



Vadodara Manufacturing Division

RIL/E&E/MoEFCC/24-25/97

Date: 29.05.2024

To,

SHRI SHRAWAN KUMAR VERMA, IFS (Addl. Charge)

Deputy Director General of Forests (C),
Ministry of Environment, Forest and Climate Change,
Integrated Regional Office,
Gandhi Nagar A wing- 407 & 409,
Aranya Bhawan, Near CH-3 Circle, Sector-10A,
Gandhi Nagar-382010
iro.gandhingr-mefcc@gov.in

Sub: Submission of Six-monthly EC compliance Report (Oct -2023 to Mar-2024)

Dear Sir,

Please find enclosed herewith six-monthly EC Compliance report (Oct -2023 to Mar-2024) for Reliance Industries Ltd. Vadodara Manufacturing Division.

We assure you that we are environmentally responsible corporate and are taking all necessary actions to protect environment beyond compliance.

Thanking you,

With regards,

Yours sincerely,

For RIL- Vadodara Manfg. Divn.

Purna Paul

(Authorized Signatory)

Encl: as Above

Copy:

- 1) Zonal Office, CPCB, Vadodara(only softcopy by-Email)
- 2) Unit Head, GPCB, Gandhinagar – 382 010
- 3) Regional Officer, GPCB, Vadodara

CIN L 17110MH1973PLCo19786

P. O. Petrochemicals-391 346. Dist: Vadodara, Gujarat, India. Phone: +91-265-2616000, 2617000

Registered Office: 3rd Floor, Maker Chambers IV, 222, Nariman Point. Mumbai – 400 021, India

Half Yearly Compliance Report**2024****01 Jun(01 Oct - 31 Mar)****Acknowledgment**

Proposal Name	Expansion and Debottlenecking of Existing Petrochemical manufacturing facility at Vadodara (Gujarat) Manufacturing division (VMD) of M/s Reliance Industries Limited (RIL)-Consideration of Environmental Clearance regarding		
Name of Entity / Corporate Office	Reliance Industries Ltd.		
Village(s)	Dhanora		
District	VADODARA		
Proposal No.	IA/GJ/IND2/100410/1998	Category	Industrial Projects - 2
Plot / Survey / Khasra No.		Sub-District	Vadodara Rural
State	GUJARAT	Entity's PAN	AAACR5055K
MoEF File No.	File No. J-11011/212/2017-IA II (I)	Entity name as per PAN	RELIANCE INDUSTRIES LIMITED

Compliance Reporting Details

Reporting Year	2024
Remarks (if any)	
Reporting Period	01 Jun(01 Oct - 31 Mar)

Details of Production and Project Area

Name of Entity / Corporate Office Reliance Industries Ltd.

	Project Area as per EC Granted	Annual Project Area in Possession
Private	0	0
Revenue Land	0	0
Forest	0	0
Others	0	0
Total	0	0

Production Capacity

Sr. no	Product Name	units	Valid Upto	Capacity	Production last year	Capacity as per CTO
1	Ethylene	Tons per Annum (TPA)	N/A	3,00,000	1,65,422	
2	Propylene	Tons per Annum (TPA)	N/A	1,80,000	93,963	
3	Orthoxylene	Tons per Annum (TPA)	N/A	45,408	0	
4	Paraxylene	Tons per Annum (TPA)	N/A	48,600	0	
5	Dimethyl Terephthalate	Tons per Annum (TPA)	N/A	39,996	0	
6	Ethylene Glycol (EG)	Tons per Annum (TPA)	N/A	25,680	3,390	
7	Ethylene Oxide (EO)	Tons per Annum (TPA)	N/A	22,080	16,399	
8	Low Density Poly Ethylene (LDPE)	Tons per Annum (TPA)	N/A	1,60,020	84,446	
9	Ethylene Dichloride (EDC)	Tons per Annum (TPA)	N/A	1,00,020	57,681	
10	Vinyl Chloride Monomer (VCM)	Tons per Annum (TPA)	N/A	93,240	68,977	
11	Poly Vinyl Chloride (PVC)	Tons per Annum (TPA)	N/A	94,800	68,673	
12	Chlorinated Poly Vinyl Chloride (C-PVC) (New Product)	Tons per Annum (TPA)	N/A	72,000	0	
13	Poly Propylene PPCP (PP-II)	Tons per Annum (TPA)	N/A	64,080	36,820	
14	Poly Propylene (PP-IV)	Tons per Annum (TPA)	N/A	1,60,440	94,071	
15	Poly Propylene (PP-I)	Tons per Annum (TPA)	N/A	36,000	0	
16	Acrylonitrile	Tons per Annum (TPA)	N/A	30,000	0	
17	Methyl Acrylates	Tons per Annum (TPA)	N/A	2,040	0	
18	Ethyl Acrylates	Tons per Annum (TPA)	N/A	3,000	0	

