गेल (इंडिया) लिमिटेड
GAIL (India) Ltd.
(A Government of India Undertaking)
(A Maharatna Company)

पोस्ट: गेल कॉम्पलेक्स,विजयपुर
जिला गुना (म.प्र) 473 112
P.O. GAIL COMPLEX, VIJAIPUR
DISTT. GUNA (M.P) 473 112
दूरभाष/Phone: (07544) 274444
फैक्स/Fax: (07544) 274600

GAIL/VIJP/EMC/10/EC-Compliance/05/2020 **Date: 19th May 2020**

To,

Addl. Principal Chief Conservator of Forests (Central),
Ministry of Environment & Forests,
Regional Office,
Kendriya Paryavaran Bhavan,
Link Road No.3,
Bhopal – 462016.

Sub: **Regarding Six Month Point-wise Compliance Status of Conditions under Environment Clearance accorded to C2C3 recovery & Gas Processing Unit, DVPL, VDPL of GAIL (India) Ltd., by Ministry of Environment & Forests.**

Ref.: **Your letter No. J-11011/168/2011-IA II (I) dated 02.03.2012 for C2C3 recovery & GPU**
Your letter No. J-11011/46/2002-IA II (I) dated 09.10.2002 for Dahej Vijaipur Pipeline (DVPL).
Your letter No. J-11011/1054/2007-IA II (I) dated 08.01.2008 for Vijaipur Dadri Pipeline (VDPL).

Dear Sir,

This is in reference to the Environment Clearances, under the provisions of EIA Notification dated 14th September 2006, accorded by your good office to **GAIL (India) Ltd.** Respectively as per ref. in accordance with the Environment (Protection) Act, 1986; Water (Prevention & Control of Pollution) Act, 1974 & Air (Prevention & Control of Pollution) Act, 1981.

In regard to the same & in compliance of the conditions stipulated in the respective Environment Clearances, the Six – monthly point-wise compliance status of the conditions under the various clearances accorded by MoEF for the pipelines under the aegis of GAIL Vijaipur are being enclosed for your ready reference.

We shall be deeply obliged if you would kindly acknowledge the receipt of the same by sending the stamped & signed copy of the same to the following address for official record purposes.

Thanking you.

Sincerely Yours,

For GAIL (India) Ltd., Vijaipur

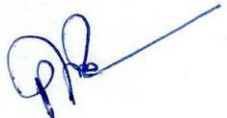
H.H. Meshram,
DGM (O&M-TS)
GAIL Vijaipur

हंसराज मेश्राम
Hansraj Meshram
डी.जी.एम. (ओ. एण्ड एम.) जी.पी.यू.
DGM (O & M) G.P.U.
गेल (इंडिया) लिमिटेड,विजयपुर -गुना (म.प्र.)
GAIL (India) Limited,Vijaipur-Guna(M.P.)

Point-wise Compliance Status of Conditions under Environmental Clearance accorded to C2C3 Complex, GAIL Vijaipur		
S. No.	**Details of Conditions under Environmental Clearance**	**Status of Compliance**
A	**General Conditions**	
1	The Project Authorities must strictly adhere to the stipulations made by the Madhya Pradesh Pollution Control Board.	Complied
2	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment & Forests. 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 to assess the adequacy of the conditions imposed & add additional environmental protection measures required, if any.	Complied
3	The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) & it shall be ensured that at least one station is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.	Complied
4	The overall noise levels in the plant shall be kept well within the standards by providing noise controls measures including acoustic hoods, silencers, enclosures, etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dB (A) (day time) & 70 dB (A) (night time).	Complied
5	The Company shall harvest rainwater from the rooftops of the buildings & storm water drains to recharge the ground water & use the same water for the process activities of the project to conserve fresh water.	Complied
6	Training shall be imparted to all employees on safety & health aspects of chemicals handling. Pre-employment and routine periodical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.	Complied
7	The company shall also comply with all the environment protection measures & safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/ EMP in respect of environment management, risk mitigation measures and public hearing relating to the project shall be implemented.	Complied
8	The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. CSR activities shall be undertaken by involving local villages & administration.	Complied
9	The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.	Complied
10	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to carry out the Environmental Management and monitoring functions.	Complied
11	The company shall earmark sufficient funds towards capital cost & recurring cost per annum to implement the conditions stipulated by the MoEF as well as State government alongwith the implementation schedule of for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.	Complied
12	A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla parishad/ Municipal corporation, Urban local body, & the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.	Complied
13	The Project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental clearance conditions including results of monitoring data (both in hard copies as well as by e-mail)to the respect regional office of MoEF, the respective zonal office of CPCB & MPPCB. A copy of Environmental clearance & six monthly compliance status shall be posted on company's website.	Complied

14	The environment 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 alongwith the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional offices of the MoEF by e-mail.	Complied
15	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 State Pollution control Board/ Committee & may also be seen at the website of the Ministry & Forests at http://www.envfor.nic.in. This shall be advertised within 7 days from the date of issue of the clearance letter, in at least 2 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 should be forwarded to the Ministry's RO at Bhopal.	complied during project time
16	The project authorities should inform the regional office as well as the Ministry, the state of financial closure and final approval of the project by the concerned authorities and the date of commencing the Land development work.	Complied
B	**Specific Conditions**	
1	All the specific and general conditions specified in the environment clearance letters accorded vide Ministry's letter nos. J-11011/19/88-IA.II-(I) dated 24th May 1988, J-11011/46/2002-IA.II dated 9th October 2002 & J-11011/1054/2007-IA.II dated 8th January 2008.	Noted
2	M/s GAIL (India) Ltd. shall comply with new standards / norms prescribed for petrochemical industry notified under the Environment (Protection) Rules, 1986.	Noted
3	The process emissions (particulate matter, SO2, NOx, HC, CO & VOCs) from various units shall conform to all standards prescribed by the CPCB/ MPPCB from time to time. At no time, the emissions levels shall go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit shall not be restarted until the control measure are rectified to achieve the desired efficiency. Stack emissions shall be monitored regularly.	Complied
4	Low NOx burner shall be installed to control NOx emissions.	Complied
5	Ambient Air Quality data shall be collected as per NAAQES standards notified by the Ministry vide G.S.R. No. 826 €dated 16th September, 2009.	Complied
6	In-plant control & monitoring measures for checking fugitive emissions from all the vulnerable sources should be provided. Adequate dust suppression systems with water spray system shall be provided for storage yard, junction houses. Raw material loading & unloading areas should be covered and also provided with water spraying systems. Fugitive emission in the Work zone environment, product, raw materials, storage area etc. shall be regularly monitored and record maintained. The emissions should conform to the limits stipulated by MPPCB.	Complied
7	Steps shall be taken to minimize fugitive emissions. Monitoring of fugitive emissions shall be carried out as per guidelines of CPCB by fugitive emissions detector and report shall be submitted to the Ministry's Regional Office at Bhopal. Continuous monitoring system for VOC's at all important places / areas should be ensured. When monitoring results indicate above the permissible limits, effective measures need to be taken immediately.	Complied as fugistive emission monitoring is done by IR camera as on annual basis .
8	Continuous ambient air quality monitoring stations for PM10, SO2, NOx, CO, HC & VOCs shall be set up in the petrochemical complex in consultation with CPCB/ MPPCB. Unit shall follow CPCB/ MoEF calibration protocol for the calibration of continuous Stack as well as ambient air quality monitoring analyzer installed in all stations. Data of stack monitoring and ambient air shall be displayed on web as well as outside the premises at prominent place for public viewing. The company shall upload the results of the monitored data on its website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, respective zonal offices of CPCB & MPPCB.	Complied

