chloride. The waste (approximately 100 tons) was collected and sent to the landfill site. It was analyzed and found that it contained Aluminum Oxide and some chloride which cannot be dumped in open land.

M/s. Anjaria Enviro Tech Pvt Ltd has helped many units to safely dispose of the waste in secured landfill site as well as guiding it to send at cement factory for co-incineration.

Notwithstanding, some illegal toxic dumps still exist, outside of the estate. VIA has initiated a program to clean up these dump sites in conjunction with Blacksmith Institute and other authorities.



Greening Initiatives:

CETP Vapi currently has more than 50,000 trees and every year there is addition in the green belt development. At Naholi farms more than 30,000 teak, mango trees are being grown for planting to further green the area.

Many shrubs and other beneficial plantation have been conducted on road side of Vapi. About \$600,000 is budgeted for additional plantings to be undertaken by M/s VW&EM Company Ltd.

Infrastructure Development:

Good roads are the major indicator for a well-run industrial estate. Vapi has excellent roads suitable for heavy vehicles. Major investment in road has been undertaken in the last decade, with an investment of almost \$6 million, and plans for an additional \$10 million in the works. Road works include investment in drains and underground pipeline for effluent to be directed to the CETP, now considered almost complete. Some internal areas are still to be developed and are planned for infrastructure in the next several years.

Water Management:

Vapi GIDC has a reserved a quantity of 100MGD requirement of water when the Madhuban Damam was constructed and commissioned in 1981. GIDC draws currently about 20MGD from the weir constructed in 1968 near the southern tip of the industrial estate. The entire water is taken through a set of pumps from the weir and sent to the filtration plant situated about 600 meters from the weir.

The water supply department has installed a filtering system with a capacity of 25MGD for filtering this water. The filtered water is then stored in transition sumps with a capacity of about 3.5 MGD and then pumped to a total of seven Elevated Storage Reserves (ESR) in various parts of the Estate. These ESRs then supply filtered water to various parts of estate which includes industry and residential area of the estate. One of the ESR also supplies filtered water to transit sump in the Vapi town area and then supply the same filtered water to several such ESRs of their own for further distribution to houses in Vapi Township. In this manner, clean water is provided throughout the town.



VW&EM Company Ltd has invested \$500,000 for pipeline to supply filtered water to surrounding villages outside of Vapi, which is addition to the \$5 million already spent for up-gradation and augmentation of existing water supply system at Vapi GIDC. Earlier reports of mercury in well water have proven to be inaccurate – extensive testing has not shown the presence of heavy metals.

Last but not the least Vapi Waste and Effluent Management Company Limited has spent \$3 million for the Center for Excellence supported by Ministry of Commerce for state-of-the-art lab testing facility.

Health Status:

A systematic study was carried out in Vapi Industrial area by PARIRAKSHANA (A society for promotion and protection of health systems management training and research) in 2004 with the following objective:

- 1) To assess the health status of Vapi industrial area inhabitants.
- 2) To compare the health status of Vapi industrial area population with that of non-industrial area inhabitants of Dharampur
- 3) To compare reproductive cycle and hormonal life (Spontaneous abortions, bleeding during pregnancy, abnormal fetus and infertility) of women in Vapi and that of women in Dharampur.
- 4) To compare incidence of skin diseases and mental retardation among children of Vapi and Dharampur.

The study is done in form of personal interview of families with the questionnaire prepared by experts. No direct health check up is done like body check up or blood sample analysis, urine sample analysis etc. Government hospital data is not used for study or to access health of Vapi residents and random selection of families is done.

Conclusion of study:

- 1) Study indicates no major casualty or health problem is prevalent in the males, females as well as children. The control group statistics are at par with the industrial group which is indicative of normal health
- 2) Abortion, still births, infants deaths are minimal. There is no valid difference in abortions, still births and infant mortality rates between study and control groups
- 3) Almost all the children are born without any mental and physical disabilities. There are no abnormalities observed in the physical and mental growth among children of age group 1 year to 5 years.

Recommendations:

While much has been done, several areas of additional improvement can be found. These include:

- 1) There should not be any industrial effluent discharge/overflow into Bill Khadi from the industrial area. GIDC can finalize the upgrade its drainage system and make appropriate arrangement to prevent any discharge in the Bill Khadi. Clean up and Remediation of Bill Khadi will be very helpful in beautifying Vapi.
- 2) Paper industry non-toxic waste should be taken care at the CETP site or appropriate low cost eco-friendly technology can be opted for its treatment and its open land disposal should be stopped.
- 3) The option for effluent disposal pipeline from CETP, Vapi to environmentally safe location in the Arabian Sea should be expedited to avoid further water pollution problem in River Damanganga.
- 4) Illegal dumps should continue to be remediated not only in VIA, but in surrounding areas.
- 5) Efforts should me made to check the ground water contamination and surface water contamination by regular monitoring and maximum use of Center for Excellence laboratory facility should be done.
- 6) Efforts should continue to ensure the pollution level is within the prescribed standards of CPCB for all the sites

Conclusion

It is clear that investments in pollution management have resulted in significant improvements in the past decade. While additional efforts are required, Vapi no longer should be considered as highly polluted. It has been removed from the list of the Worst Polluted Places.

Report Prepared by Dr Suneet V Dabke.

References:

“A Report on Health Status of Vapi Industrial Area in Valsad Dist of Gujarat”
Dr. A.V. Ratnam M.B.B.S, D.L.O, M.Phil., Ph.D; Parirakshana (A Society for Promotion and Protection of Health Systems Management Training & Research)

Air Quality test results
Well water test results
GPCB rest results – Vapi CETP