Conditions

Specific Conditions

Sr.No.	Condition Type	Condition Details
1	WATER QUALITY MONITORING AND PRESERVATION	The Project Proponent proposed post expansion effluent load is expected to be below 20,000 M3/day. The Project Proponent will recycle 50% of the effluent and discharge treated effluent up to maximum 10,000 M3/day within next five years.
<p>PPs Submission: Complied Complied. The effluent load is below 20,000 m3/day. The effluent reduction schemes are under implementation to reduce treated effluent discharge maximum upto 10,000 m3/day within the specified time frame.</p>		Date: 29/05/2024
2	Risk Mitigation and Disaster Management	The company shall comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.
<p>PPs Submission: Complied Complied. All the environmental protection measures and safeguards proposed in the documents submitted to the Ministry are duly complied as applicable for the debottlenecking of existing plants. Also, the recommendations with respect to environment management and risk mitigation measures made in EMP for activities during construction phase as well as during operation phase, duly complied as per RIL's current practices and procedures.</p>		Date: 29/05/2024
3	AIR QUALITY MONITORING AND PRESERVATION	Regular VOC monitoring shall be done at vulnerable points.
<p>PPs Submission: Complied Complied. Regular VOC monitoring is carried out in all the plants as per the LDAR(Leak Detection & Repair) program which includes all joints, valves, flanges, fittings, heat exchanges, pumps, storage tanks and compressors seals. Monthly report is being submitted to GPCB. VOC monitoring data for the reporting period is as below: Complied. Regular VOC monitoring is carried out in all the plants as per the LDAR(Leak Detection & Repair) program which includes all joints, valves, flanges, fittings, heat exchanges, pumps, storage tanks and compressors seals. Monthly report is being submitted to GPCB. VOC monitoring data for the reporting period is as follows: Plant, No. of points covered using Photoionization Detector (LDAR Level III) [Oct 23 to Mar-24]: BBH=3081, EG=802, LDPE=719, IOP=2548, NCP=336, PBR I =431, PBR II=1570, PPCP=1510, PPIV=252, PTD=252, PVC=378, UB II=304, VCM=1106. Note: No major leakage had been observed.</p>		Date: 29/05/2024
4	MISCELLANEOUS	The project proponent shall ensure 70% of the employment to the local people, as per the applicable law. The project proponent shall set up a skill development center/provide skill development training to village people.
<p>PPs Submission: Complied Complied. The current employment of the local people is as per the applicable law. We are providing the skill development training to nearby villagers through various activities as a part of the CSR activities.</p>		Date: 29/05/2024
5	Human Health Environment	PP to set up occupational health Centre for surveillance of the worker's health within and outside the plant on a regular basis. The health data shall be used in deploying the duties of the workers. All workers & employees shall be provided with required safety kits/ mask for personal protection.