9	A proper Leak detection & Repair (LDAR) Program shall be prepared and implemented. Focus shall be given for prevention of fugitive emissions for which maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to.	Complied as fugistive emission monitoring is done by IR camera as on annual basis .
10	The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Accoustic enclosure shall be provided to the DG sets to mitigate the noise pollution.	Complied
11	The total freshwater requirement from Gopikrishna Sagar Dam shall not exceed 830 m3/hr and prior permission from the concerned authority. No ground water shall be used.	Complied
12	As proposed additional effluent generation shall not exceed 133 m3/hr. Industrial effluent shall be treated in effluent treatment plant (ETP) and treated effluent shall be recycled and reused within factory premises. Company shall construct guar pond for collection of treated effluent and shall carry out water quality test by collecting the treated effluent before application. Water quality of treated effluent shall conform to the norms prescribed by CPCB/ MPPCB from time to time. As proposed, sewage shall be transferred to aeration tank alongwith process wastewater.	Complied
13	No effluent shall be discharged outside factory premises and 'Zero' discharge concept shall be adopted.	Complied
14	Process effluent/ any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.	Complied
15	The company shall obtain Authorisation for collection, storage and disposal of hazardous waste under the Hazardous Waste (Management, Handling & Trans-boundary movement) Rules, 2008 and amended as on date for management of Hazardous Wastes and prior permission from MPPCB shall be obtained for disposal of solid/ hazardous waste in the TSDF. Measures shall be taken for fire fighting facilities in case of emergency.	Complied
16	Spent catalyst & bottom tank sludge shall be sent to authorised recyclers/ reprocessors.	Complied
17	The unit shall make the arrangement for protection of possible fire hazards during manufacturing process like material handling. Fire fighting system should be as per the OISD norms. All the OISD standards shall be followed.	Complied
18	OISD guidelines shall be followed for minimum distance between various units.	Complied
19	The company shall strictly comply with the rules and guidelinesunder Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicles Act (MVA), 1989	Complied
20	The company shall undertake following waste minimsation measures:	
	a) Metering & control of quantities of active ingredients to minimise waste.	Complied
	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 of Close feed system in batch reactors	
	e) Venting equipment through vapor recovery system.	
	f) Use of High pressure hoses for equipment cleaning to reduce wastewater generation	
21	Green belt shall be developed in 33% area to mitigate the effects of fugitive emissions all around the plant as per CPCB guidelines in consultation with the local DFO. Thick greenbelt with suitable plant species shall be developed around the proposed expansion.	Complied
22	Occupational health surveillance programme shall be undertaken as regular exercise for all the employees. The first aid facilities in the occupational health centre shall be strengthened & the regular medical test records of each employee shall be maintained separately.	Complied
23	All the recommendation mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.	Complied
24	All the commitments made during the Public hearing/ Public Consultation meeting held on 9th September 2011 shall be satisfactorily implemented and adequate budget provision shall be made accordingly.	Complied
25	Company shall prepare project specific environmental manual and a copy shall be made available at the project site for the compliance.	Complied



26	Company shall adopt Corporate Environment Policy as per the Ministry's O.M. No. J-11013/41/2006/-IA.II(I) dated 26th April, 2011 and implemented. Under Corporate Social Responsibility (CSR), sufficient budgetary provision shall be made for health improvement, education, water and electricity supply etc. in & around the project.	Complied
27	Provision shall be made for the housing for the construction labor within the site with all the necessary infrastructure and facilites such as fuel for cooking, mobile toilets, mobile sewage treatment plant, safe drinking water, medical healthcare, creche, etc. The housing may be in the form of temporary structure to be removed after the completion of the project. All the construction wastes shall be managed so that there is no impact on the surroundings.	Complied

Point-wise Compliance Status of Conditions under Environmental Clearance accorded to Vijaipur - Dadri Pipeline (2008)		
S. No.	**Details of Conditions under Environmental Clearance**	**Status of Compliance**
A	**General Conditions**	
1	The Project Authority must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	Complied
2	There will be no change in the Pipeline route, design, capacity without the prior approval of this Ministry.	No change has been carried out.
3	During the project construction phase, adequate care must be exercised for protection to public life, wildlife, forest, power line, buildings etc. in the vicinity of Pipeline and in consonance with local government regulations.	Complied
4	The Project Authorities must strictly comply with the rules & regulations under Manufacture, Storage & Import of Hazardous Chemicals Rules, 2000. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained.	Complied
5	Detailed Risk Analysis of the pipeline and associated facilities must be done once the Engineering design & layout is frozen. Based on this, on site & off site Emergency preparedness plan must be prepared. Approval from the nodal agency must be obtained before commissioning the project.	Complied
6	Adequate provisions for infrastructural facilities such as water supply, fuel, sanitation etc. should be ensured for construction workers during construction phase so as to avoid felling of trees & pollution of water & the surroundings.	Complied
7	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the Environmental Impact Assessment/ Environmental Management Plan and risk analysis report.	Complied
8	The project proponent should have a scheme for social upliftment in the surrounding villages with reference to contribution to road construction, education of Health centres, sanitation facilities, drinking water supply, community awareness and employment to local people whenever & wherever possible both for technical & non-technical jobs.	Complied
9	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to carry out the Environmental Management and monitoring functions.	NABL accredited Laboratory with Environment Engineer at place in Vijaipur
10	The project authorities will provide adequate funds both recurring & non-recurring to implement the conditions stipulated by the Ministry of Environment & Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds do provided should not be diverted for any other purpose.	Stipulated condition is being complied
11	The implementation of the project vis-à-vis environmental action plans will be monitored by Ministry's Regional office at Bhopal/ State Pollution Control Board/ Central Pollution Control Board. A Six monthly compliance status report should be submitted to monitoring agencies.	Complied
12	A separate environmental management cell with full-fledged laboratory facilities to carry out various management & monitoring activities should be set up under the control of a senior executive.	NABL accredited Laboratory with Environment Engineer at place in Vijaipur
13	The project proponent should advertise in at least 2 local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned informing the public that the project has been accorded environmental clearance by the ministry and copies of the clearance letter are available with the State Pollution control Board/ Committee & may also be seen at the website of the Ministry & Forests at http://www.envfor.nic.in the advertisement should be made within 7 days from the date of issue of the clearance letter and a copy of the same should be forwarded to the Ministry's RO at Bhopal.	Complied
14	The project authorities should inform the regional office as well as the Ministry, the state of financial closure and final approval of the project by the concerned authorities and the date of commencing the Land development work.	Complied