<p>PPs Submission: Complied Complied. A fully operational well maintained occupational health Centre (OHC) is already setup and available for surveillance of the worker's health on regular basis. The data from OHC is utilized for deploying workers at various locations in plants. Also required mandatory PPE kits are provided to the employees and workers to ensure safety while carrying out their jobs.</p>		<p>Date: 29/05/2024</p>
6	<p>WATER QUALITY MONITORING AND PRESERVATION</p>	<p>Comprehensive water audit to be conducted on annual basis and report to the concerned Regional Office of MoEF&CC. Outcome from the report to be implemented for conservation scheme.</p>
<p>PPs Submission: Complied Complied. Comprehensive Water Audit has been carried out for the year 23-24 and attached as Annexure I. Recommendations of the audit under implementation.</p>		<p>Date: 29/05/2024</p>
7	<p>GREENBELT</p>	<p>The green belt of 5-10 m width shall be developed in 40% of the total project area as committed by PP, mainly along the plant periphery, in downward wind direction, and along road sides etc. selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department.</p>
<p>PPs Submission: Complied Complied. 40% greenbelt have been developed along the periphery, in downward wind direction, along roadsides and at other available locations. Species have been selected as per the CPCB guideline with consultation with the State Forest Department.</p>		<p>Date: 29/05/2024</p>
8	<p>Corporate Environmental Responsibility</p>	<p>As per the Ministry's OM dated 30.09.2020 superseding the OM dated 01.05.2018 regarding the Corporate Environmental Responsibility, and as per the action plan proposed by the project proponent to address the socio-economic and environmental issues in the study area, the project proponent, as committed, shall provide education funds in technical training centers/support in nearby village's schools, support in health care facilities, drinking water supply and funds for miscellaneous activities like solar street lights, battery, solar panel etc., in the nearby villages. The action plan shall to be completed within time as proposed.</p>
<p>PPs Submission: Complied Complied. The CER plan spreading over 5 years had been proposed to address the socio-economic and environmental issues in the study area. As per plan, we have utilized the allocated funds towards upliftment of nearby villages through livelihood support, women empowerment, education, environment protection, health and sanitation as follows: 2020-21=₹ 20.86 Cr, 2021-22=₹ 15.32 Cr, 2022-23=₹ 17.38 Cr, 2023-24=₹16.43 Cr</p>		<p>Date: 29/05/2024</p>
9	<p>AIR QUALITY MONITORING AND PRESERVATION</p>	<p>Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. In case of the treated effluent to be utilized for irrigation/gardening, real time monitoring system shall be installed at the ETP outlet.</p>
<p>PPs Submission: Complied Complied. All operational stacks are installed with CEMS (Continuous Emission Monitoring System) for monitoring the quality of flue gases discharged to the atmosphere and we are ensuring that the data is regularly transmitted to CPCB & GPCB server in accordance with the CPCB guidelines. Real time monitoring system is also installed at the ETP outlet and connected to CPCB & GPCB server. ETP outlet monitoring data for reporting period is as below: Parameter, UoM, Min, Max, Avg: pH -6.96, 7.32,7.16 ; COD (mg/L)-33,136, 77; BOD(mg/L)-10,31,17; TSS(mg/L)-22, 27,24 ; NH4-N (mg/L)-<0.05, <0.05, <0.05</p>		<p>Date: 29/05/2024</p>
10	<p>MISCELLANEOUS</p>	<p>The project proponent shall develop R&D facilities to develop their</p>

		own technologies for propylene and polypropylene processing.
<p>PPs Submission: Complied Complied. We have R&D facility in place working on development of various technologies, products for propylene and polypropylene processing to cater the needs and expectations of our customers.</p>		<p>Date: 29/05/2024</p>
11	MISCELLANEOUS	Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. flame arresters shall be provided on tank farm, and solvent transfer to be done through pumps.
<p>PPs Submission: Complied Complied. All the hazardous chemicals are stored in tanks, tank farms, drums, carboys etc. safely as per standard practices. Also, flame arresters are provided in tank farm and transfer of solvent takes place in closed system through pipelines using pumps.</p>		<p>Date: 29/05/2024</p>
12	WASTE MANAGEMENT	Process organic residue and spent carbon, if any, shall be sent to cement industries. ETP sludge, process inorganic & evaporation salt shall be disposed off to the TSDF. The ash from boiler shall be sold to brick manufactures/cement industry.
<p>PPs Submission: Complied Complied. Process organic residue is sent for co-processing to cement industries for the said period. The ETP sludge and process inorganics are disposed to captive TSDF(Survey No.-162, Block – 300, Angad – Nandesari) Hazardous Waste disposal data for reporting period is as below: Month of Disposal, SLF (MT), Cement Co-processing (MT), Total (MT): Oct-23, 0.0, 0.0, 0.0; Nov-23, 4.7, 0.0, 4.7; Dec-23, 19.2, 0.0, 19.2; Jan-24, 4.7, 20.48, 25.18; Feb-24, 0.0, 0.0, 0.0; Mar-24, 0.0, 0.0, 0.0</p>		<p>Date: 29/05/2024</p>
13	WASTE MANAGEMENT	The company shall undertake waste minimization measures as below: a) Metering and control of quantities of active ingredients to minimize waste. b) Reuse of by-products from the process as raw materials or as raw material substitutes in other processes. c) Use of automated filling to minimize spillage. d) Use or Close Feed system into batch reactors. e) Venting equipment through vapour recovery system. f) Use of high-pressure hoses for equipment cleaning etc. to reduce wastewater generation.
<p>PPs Submission: Complied Complied. Measures for waste minimization have been undertaken. a) All quantities of active ingredients are metered/quantified and closely monitored to minimize wastage and optimized accordingly. b) We are re-using by-products as a raw material in downstream process plants and power plant. c) Level sensors/indicators are already installed in tanks to minimize spillage and optimize usage. d) All feed systems in reactors are designed with close loop. e) It is a design feature and already provided to all the vents of spheres, flares, etc. f) High pressure hoses are already in use for cleaning purpose which saves water and reduce wastewater generation also.</p>		<p>Date: 29/05/2024</p>
14	WATER QUALITY MONITORING AND PRESERVATION	Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.
<p>PPs Submission: Complied Complied. We have separate network system of storm water across the complex and hence not allowed to mix with process effluent/any wastewater. There are sluice gates at strategic locations in Strom water channel and thus can be passed through guard pond. Prior to final outlet of storm water, it is duly analyzed as per defined SOP.</p>		<p>Date: 29/05/2024</p>
15	WASTE MANAGEMENT	The oily sludge shall be subjected to melting pit for oil recovery and the residue shall be bio-remediated. The sludge shall be stored in HDPE lined pit with proper leachate collection system.

<p>PPs Submission: Complied Complied. The oily sludge is recovered and being sent for cement coprocessing. The residue is being bioremediated. The sludge is stored in HDPE lined pit with proper leachate collection system. Monthly reports being submitted to GPCB.</p>		<p>Date: 29/05/2024</p>
16	MISCELLANEOUS	A separate Environmental Management Cell (having qualified person with Environmental Science/Environmental Engineering / specialization in the project area) equipped with full-fledged laboratory facilities shall be set up to carry out the Environmental Management and Monitoring functions.
<p>PPs Submission: Complied Complied. We already have a separate Environment Management Cell with qualified personnel for Environmental Management as well as full-fledged NABL accredited laboratory setup to carry out Environment monitoring functions.</p>		<p>Date: 29/05/2024</p>
17	Risk Mitigation and Disaster Management	Recommendations of mitigation measures from possible accident shall be implemented based on Risk Assessment studies conducted for worst case scenarios using latest techniques.
<p>PPs Submission: Complied Complied. Plant risk assessment has been carried out using PHAST software and all mitigation measures are in place. PIPA (Pre-incident Planning and Assessment) for various probable identified scenarios of emergency for which consequence analysis are done to identify actions required to handle such kind of emergencies.</p>		<p>Date: 29/05/2024</p>
18	MISCELLANEOUS	The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Firefighting system shall be as per the norms.
<p>PPs Submission: Complied Complied. We have an adequate setup for protection of possible fire hazard during manufacturing process in material handling. We have well established fire-fighting system in place as per norms.</p>		<p>Date: 29/05/2024</p>
19	WASTE MANAGEMENT	Oil catchers/oil traps shall be provided at all possible locations in rain/storm water drainage system inside the factory premises.
<p>PPs Submission: Complied Complied. Oil catcher/oil traps are provided at all possible locations. Also, 5 nos. of sluice gates provided at strategic locations in storm water drainage system inside the factory premises to prevent oil/HC carryover in storm water drain.</p>		<p>Date: 29/05/2024</p>
20	AIR QUALITY MONITORING AND PRESERVATION	The National Emission Standards for Petrochemical (Basic & Intermediates) issued by the Ministry vide G.S.R. 820 (E) dated 9th November, 2012 as amended time to time shall be followed.
<p>PPs Submission: Complied Complied. The National Emission Standards for Petrochemical (Basic and Intermediates) is followed. Monthly compliance is being submitted to GPCB. Summary of stack monitoring data for operational plants/stacks for reporting period is given in Attachment- Specific Condition (xviii).</p>		<p>Date: 29/05/2024</p>
<p>General Conditions</p>		
Sr.No.	Condition Type	Condition Details
1	ENERGY PRESERVATION MEASURES	The energy source for lighting purpose shall be preferably LED based, or advanced having preference in energy conservation and environment betterment.

<p>PPs Submission: Complied Complied. The lighting fixtures in offices, plants and streets are all LEDs for energy conservation and environment betterment.</p>		<p>Date: 29/05/2024</p>
2	MISCELLANEOUS	<p>A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal.</p>
<p>PPs Submission: Complied Not Applicable. Project as it is located within Petrochemical Complex Area Notified by GIDC.</p>		<p>Date: 29/05/2024</p>
3	MISCELLANEOUS	<p>No further expansion or modifications in the plant, other than mentioned in the EIA Notification, 2006 and its amendments, shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change/SEIAA, as applicable. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry/SEIAA, as applicable, to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.</p>
<p>PPs Submission: Complied Noted and Agreed.</p>		<p>Date: 29/05/2024</p>
4	Noise Monitoring & Prevention	<p>The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under the Environment (Projection) Act, 1986 Rules 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).</p>
<p>PPs Submission: Complied Complied. The noise levels in and around the plant area is kept well within the standards of EPA 1986 through provision of acoustic enclosures, silencers, and mature green belt. The ambient noise monitoring is also carried out at various locations at the periphery of the complex area. We are complying with the standards prescribed under the Environment (Projection) Act, 1986 Rules 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime) and report is submitted to GPCB on monthly basis. Noise monitoring data for reporting period is given in Attachment- General Condition (iii).</p>		<p>Date: 29/05/2024</p>
5	Corporate Environmental Responsibility	<p>The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CER activities shall be undertaken by involving local villages and administration and shall be implemented. The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.</p>
<p>PPs Submission: Complied Complied. CER activities are being undertaken for improving the socio-economic conditions, eco-developmental measures including community welfare of the surrounding area as per plan. In accordance with the plan, we have utilized the allocated funds towards upliftment of nearby villages through livelihood support, women empowerment, education, environment protection, health, and sanitation.</p>		<p>Date: 29/05/2024</p>
6	Statutory compliance	<p>The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC,</p>