B	Specific Conditions	
1	Environmental Clearance is subject to obtaining clearance from the national board for Wildlife/ Competent Authority under the Wildlife (Protection) Act, 1972	Complied
2	Environmental Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation vs. Union of India in writ petition (civil) No. 460 of 2004 as may be applicable to this project.	Complied
3	The construction of Pipeline particularly at the river and stream crossings should be done during dry seasons to avoid disturbance of breeding seasons and soil erosion. The riverbed, embankments and dykes shall be restored adequately after installation of crossings.	Complied
4	Annual safety audit should be carried out for the initial 3 years by an independent agency and report submitted to this Ministry for ensuring the strict compliance of safety regulations on Operation & Maintenance.	Complied
5	The construction of Pipeline particularly at the river and stream crossings should be done during dry seasons to avoid disturbance of breeding seasons and soil erosion. The riverbed, embankments and dykes shall be restored adequately after installation of crossings.	Complied
6	Pipeline Wall thickness and minimum depth of burial at river crossings and casings at rails, major road crossings should be in conformity with ANSI/ASME requirements.	Complied
7	The company shall follow horizontal drilling technique for laying of the pipeline while passing through major rivers.	Complied
8	The company shall obtain forest clearance under the forest (Conservation) Act 1980 while passing through forest land.	Complied
9	The project authorities should plant a minimum of 10 trees for every tree cut along the pipeline route in consultation with the local DFO (s).	Complied
10	The project authorities should install SCADA system for safe operation of Pipeline & Leak detection system. Additional sectionalizing valves in the residential areas and sensitive installations should be provided to prevent the amount of LNG going to the atmosphere in the event of pipeline failure. Intelligent pigging facility should be provided for the entire pipeline system for internal corrosion monitoring. Coating & Impressed current cathodic protection system should be provided to prevent external corrosion.	Complied
11	The project authorities will patrol and inspect the pipeline regularly for detection of faults as per OISD guidelines and continuous monitoring of pipeline operation by adopting non-destructive method (s) of testing as envisaged in the LMP. Pearson survey and continuous potential survey should be carried out at regular intervals to ensure the adequacy of cathodic protection systems.	Complied
12	The fire water facilities at the terminals must be designed as per OISD – 117 guidelines. However, for fighting prolonged fires, the company should firm up a plan for assured water supply from nearby ground water source/ surface water source. This must be complied before commissioning the project.	Complied
13	Green belt of adequate width and density should be provided to mitigate the effects of fugitive emissions all around the intermediate pumping stations. A minimum of 25 % of the total land acquired should be developed as green belt in consultation with the local DFO.	Complied

Point-wise Compliance Status of Conditions under Environmental Clearance accorded to Dahej - Vijaipur Pipeline (2002)		
S. No.	**Details of Conditions under Environmental Clearance**	**Status of Compliance**
A	**General Conditions**	
1	The Project Authority must strictly adhere to the stipulations made by the State Pollution Control Board and the State Government.	Complied
2	There will be no change in the Pipeline route, design, capacity without the prior approval of this Ministry.	No change has been carried out.
3	During the project construction phase, adequate care must be exercised for protection to public life, wildlife, forest, power line, buildings etc. in the vicinity of Pipeline and in consonance with local government regulations.	Complied
4	The Project Authorities must strictly comply with the rules & regulations under Manufacture, Storage & Import of Hazardous Chemicals Rules, 2000. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained.	Complied
5	Detailed Risk Analysis of the pipeline and associated facilities must be done once the Engineering design & layout is frozen. Based on this, on site & off site Emergency preparedness plan must be prepared. Approval from the nodal agency must be obtained before commissioning the project.	Complied
6	Adequate provisions for infrastructural facilities such as water supply, fuel, sanitation etc. should be ensured for construction workers during construction phase so as to avoid felling of trees & pollution of water & the surroundings.	Complied
7	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the Environmental Impact Assessment/ Environmental Management Plan and risk analysis report.	Complied
8	The project proponent should have a scheme for social upliftment in the surrounding villages with reference to contribution to road construction, education of Health centres, sanitation facilities, drinking water supply, community awareness and employment to local people whenever & wherever possible both for technical & non-technical jobs.	Complied
9	A separate Environmental Management Cell equipped with full-fledged laboratory facilities must be set up to carry out the Environmental Management and monitoring functions.	NABL accredited Laboratory with Environment Engineer at place in Vijaipur
10	The project authorities will provide adequate funds both recurring & non-recurring to implement the conditions stipulated by the Ministry of Environment & Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds do provided should not be diverted for any other purpose.	Stipulated condition is being complied
11	The implementation of the project vis-à-vis environmental action plans will be monitored by Ministry's Regional office at Bhopal/ State Pollution Control Board/ Central Pollution Control Board. A Six monthly compliance status report should be submitted to monitoring agencies.	In compliance, said report is being attached forthwith.
12	A separate environmental management cell with full-fledged laboratory facilities to carry out various management & monitoring activities should be set up under the control of a senior executive.	NABL accredited Laboratory with Environment Engineer at place in Vijaipur
13	The project proponent should advertise in at least 2 local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned informing the public that the project has been accorded environmental clearance by the ministry and copies of the clearance letter are available with the State Pollution control Board/ Committee & may also be seen at the website of the Ministry & Forests at http://www.envfor.nic.in the advertisement should be made within 7 days from the date of issue of the clearance letter and a copy of the same should be forwarded to the Ministry's RO at Bhopal.	Complied
14	The project authorities should inform the regional office as well as the Ministry, the state of financial closure and final approval of the project by the concerned authorities and the date of commencing the Land development work.	Complied

B	Specific Conditions	
1	The design, material of construction, operation & maintenance of pipeline shall be as per API.ANSI.ASME Codes and OISD standards. Pipeline wall thickness and minimum depth of burial a river crossings and casing at rails, major road crossings should be in conformity with ANSI/ ASME requirements.	Complied
2	Annual safety audit should be carried out for the initial 3 years by an independent agency and report submitted to this Ministry for ensuring the strict compliance of safety regulations on Operation & Maintenance.	Complied
3	The construction of Pipeline particularly at the river and stream crossings should be done during dry seasons to avoid disturbance of breeding seasons and soil erosion. The riverbed, embankments and dykes shall be restored adequately after installation of crossings.	Complied
4	The project authorities should plant a minimum of 10 trees for every tree cut along the pipeline route in consultation with the local DFO (s). The company should develop a special forestry programme to benefit the project affected local people in consultation with the local DFO/ village Panchayat/ NGO.	Complied
5	The project authorities will patrol and inspect the pipeline regularly for detection of faults as per OISD guidelines and continuous monitoring of pipeline operation by adopting non-destructive method (s) of testing as envisaged in the LMP. Pearson survey and continuous potential survey should be carried out at regular intervals to ensure the adequacy of cathodic protection systems.	Complied
6	The project authorities should install SCADA system for safe operation of Pipeline & Leak detection system. Additional sectionalizing valves in the residential areas and sensitive installations should be provided to prevent the amount of LNG going to the atmosphere in the event of pipeline failure. Intelligent pigging facility should be provided for the entire pipeline system for internal corrosion monitoring.	Complied
7	Hydrocarbon gas detectors should be installed at strategic locations in the compressor stations and intermediate pigging stations.	Complied
8	The fire water facilities at the terminals must be designed as per OISD – 117 guidelines. However, for fighting prolonged fires, the company should firm up a plan for assured water supply from nearby ground water source/ surface water source. This must be complied before commissioning the project.	Complied
9	Green belt of adequate width and density should be provided to mitigate the effects of fugitive emissions all around the intermediate pumping stations. A minimum of 25 % of the total land acquired should be developed as green belt in consultation with the local DFO.	Complied

FORM – V

(See Rule – 14)

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING 31ST MARCH 2020

C2C3 RECOVERY & GAS PROCESSING UNIT: PCB ID 19125

PART – A:

1.	Name & Address of the Owner/ Occupier of the Industry	**Shri S. S. Agrawal** **Executive Director (O&M – Central Region)** C2C3 Recovery & Gas Processing Unit GAIL (India) Ltd., Vijaipur, Dist. – Guna (MP) Pin – 473112.
2.	Date of Last Environment Statement Submitted	15th May, 2019

PART – B:

WATER AND RAW MATERIAL CONSUMPTION:

1. **Water Consumption**

Total Consumption	: 18264.24 M^3 / Day
Process	: Nil (No water is consumed for LHC production)
Industrial (Cooling/ Boiler)	: 15437.62 M^3 / Day
Domestic (including township)	: 2826.61 M^3 / Day