		the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.
<p>PPs Submission: Complied Complied. Last submitted six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of required monitored data was submitted to Regional Office of MoEF&CC, Gandhinagar, Zonal office CPCB, Vadodara & GPCB dtd. 29th May-2023 (both in hard copies as well as by e-mail). The copy of Environmental Clearance and six monthly compliance status report have been posted on the company's website.</p>		<p>Date: 29/05/2024</p>
7	Statutory compliance	The environmental statement for each financial year ending 31st March in Form V as is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.
<p>PPs Submission: Complied Complied. Last submitted Environmental Statement in Form V was submitted and e-mailed to GPCB and Regional office of MoEF&CC, Gandhinagar dtd. 04.09.2023 and dtd. 28.09.2023 respectively. The same has also been put on company's website along with the status of compliance of environmental clearance conditions.</p>		<p>Date: 29/05/2024</p>
8	MISCELLANEOUS	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.
<p>PPs Submission: Complied Noted and Agreed. The project was started with due approval from GPCB vide CTE dtd. 07.09.2021. The project has been partially completed.</p>		<p>Date: 29/05/2024</p>
9	MISCELLANEOUS	This Environmental clearance is granted subject to final outcome of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other court of Law, if any, as may be applicable to this project.
<p>PPs Submission: Complied Noted and Agreed.</p>		<p>Date: 29/05/2024</p>
10	MISCELLANEOUS	The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.
<p>PPs Submission: Complied Complied. Yearly capital cost and recurring cost earmarked and spent for environment management/ pollution control measures are submitted to the Ministry and GPCB in Form V. The total Capital Cost incurred in 2023-24 is ₹4.46 Cr. and Recurring cost is ₹ 10.62 Cr.</p>		<p>Date: 29/05/2024</p>
11	Statutory compliance	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry and at https://parivesh.nic.in/ . This shall be advertised within seven days from the date of issue of

the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional Office of the Ministry.

PPs Submission: Complied
Complied. Advertised in 4 local newspapers (3 in vernacular language and 1 English language) dtd. 7th Feb 2021 and the copy forwarded to the Regional Office of the Ministry in Bhopal vide letter no. RIL/E&E/EC/21/2867 dtd. 10.03.2021.

Date:
29/05/2024

Visit Remarks

Last Site Visit Report Date:

N/A

Additional Remarks:

Annexure-I is uploaded as additional Attachment.

Reliance Industries Limited
Vadodara Manufacturing Division
Water Audit Report
Year: 2023-24

Submitted by:

Cross-functional Water Audit Team (Mr. Tulsi Choudhary – Team Leader, Lalit M Singh (Operations), Ms. Mumuksha Surani (CTS), Ms. Champa Sil (CTS), Mr. Animesh(Fire), Mr. Senthikumar Palaniyappan (Safety), Mr. Bhaumik Darji (Water Supply), Mr. Shishir D Singh (Env), Mr. Nishant Pradhan (Env), Mr. Brijesh R Shah (Maint.)

Mar -2024

Acknowledgement

This study was conducted with data collection through various plants and departments and through analysis. We would like to acknowledge the Water Supply Dept., Plant Managers & HOS (All plants), CTS, REAM and Environment department who have devoted their valuable time and technical expertise and guidance in providing direction and support in conducting the water audit.

We trust that the findings of this study will help M/s. Reliance Industries Limited. Vadodara Manufacturing Division in improving the water management at site.