Name of the Product	Water consumption per unit of Product	
	During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
	(1)	(2)
Liquid Hydrocarbon (LPG, Propane, Naphtha/ SBP, & Pentane)	4.14 M^3 / MT	4.58 M^3 / MT

2. **Raw Material Consumption**

Name of the Raw Material	Name of the Product	Consumption of raw material per unit of output	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
Natural Gas	Liquid Hydrocarbon (LPG, Propane, Naphtha/ SBP, & Pentane)	564.1 SM^3 / MT of Product	578.84 SM^3 / MT of Product

PART – C:

POLLUTION GENERATED:

(Parameters as specified in the consent issued)

Sr.No.	Pollutants	Quality of Pollution Generated	Generated Percentage of variation from prescribed Standards with Reasons
(a)	Water	BOD = 10.9 mg/l COD = 51.2 mg/l pH = 7.4 units S.S. = 27 mg/l O & G = Not Detectable Phenol = Not Detectable	The actual values of the parameters are well within the limits of the prescribed standards as per Consent Conditions
(b)	Ambient Air	PM_{10} = 78.50 µg/m³ $PM_{2.5}$ = 45.93 µg/m³ SO_2 = 11.13 µg/m³ NO_2 = 20.20 µg/m³ CO = 1.10 mg/m³ O_3 = 22.93 µg/m³ NH_3 = 12.23 µg/m³ VOC = Not Detectable	
(c)	Stack	SO_2 = 9.3 mg/ Nm³ NO_x = 32.4 mg/Nm³ VOC = 10.8 mg/ Nm³	

PART – D:

HAZARDOUS WASTES:

(As specified under Hazardous Wastes – Management & Handling Rules, 2016-Amended)

Sr.No.	Hazardous Wastes	Total Quantity (Litres)	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
(a)	From Process (Spent Oil, Waste Stream 5.1)	8990 Litre	17469 Litre
(b)	From Control Facility (ETP) (Waste oil, Waste stream 5.2)	0 Liters	0 Liters

PART – E:

SOLID WASTES:

Sr. No.	Source	Total Quantity (Metric tonnes)	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
(a)	From Process (Mol. sieves, PUF-Glass Wool, Wastes with oil residues)	10.731	8.205
(b)	From Pollution Control Facility	NIL	NIL
(c)	Quantity Recycled or Reutilized	NIL	NIL

PART – F:

Condition	Remarks
Please specify the characteristics and quantum of hazardous as well as solid wastes and indicate disposal practices adopted for these categories	1) 138 Nos. of Empty Ethyl Mercaptan drums are reused (in-house) as tree guards after proper treatment. 2) Used oil is being collected in drums and kept at designated yard and sold to CPCB/MPPCB/MoEF authorized re-processors as per authorization guidelines. 3) Solid Hazardous Wastes generated from Plant process is currently disposed through MPPCB authorized TSDF.

PART – G:

Condition	Remarks
Impact of pollution control measures on conservation of natural resources and consequently on the cost of production.	1) GAIL has constantly taken the measures to conserve energy and consumption of Natural resources for its energy requirement i.e. Gas. Constant efforts in this direction has enabled the company reduce its specific energy consumption and thereby saving cost of production. 2) Approximately 5 lacs sq. mts. of Land is being maintained as a lawn area and approx. 1 Lakh trees of different categories (Teak, Ashoka, Royal Palm, Sisam, Awala, Jamun, Gulmohar, Imli, Botal Brush etc.) are planted inside plant, township & surrounding area and maintained well. 3) Total Plantations for GAIL Complex, Vijaipur in FY 19-20 are 3389 nos.

PART – H:

Condition	Remarks
Additional investment proposal for environmental protection including abatement of pollution.	**Rs. 79.6356 lac**– for Energy Saving initiatives, Environment Monitoring and Waste Management (Common in Environment Statement of other units under Compressor Station Area for GAIL Vijaipur for the FY 2019 – 2020).

PART – I:
Miscellaneous

Condition	Remarks
Any other particulars in respect of environment protection and abatement of pollution.	1) All Hazardous Wastes disposed through Authorized recyclers/ disposal agency only. 2) All Municipal waste converted to Manure or disposed through authorized recyclers only.

Authorized signatory

Pintu Jain
Sr. Engineer (EMC)

FORM – V

(See Rule – 14)

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING 31ST MARCH 2019

DVPL Compressor Station & Pipeline Operation: PCB ID 19129

PART – A:

1.	Name & Address of the Owner/ Occupier of the Industry	**Shri S. S. Agrawal** **Executive Director (O&M – Central Region)** DVPL Compressor & Pipeline Operations GAIL (India) Ltd., Vijaipur, Dist. – Guna (MP) Pin – 473112.
2.	Date of Last Environment Statement Submitted	15th May, 2019

PART – B:

WATER AND RAW MATERIAL CONSUMPTION:

1. **Water Consumption** (M^3 / Day)

Process : Not Applicable since no water is utilized in operations.

Cooling : Not Applicable since no water is utilized in operations.

Domestic : The quantity is included in Environmental Statement of Gas Processing Unit for the Year 2019 – 2020.

Name of the Product	Water consumption per unit of Product	
	During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
	(1)	(2)
Not Applicable	Not Applicable	Not Applicable

2. **Raw Material Consumption**

Name of the Raw Material	Name of the Product	Consumption of raw material per unit of output	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
No manufacturing is involved. Only compression & transportation of Natural Gas / RLNG through pipe line is carried out. Hence, it is not applicable.			

PART – C:

POLLUTION GENERATED:
(Parameters as specified in the consent issued)

Sr. No.	Pollutants	Quality of Pollution Generated	Generated Percentage of variation from prescribed Standards with Reasons
(a)	Water	Not Applicable since Pipeline transmission does not consume water & hence does not generate any effluent	
(b)	Ambient Air	SO_2 = 9.87 µg/m³ NO_2 = 12.8 µg/m³ CO = 0.93 mg/m³ O_3 = 18.13 µg/m³ NH_3 = **12.53** µg/m³ PM_{10} = 74 µg/m³ $PM_{2.5}$ = 36.7 µg/m³ VOC = Not Detectable	The actual values of the parameters are well within the limits of the prescribed standards (NAAQS, 2010) as per Consent Conditions
(c)	Stack	NO2 = 50.7 mg/Nm³ SO2 = Not Detectable VOC = Not Detectable	The actual values of the parameters are well within the limits of the prescribed standards as per Consent Conditions

PART – D:

HAZARDOUS WASTES:
(As specified under Hazardous Wastes – Management & Handling Rules, 2016 – Amended)

Sr. No.	Hazardous Wastes	Total Quantity (Litres)	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
(a)	From Process (Spent Oil, Waste Stream 5.1)	525 Litre	7349 Litre

PART – E:

SOLID WASTES:

Sr. No.	Source	Total Quantity (Metric tonnes)	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
(a)	From Process	NIL	NIL
(b)	From Pollution Control Facility	NIL	NIL
(c)	Quantity Recycled or Reutilized	NIL	NIL

PART – F:

Condition	Remarks
Please specify the characteristics and quantum of hazardous as well as solid wastes and indicate disposal practices adopted for these categories	Used oil is being collected in drums and kept at designated yard and sold to CPCB/MPPCB/MoEF authorized re-processors as per authorization guidelines.

PART – G:

Condition	Remarks
Impact of pollution control measures on conservation of natural resources and consequently on the cost of production.	1) GAIL has constantly taken the measures to conserve energy and consumption of Natural resources for its energy requirement i.e. Gas. Constant efforts in this direction has enabled the company reduce its specific energy consumption and thereby saving cost of production. 2) Approximately 5 lacs sq. mts. of Land is being maintained as a lawn area and approx. 1 Lakh trees of different categories (Teak, Ashoka, Royal Palm, Sisam, Awala, Jamun, Gulmohar, Imli, Botal Brush etc.) are planted inside plant, township & surrounding area and maintained well. 3) Total Plantations for GAIL Complex, Vijaipur in FY 19-20 are [redacted].

PART – H:

Condition	Remarks
Additional investment proposal for environmental protection including abatement of pollution.	**Rs. 79.6356 lac**– for Energy Saving initiatives, Environment Monitoring and Waste Management (Common in Environment Statement of other units under Compressor Station Area for GAIL Vijaipur for the FY 2019 – 2020).

PART – I:
Miscellaneous

Condition	Remarks
Any other particulars in respect of environment protection and abatement of pollution.	1) All Hazardous Wastes disposed through Authorized recyclers/ disposal agency only. 2) All Municipal waste converted to Manure or disposed through authorized recyclers only.

Authorized signatory

Pintu Jain
Sr. Engineer (EMC)

FORM – V

(See Rule – 14)

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING 31ST MARCH 2019

VDPL Compressor Station & Pipeline Operation:

PART – A:

1.	Name & Address of the Owner/ Occupier of the Industry:	**Shri S. S. Agrawal** **Executive Director (O&M – Central Region)** VDPL Compressor & Pipeline Operations GAIL (India) Ltd., Vijaipur, Dist. – Guna (MP) Pin – 473112.
2.	Date of Last Environment Statement Submitted:	15th May, 2019

PART – B:

WATER AND RAW MATERIAL CONSUMPTION:

1. **Water Consumption** (M^3 / Day)

Process : Not Applicable since no water is utilized in operations.

Cooling : Not Applicable since no water is utilized in operations.

Domestic : The quantity is included in Environmental Statement of Gas Processing Unit for the Year 2019 – 2020.

Name of the Product	Water consumption per unit of Product	
	During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
	(1)	(2)
Not Applicable	Not Applicable	Not Applicable

2. **Raw Material Consumption**

Name of the Raw Material	Name of the Product	Consumption of raw material per unit of output	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
No manufacturing is involved. Only compression & transportation of Natural Gas / RLNG through pipe line is carried out. Hence, it is not applicable.			

PART – C:

POLLUTION GENERATED:
(Parameters as specified in the consent issued)

Sr. No.	Pollutants	Quality of Pollution Generated	Generated Percentage of variation from prescribed Standards with Reasons
(a)	Water	Not Applicable since Pipeline transmission does not consume water & hence does not generate any effluent	
(b)	Ambient Air	SO_2 = 9.87 µg/m³ NO_2 = 12.8 µg/m³ CO = 0.93 mg/m³ O_3 = 18.13 µg/m³ NH_3 = **12.53** µg/m³ PM_{10} = 74 µg/m³ $PM_{2.5}$ = 36.7 µg/m³ VOC = Not Detectable	The actual values of the parameters are well within the limits of the prescribed standards (NAAQS) as per Consent Conditions
(c)	Stack	PM = 14.1 mg/Nm³ NO_2 = 52.6 mg/Nm³ SO_2 = Not Detectable VOC = Not Detectable	

PART – D:

HAZARDOUS WASTES:
(As specified under Hazardous Wastes – Management & Handling Rules, 2016 – Amended)

Sr. No.	Hazardous Wastes	Total Quantity (Litres)	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
(a)	From Process (Spent Oil, Waste Stream 5.1)	2410 Litre	100 Litre

PART – E:

SOLID WASTES:

Sr. No.	Source	Total Quantity (Metric tonnes)	
		During the previous Financial Year (2018-19)	During the current Financial Year (2019-20)
(a)	From Process	NIL	NIL
(b)	From Pollution Control Facility	NIL	NIL
(c)	Quantity Recycled or Reutilized	NIL	NIL

PART – F:

Condition	Remarks
Please specify the characteristics and quantum of hazardous as well as solid wastes and indicate disposal practices adopted for these categories	Used oil is being collected in drums and kept at designated yard and sold to CPCB/MPPCB/MoEF authorized re-processors as per authorization guidelines.

PART – G:

Condition	Remarks
Impact of pollution control measures on conservation of natural resources and consequently on the cost of production.	1) GAIL has constantly taken the measures to conserve energy and consumption of Natural resources for its energy requirement i.e. Gas. Constant efforts in this direction has enabled the company reduce its specific energy consumption and thereby saving cost of production. 2) Approximately 5 lacs sq. mts. of Land is being maintained as a lawn area and approx. 1 Lakh trees of different categories (Teak, Ashoka, Royal Palm, Sisam, Awala, Jamun, Gulmohar, Imli, Botal Brush etc.) are planted inside plant, township & surrounding area and maintained well. 3) Total Plantations for GAIL Complex, Vijaipur in FY 19-20 are [redacted].

PART – H:

Condition	Remarks
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PART – I:
Miscellaneous

Condition	Remarks
Any other particulars in respect of environment protection and abatement of pollution.	1) All Hazardous Wastes disposed through Authorized recyclers/ disposal agency only. 2) All Municipal waste converted to Manure or disposed through authorized recyclers only.

Authorized signatory

Pintu Jain
Sr. Engineer (EMC)

FUGITIVE EMISSION SURVEY

GAIL (INDIA) LIMITED
VIJAIPUR , LPG PLANT

SUBMITTED BY

ANAND SHUKLA , SE (O&M)

DIVYANSHU , ET (MECHANICAL)

TABLE OF CONTENTS

INTRODUCTION:

GLOBAL METHANE INITIATIVE

Launched in 2004, GMI is the only international effort to specifically target methane abatement, recovery, and use by focusing on methane emission sources. The Initiative works in concert with other international agreements, including the United Nations' Framework Convention on Climate Change, to reduce greenhouse gas (GHG) emissions. Unlike other GHGs, methane is the primary component of natural gas and can be converted to usable energy. The reduction of methane therefore serves as a cost-effective method to reduce GHGs and increase energy security, enhance economic growth, improve air quality and improve worker safety.

WHY FOCUS ON METHANE?

Methane is the 2nd most important greenhouse gas after carbon dioxide and the primary component of natural gas, is virtually omnipresent. The odourless, colourless gas leaks from the Earth's mantle through volcanoes, vents from the stomachs of billions of livestock, rises from wetlands, marshes, coal mines and bubbles up from all things decaying.

Methane's warming effect over a period of 100 years is 21 times stronger than that of CO2. Methane's lifetime is about 12 years. Since 1750, methane levels have increased by about 150%. Its present contribution to Human – Induced Climate Change is a whopping 23 %.

NATURAL GAS STAR INTERNATIONAL

In 2006, the Natural Gas STAR Program expanded to include oil and natural gas companies throughout the world in support of the Global Methane Initiative. The launch of Natural Gas STAR International significantly increases opportunities to reduce methane emissions from oil and natural gas operations worldwide and creates a framework for global application of the Program's principles including cost-effective methane emissions reduction technology and practice implementation.

GAIL (INDIA) LTD AND GMI

GAIL (India) Limited became a Natural Gas Star International Partner in August 2011 under the Natural Gas Star Program which is a partnership between the United States Environment Protection Agency (US EPA) and the international Oil and Gas Industry in support of the Global Methane Initiative (GMI).