Regards,

(Mr. Tulsi Choudhary – Team Leader)

Water Audit Team

Date: 19.04.2024

Place: Vadodara

Abbreviations

RIL – Reliance Industries Limited

IOCL – Indian Oil Corporation Limited

GOI – Government of India

W/S – Water Supply

GOP – Gujarat Olefins Plant

IOP – Integrated Off Site Plant

UB-II – Utility Block -II

BBP – Baroda Based Project (PBR-II & PPIV plant)

O/H –Over Head

VECL – Vadodara Enviro Channel Limited

FEPH – Final Effluent Pump House

ISBL – Inside Battery Limit

ETP – Effluent Treatment Plant

VMD – Vadodara Manufacturing Division

GACL – Gujarat Alkalies Chemical Limited

GSFC – Gujarat State Fertilizer Corporation

SIPL – Sabic Innovative Plastics Limited

MGD – Million Gallons per Day

DM Water – Demineralized Water

COC – Cycle of Concentration

SSM – Site Shift Manager

LLF – Look Listen Find

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1 Introduction

RIL, VMD is one of the manufacturing facilities of Reliance Industries Limited. RIL, VMD is the pioneering petrochemical unit in India. RIL-VMD (Erstwhile Indian Petrochemicals Corp. Ltd.) was established in March 1969, as a Government of India Enterprise to catalyze growth of Petrochemical Industry.

Reliance Industries limited (RIL) VMD Vadodara was setup in the year 1973 by IPCL to utilize the Naphtha readily available from the neighbouring Gujarat Refinery of Indian Oil Corporation Limited (IOCL). This petrochemical manufacturing facility comprising of a state-of-the-art Naphtha cracker unit as its mother plant and other downstream units. In the year 2002 RIL took over IPCL and renamed it as Vadodara Manufacturing Division (VMD).

The VMD site is flanked by the villages Koyali, Dhanora, Ranoli, Bajwa, in Vadodara Taluka of Vadodara District, Gujarat between latitudes of 22°23'7.78"N latitude and 73° 6'44.57"E longitudes. The site is located within the Petrochemical Complex area. Some of the industries in immediate vicinity of VMD are IOCL Gujarat Refinery, Sabic Innovative Plastics India Pvt. Ltd., Hettich India etc.

2 Overview of Water Supply at VMD

Raw water source is Mahi river. The total need of raw water is met through two Nos. of Radial Wells, each having capacity of 10 MGD, are constructed in Mahi river bed at Khandi and Jalampura about 18 KMs from the site.

Raw water drawn from Khandi & Jalampura radial wells is supplied to Water Block Area, through 33" dia & 36" dia pipelines and also nearby villages along pipelines for drinking purposes. There are 6 Nos. inter connection junction points along pipelines to isolate section of pipelines for maintenance purpose.

To avoid the installation of separate filtration plant these radial wells are constructed below the mahi river bed up to the depth of around 15 meters. During monsoon when there is good rains, water flow in the river is more and radial well gets enough water.

3 Water demand

The major water requirement are –

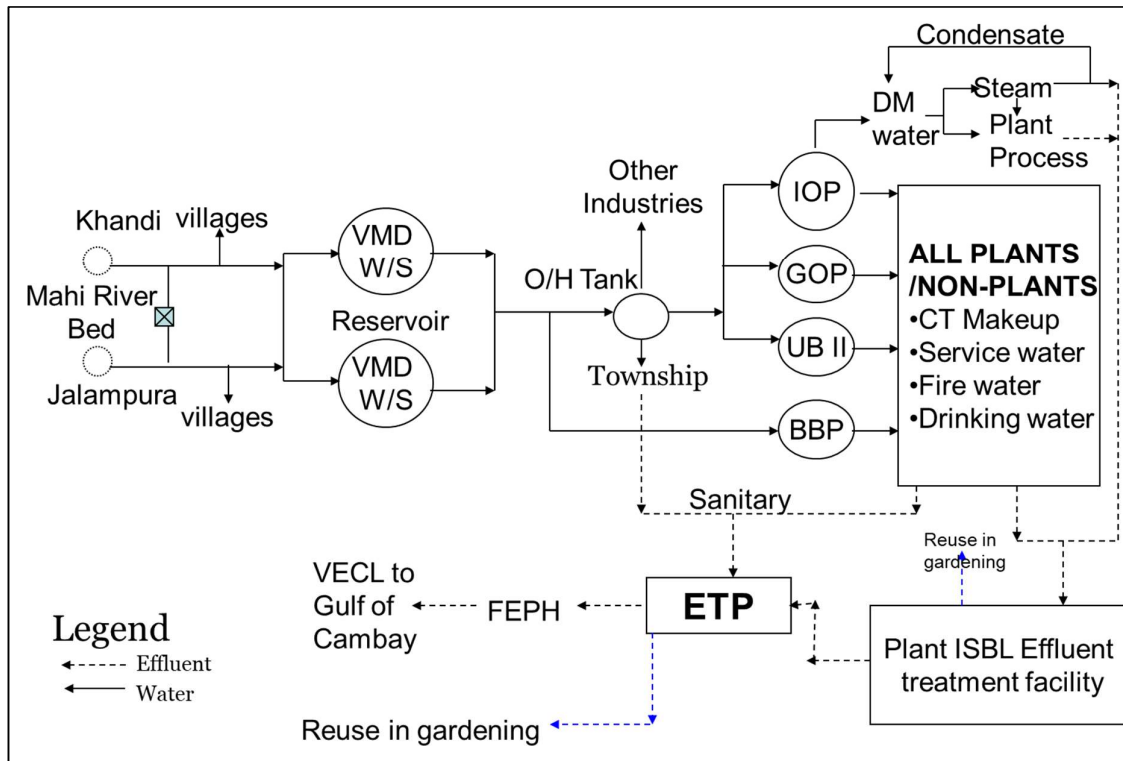
1. Cooling water makeup
2. DM water and boilers
3. Fire water Makeup
4. Process water
5. Drinking water in plant and nearby villages
6. Domestic purpose at Township
7. Industrial purpose of other neighbouring industries (GACL, GSFC, SIPL & Panoli Int.)