The US EPA team visited Vijaipur which is the regional headquarter of our cross country pipelines and also home to one of the biggest LPG recovery plants and Gas Processing Units of the country. They carried out a fugitive methane emissions study at GAIL Vijaipur in the

year 2011. This study aimed to identify and quantify baseline methane emission levels at various GAIL sites. This study quantified the methane emissions inventory at Vijaipur site and pegged it at a whopping 8.95 Million Cubic Meters/per year. Of this, the major source of emissions was identified from the Centrifugal Compressors through their Seal Oil degassing vents (4.4 million cubic meters/year). Centrifugal Compressors are the prime machines that push the Natural gas through the pipelines for transmission. The older compressors that employ wet seal gas system are the major source of methane emissions into the environment through their seal oil degassing units.

FUGITIVE EMISSION SURVEY

Fugitive emission survey is a technology that has been developed to provide rapid, accurate and safe identification of fugitive emissions. This technology enables the Engineers to "see" emissions of hydrocarbon vapours such as methane that are normally invisible to naked eye. The camera provides visible images of a gas emission leak in real-time against the facility background. The image facilitates precise identification of the origin of the leaks, essential for repair activities, and qualitatively the magnitude of the leak based on plume size and density.

Following pictures depict how a gas leak is seen through an IR camera.

Exhibit 10: Leak as Seen in Visible Light

Exhibit 11: IR Camera Display

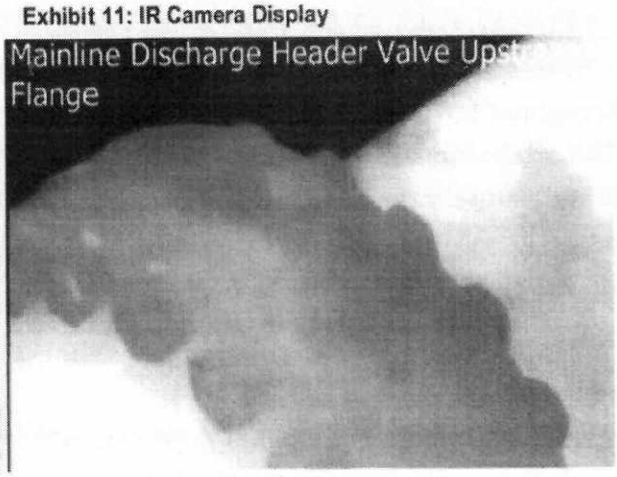


Exhibit 13: Vent as Seen in Visible Light

Exhibit 14: IR Camera Display

OPGAL MAKE EyeCGas GAS IMAGING CAMERA

- Specially designed for the applicative market of natural gas, oil and petrochemical industries, taking into consideration the requirements of the users.
- Very sensitive and detects smaller leaks than the existing optical imagers' portable solutions.
- Certified for use in hazardous environments (Class 1, Div. 2 and ATEX II), allowing the inspection at hazardous places in the plants.
- Implements an internal video and audio recording device.
- Features a large colour LCD display for image and text display.
- Rugged and durable by design to be used as a tool in the field.
- SPECIFICATIONS

Detector Type	High Sensitivity Cooled, 320 x 240 pixels
Detector Spectral Range	MWIR 3-5μ
Display	3.5" Color LCD 640 x 480
Certifications	FCC 47 CFR part 15 subpart B – Radiated Emissions EN 610000-6 (Immunity to ESD, RFE, Power Frequency Magnetic field, Radiated Emissions). EMC / EMI.
Vibration	Mil-Std 810F 514.5
Water/Dust Protection	IP 65 & Mil-Std 810F 510.4
HALT	High Accelerated Life Test: Vibration: Max temp: 55 deg, Min temp: -20 deg
Safety	– UL1604, Electrical Equipment for use in Class I and II, Division 2, and Class III locations. – CSA C22.2 No. 213-M1987,Non-Incendive Electrical equipment for use in

	Class I Division 2 Hazardous Locations – ANSI/ISA-12.12.01 – Non incendive Electrical Equipment for Use in Class I and II, Division 2, and Class III Hazardous (Classified) Locations – Atex II 3G Ex nL IIC T6
Gases Detected	Benzene, Butane, Ethane, Ethanol, Ethyl benzene, Ethyl, Ketone2-butanone, Ethylene oxide, Heptane, Hexane, Isobutylene, Isoprene, Iso propyl alcohol, MEK Methyl, Methane, Methanol, Octane, Pentane, Propanal, Propane, Propylene, Propylene1-pentene, Propyleneoxide, Styrene, Toluene, Xylene.

SURVEY USING INFRARED CAMERA

Fugitive emission survey at Vijaipur LPG Plant has been carried out on 21.09.2018 to 24.09.2018 to identify fugitive methane emissions sources using Infrared Camera. Various leakages were identified from valves, flanges, vents and threaded connections etc. and the same were communicated to the respective department personnel at site.

Following leakage points were observed during the visit:

Sr. No.	Classification	Leakage Area
1	Valve	CONTROL VALVE SDV 5109 (3-P-11-5102-B1K) GLAND LEAK IN LEP FUEL GAS CONDITIONING SKID
2	Threaded joint	LEF FUEL GAS CONDITIONING SKID TE-5173 THERMOCOUPLE UNION JOINT LEAK
3	Valve	LEF FUEL GAS CONDITIONING SKID FILTER MOISTURE LEVEL GLASS DRAIN VALVE GLAND LEAK
4	Valve	LEF FUEL GAS CONDITIONING SKID SCRUBBER-2 LEVEL GLASS DRAIN I/V GLAND LEAK
5	Valve	LEF FUEL GAS SKID PCV-5186 GLAND LEAK
6	Valve	LEF FUEL GAS SKID LEVEL GLASS LSH5198 DRAIN VALVE GLAND LEAKAGE
7	Valve	LEF FUEL GAS SKID SCRUBBER-1 ,2" I/V GLAND LEAKAGE
8	Valve	11-TV-5111-B GLAND LEAK
9	Valve	TV-5111A CONTROL VALVE GLAND LEAKAGE
10	Valve	FEED GAS FILTER 11-X-101A ,4"*600# VALVE GLAND LEAK
11	Valve	11-PIC-201 GLAND LEAK
12	Flange	12"-P-11-315-B1A I/V BOTH FLANGE LEAK