Cooling tower makeup, DM water and boiler feed constitutes around 60% of the water requirement. The drinking /domestic purpose and Fire/Process water demand is around 20% respectively.

4 Water Supply and Distribution System

The water received at site is stored in underground water sumps at water supply department. The entire complex is divided into four quarters. The water from the sumps are transferred to the intermediate tanks at each area from where water is further distributed to meet the water various demand.

Schematic diagram



4.1 Water Assessment Checklist

Questions		Observations
Water Management System		
1	Water policy or any policy which commits to water conservation?	The site has Environment Policy which emphasises on conservation of natural resources.
2	What is the source of raw water for the site?	The source of water for the site is Mahi river, water is drawl and catered to site through two pipelines, about 18 km from the site. The quantity of water drawl is metered by irrigation department.
	Does the site has water distribution network layout?	Yes, the site has water distribution network.

Questions		Observations
3	Does the site have a water manager? What are the activities handled?	The site has dedicated water supply department which keeps accounting, quality & quantitative monitoring of water consumed at site. Also the team of engineer provides different schemes for optimizing water consumption.
4	Does the site have water accounting system in place?	Yes. Water accounting is done in every shift on daily basis through dedicated water meters at strategic water distribution locations/points. Detailed summary of water flow meter is attached in Annexure I
5	Does the site have monthly reviews on water consumption?	Yes, monthly review of water consumption is carried out.
6	Does the site have leak detection and repair program in place for water management	Yes, The leaks are identified by plant operators during plant round, and discussed and followed by plants during their daily rack-up meeting. Fire water leakages are also regularly reviewed by site Apex team and resource support is provided accordingly.
7	What are the training to enhance the awareness on water conservation activities?	Yes. Water conservation and management is part of the environment awareness program to train people on the water conservation activities and be water-wise. Training Modules are being circulated to plant to ensure people are conscious on water conservation.
8	How is awareness on water management being carried out?	Awareness through display posters in buildings, lamp-post banners and through mass-mails.
9	Is water metering facility available at site?	Yes, Summary of water flow meter is attached as Annexure I
10	What is the frequency of meter calibration? What is the system for calibration check of water meter?	Meter calibration is done as per scheduled frequency and tracked through SAP system.
11	Water consumption monitoring records available?	Water consumption record are logged in every shift by water department and reports are released on daily and monthly basis.
12	Is water consumption monitored at site?	Yes, being monitored. Monthly water consumption trend is attached as Annexure II
13	What is the cycle of concentration of cooling tower?	CoC in cooling tower is maintained as per design in all cooling towers.
14	Is water quality being monitored? What is the water treatment facility available?	Raw water quality is monitored regularly. As sub-surface water is drawl, no further treatment is required. Sample analysis report is attached as Annexure : III
15	What is the water consumption trend over the year and its pattern/analysis	Water consumption is in a steady state, trend attached as Annexure :II

Questions		Observations
16	Does site carry out water balance?	Yes, water balance is carried out at regular interval.
17	What are the projects implemented to achieve the savings?	During the year 2023-24 956725.86 M3 of condensate recycled. Phase wise implementation of above ground fire water network by replacing the existing old below ground network. 1.5 Km fire water network in VCPVC plant has been completed. Treated effluent reuse for cooling tower make-up and horticultural use is being carried out at site. 1000 M3/Day capacity STP is in pipe-line for township sewage.
18	Is effluent being reused at site? If yes, provide details	Yes, effluent is treated and reused for gardening purpose and for cooling tower make-up. Details of reuse trend attached as Annexure : IV
19	Is there any plan to increase effluent reuse/recycle.	Yes, STP for domestic effluent treatment and reuse is in pipeline.
Field Observation :		
20	Observation	<ul style="list-style-type: none"> - Minor service water leakage behind fire department. - Fire water leakage near OCG building – arrest under progress. - Minor service water leakage near MAB building. - Fire water leakage in NCP plant – arrest under progress.

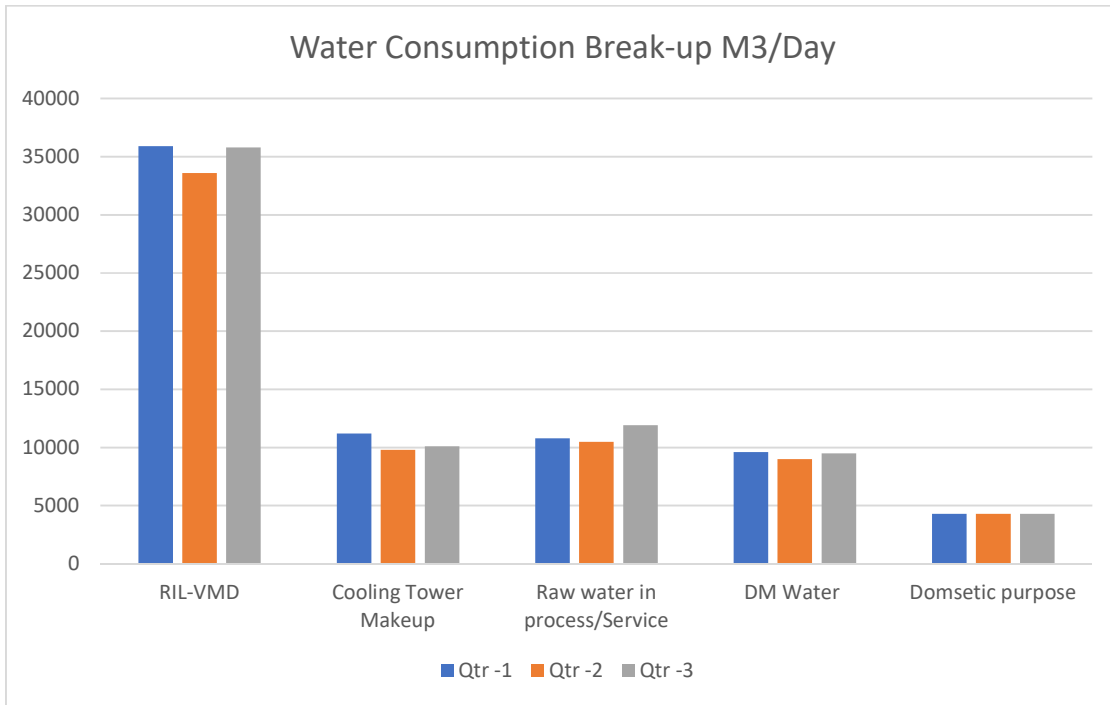
5 Conclusion & Recommendations:

- 1.5 km old underground fire water network have been replaced with above ground pipeline at VCPVC plant.
- Awareness wrt to water conservation amongst workforce was evident during field round.
- Water leakages are regularly monitored, tracked and reviewed for timely arrest, to prevent water losses.
- Treated effluent recycle and reuse can be increased.
- Leakages in the water network which are identified during audit, to be timely attended to prevent water losses.

Annexure: I Detailed summary of water flow meter

Sr. No.	Location of Flow Meter	Status
1	Inlet of Khandi & Jalampura	Available & Working
2	Distribution to Villages	Available & Working
3	Distribution to industries	Available & Working
4	Distribution to township	Available & Working
5	Distribution to internal storage	Available & Working
6	Cooling tower makeup	Available & Working
7	DM Water Consumption	Available & Working
8	Steam consumption	Available & Working
9	Fire water Makeup	Based on pumping hours
10	Service water	Available in main pipeline

Annexure :II Water Consumption Breakup



Annexure : III Average Raw Water Quality

Sr. No.	Parameter	Unit	Average Value
1	pH	--	7.7
2	Cond.	μS/cm	323.5
3	TH	ppm	156.1
4	Ca- H	ppm	71.0
5	Mg- H	ppm	85.1
6	M-Alk	ppm	160.7
7	Chloride	ppm	33.3
8	Si-SiO ₂	ppm	20.4
9	Turbidity	NTU	1.5
10	TDS	ppm	173.4
11	TSS	ppm	1.1

Annexure IV: Effluent Reuse for cooling tower make-up and horticulture