13	Valve	SEP-2 VAPOUR AFTER CHILLER MAKE UP LINE LPD DRAIN I/V GLAND LEAK (NEAR RG HEATER)
14	Valve	11-MOV-201GLAND LEAK
15	Valve	11-MOV-202 GLAND LEAK
16	Valve	11-MOV-203 GLAND LEAK
17	Valve	11-MOV-204 GLAND LEAK
18	Valve	11-MOV-209 GLAND LEAK
19	Valve	11-MOV-211 GLAND LEAK
20	Valve	11-MOV-212 GLAND LEAK
21	Valve	11-MOV-213 GLAND LEAK
22	Valve	11-MOV-215 GLAND LEAK
23	Valve	11-MOV-216 GLAND LEAK
24	Threaded joint	LGC NDE SIDE BARREL UPPER PLUG LEAK
25	Valve	LGC BALANCING LINE DE SIDE 2" LINE I/V GLAND LEAK
26	Valve	LGC OIL TRAP LEVEL GLASS I/V GLAND LEAK (DE SIDE)
27	Valve	LGC OIL TRAP NDE SIDE LEVEL GLASS TOP I/V UNION GLAND LEAK
28	Valve	MOV-215 BY PASS VALVE 2" GLAND LEAK
29	Valve	MOV-211 BY PASS VALVE 2" GLAND LEAK
30	Valve	MOV-209 BY PASS VALVE 2" GLAND LEAK
31	Valve	MOV-208 GLAND LEAK
32	Flange	DRYER -3 FEED GAS O/L BODY FLANGE JOINT LEAK
33	Valve	INITIAL DRY OUT LINE TO PRU 1ST I/V GLAND LEAK
34	Flange	INITIAL DRY OUT LINE TO PRU 2ND I/V D/S FLANGE JOINT LEAK
35	Flange	FEED GAS FILTER A BLOW DOWN LINE 1ST D/S FLANGE LEAK
36	Flange	FEED GAS FILTER B OUTLET LINE FLANGE JOINT LEAK
37	Vent	NAPTHA TANK V-133A&B VENT PASSING
38	Valve	RGC-A FIRST STAGE DISCHARGE KOD DRAIN I/V GLAND LEAK
39	Threaded joint	T1 5100 UNION JOINT LEAK
40	Flange	12-TV-5111B FLANGE LEAK
41	Valve	12-V-152 LG I/V GLAND LEAK
42	Valve	LGC 12-K-101 BALANCING LINE I/V GLAND LEAK
43	Flange	LEF REFLUX SAMPLE POINT I/V END BLIND LEAK
44	Valve	12-FV-301 U/S LPD I/V GLAND LEAK
45	Valve	12-FV-301, BYPASS VALVE STEM BOTTOM PLATE LEAK
46	Valve	12-FV-302 D/S LPD I/V GLAND LEAK
47	Flange	12-FV-302 U/S LPD I/V END BLIND LEAK
48	Flange	FV-1101 BONNET LEAK
49	Valve	12-FV-1101 U/S I/V GLAND LEAK
50	Flange	PROPANE REFLUX PUMP-B DISCH NRV D/S FLANGE JOINT LEAK
51	Flange	PROPANE REFLUX PUMP-B DISCH. NRV TOP FLANGE LEAK

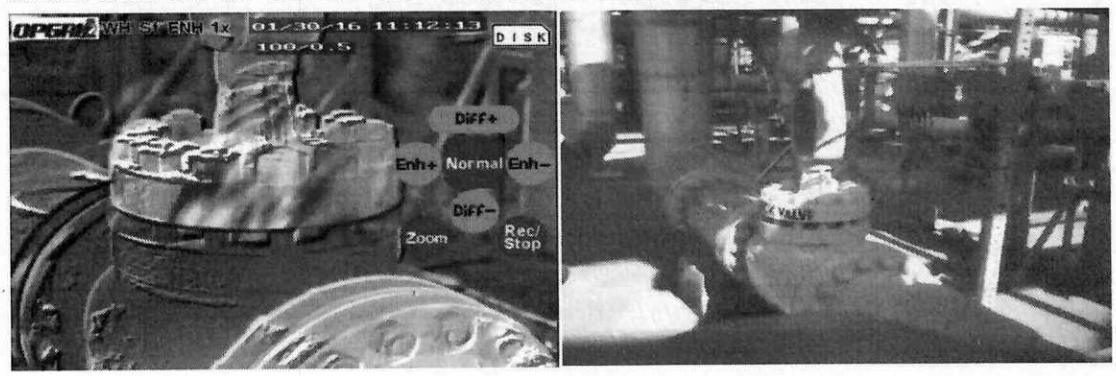
52	Valve	PROPANE REFLUX PUMP-B RECIRCULATION LINE I/V GLAND LEAK
53	Valve	LPG REFLUX PUMP A DIS. LINE PG ROOT I/V GLAND LEAK
54	Valve	LPG REFLUX PUMP A DIS.NRV D/S LPD I/V GLAND LEAK
55	Threaded joint	RAIL LOAD PUMP-C 20-P-209C SEAL PLAN CASING JOINT POINT LEAK
56	Valve	20-P-209D PUMP CASING VENT I/V GLAND LEAKAGE
57	Threaded joint	20-P-216D PUMP SEAL FLUSHING LINE LEAKAGE
58	Valve	20-FV-2612 BY PASS VALVE GLAND LEAK
59	Valve	20-FV-2612 D/S I/V GLAND LEAKAGE
60	Valve	20-P-2304 BY PASS I/V GLAND LEAKAGE
61	Valve	20-FV-2304 D/S I/V GLAND LEAKAGE
62	Valve	20-FV-2607 BY PASS I/V GLAND LEAKAGE
63	Valve	20-P-220C CASING VENT I/V GLAND LEAK
64	Valve	20-P-220B DISCH. LINE PG ROOT I/V GLAND LEAK
65	Valve	20-FT-5102 (20-P-220B) TUBING ROOT I/V LEAK
66	Valve	20-FV-5102 D/S I/V GLAND LEAK
67	Valve	20-FV-5101 BY PASS I/V GLAND LEAK
68	Valve	20-FV-5103 BY PASS I/V GLAND LEAK
69	Valve	20-FT-5103 TUBING ROOT I/V GLAND LEAK
70	Valve	20-FT-5104 U/S I/V GLAND LEAK
71	Valve	20-FT-5105 U/S I/V GLAND LEAK
72	Valve	20-FT-5105 BY PASS I/V GLAND LEAK
73	Valve	20-FT-5105 D/S I/V GLAND LEAK
74	Valve	20-P-207B BLOW DOWN DRAIN I/V GLAND LEAK
75	Flange	20-PA-127A SEAL FLUSHING LINE FLANGE LEAKAGE
76	Valve	20-P-127B SUCTION VALVE GLAND LEAK
77	Valve	20-ROV-1501B U/S I/V GLAND LEAK
78	Valve	20-ROV-1501A D/S I/V GLAND LEAK
79	Valve	20-ROV-1502A D/S I/V GLAND
80	Valve	20-ROV-1503A D/S I/V GLAND LEAK
81	Valve	20-V-132D DRAIN I/V GLAND LEAK
82	Valve	20-ROV-1504A D/S I/V GLAND
83	Valve	20-V-132E DRAIN I/V GLAND LEAK

The study identified a total of 83 fugitive emission sources within the facility. Leaks were classified as per leak source types (i.e. threaded connections, flanges, valves, seals and vents). Detail description of leak is given below:

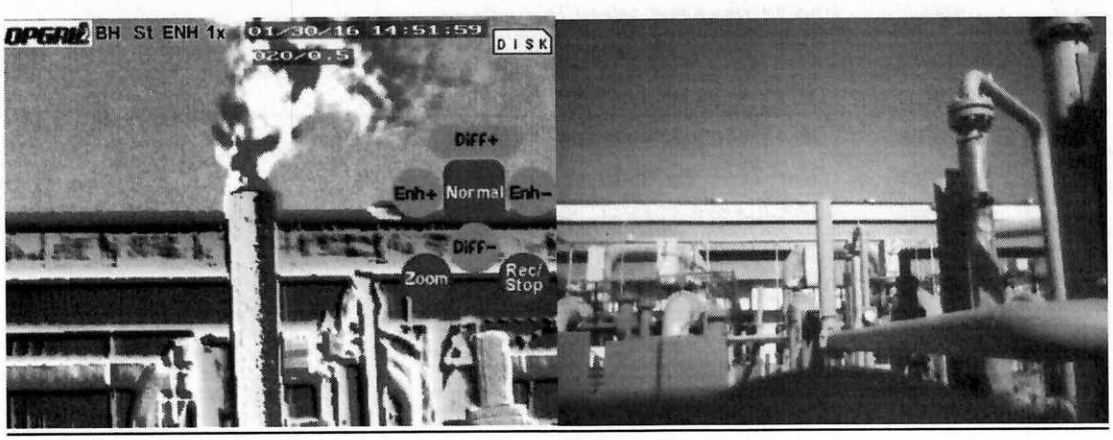
- Leak from Flanges- It includes leakages from various flanges or any gasket connection
- Leak from Threaded connection –It includes leakage from instrument tubing's, fitting, PT fittings or any threaded joint

- Leak from Valves- It includes leakages from valves through stem, gland packing, actuator etc.
- Leakage from Vents – It includes leakages from vent lines which may be due to passing of valves, pressure safety valves, pressure control valves etc.
- Leakage from door seal/mechanical seal – Leakage from filter doors, pig launcher/receiver doors, compressor barrel end cover, pump seal etc.

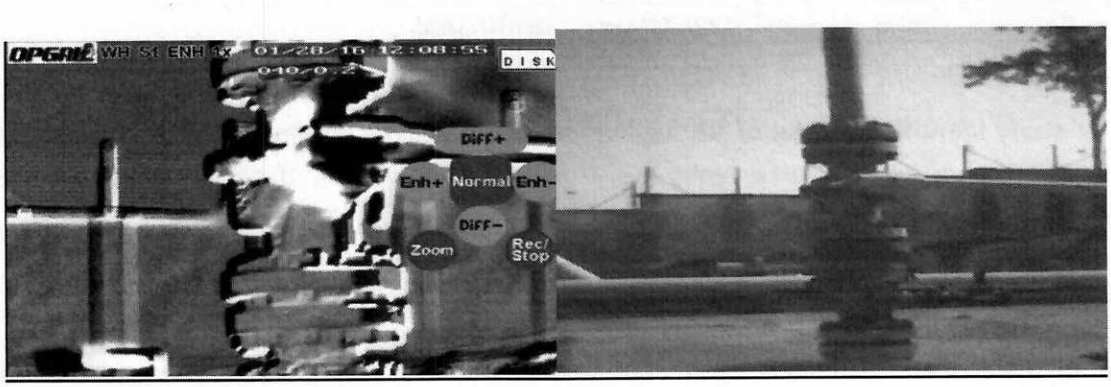
SNAPSHOTS OF LEAKAGES OBSERVED IN IR AND NORMAL MODES



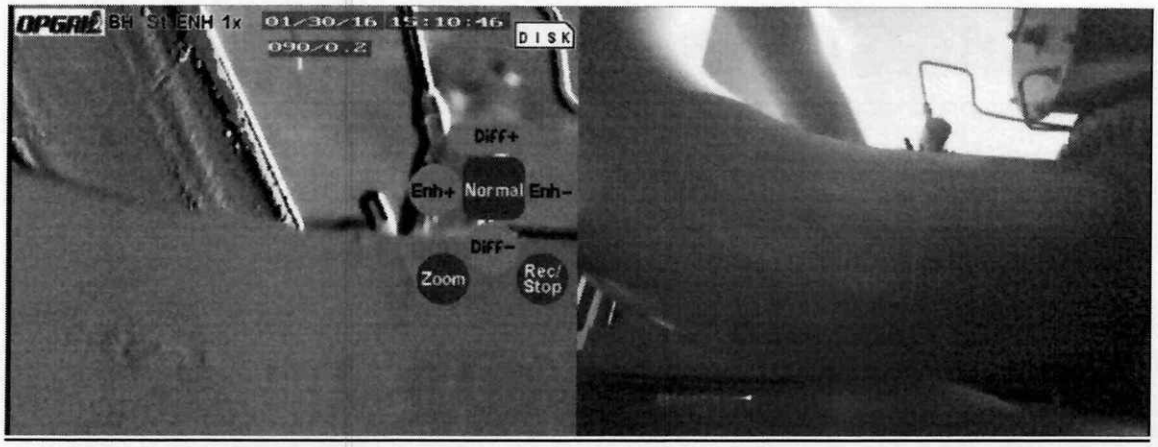
FROM FLANGE



FROM VENT

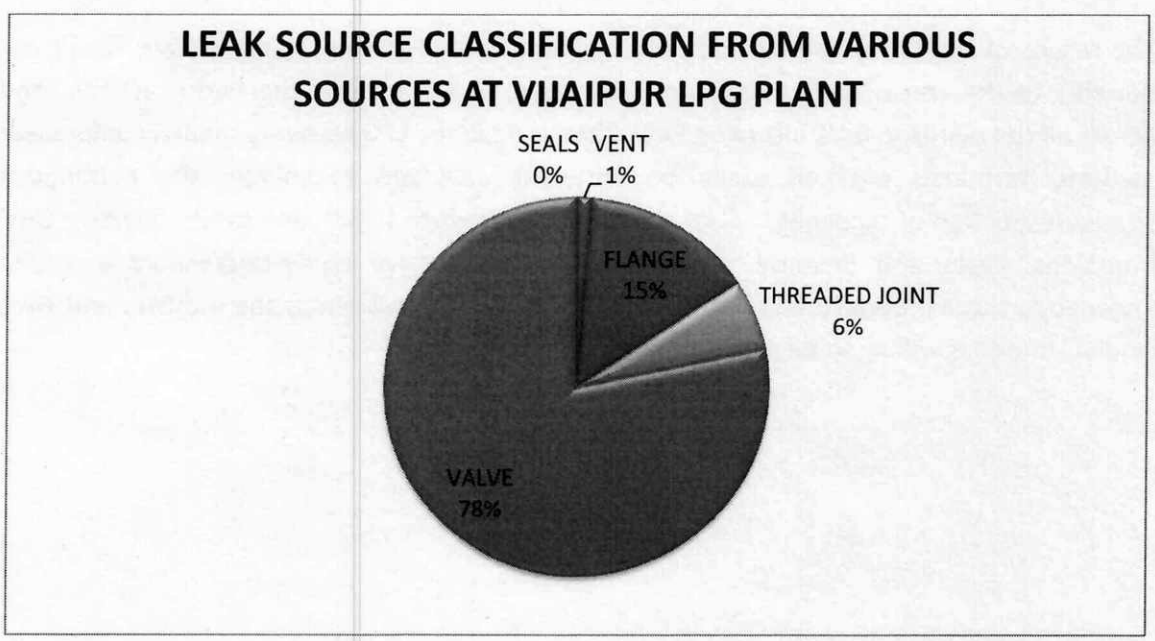


FROM VALVE



FROM THREADED JOINT

After classifying various sources of leakages, Pie chart Analysis was done for finding the major leakage source and to figure out key concern area.



LEAK SOURCE CLASSIFICATION

It can be easily observed majority of leakages are from valves and same will be reviewed after the completion of maintenance/rectification of all the leakages.

Benefits of Optical Leak Imaging

The benefits of optical leak imaging include:

- Cost-effectively scan hundreds of components simultaneously.
- Identify exact source of leaks in real-time with video record.
- Assessments performed without interruption of operations.
- Scan hard-to-reach components from a distance.
- Conduct aerial leak surveys over large area.

SUMMARY

Through industry studies, gas pipeline leaks have been identified as high contributors to fugitive emissions. Optical leak detection has successfully been used in pipeline assessments in the United States.

The results of this study at GAIL Vijaipur LPG Plant have identified that there are significant benefits to the use of optical emission detection. Since most of the hydrocarbons used across all the plants in GAIL including Petrochemical plants, LPG recovery plants, compressor stations, terminals etc can easily be detected with this technique, the continuous survey/inspection of pipelines in GAIL would help to reduce health and safety hazards, GHG emissions, costs and increase production. This innovative study represents a strong knowledge sharing opportunity both within the company and across the industry and GAIL (India) Limited is willing to be a leader in addressing Fugitive Emissions.