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Confidential

EXTERNAL SAFETY AUDIT REPORT

Petronet LNG Limited

Survey No. 347, Puthuvypu, Kochi-682508
Kerala

Site Visit: 23rd – 25th November 2021

Final (00)	11/01/2022	Sanjay.C Salunkhe Kirankumar Reddy	Sunil Gonsalves
Draft (00)	12-12-2021	Sanjay.C Salunkhe Kirankumar Reddy	Sunil Gonsalves
Revision	**Date of Issue**	**Prepared by**	**Reviewed by**

External Safety Audit Report

Petronet LNG Ltd

Survey No. 347, Puthuvypu, Kochi – 682 508, Kerala

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This report includes the findings of the Safety Audit of M/s Petronet LNG Ltd, Puthuvypu. This report is issued within the scope of contract, documents submitted and does not perpetuate into compliance to any statutory regulations and / or codes of any country/region. The discussion of facts, as determined by the investigator, and the views expressed in the report do not assume and are not intended to establish the existence of any duty at law on the part of Petronet LNG Ltd., its employees or agents, contractors, their employees or agents, or any other party. This report neither determines nor implies liability. All information presented during the audit, meetings and in this report are based on the site condition during the audit and the information shared by the site. The auditor, Bureau Veritas and their representatives shall be in no way responsible for any accidents, incidents, losses in the plant. This report is a third-party audit observation based on random sampling of the site infrastructure. It is not a certificate of safety and does not guarantee the operational conditions. The auditee is solely responsible in ensuring the implementation of any recommendations and adapting the same in other applicable areas as feasible

ACKNOWLEDGEMENT

We are thankful to the Management and Employees of M/s. Petronet LNG Limited, Puthuvypu, Kochi, Kerala, (PLL) for their whole hearted co-operation and support to the team of Bureau Veritas auditors during the Safety Audi.

- Bureau Veritas Industrial Services (India) Pvt. Ltd.

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1. PREAMBLE

1.1 INTRODUCTION:

This report presents the observations, findings and recommendations of the safety audit carried out at Petronet LNG Limited, Puthuvypu, Kochi, Kerala *(PLL)* from *23rd November to 25th 2021*, by Bureau Veritas Industrial Services (I) Pvt. Ltd. (BVIS).

The information presented in this report is predominantly based on perusal of various documents and internal records pertaining to OH&S. A sample site visit & inspection of various process units of the LNG regasification, associated infrastructure and discussions held at different level with various officials & personnel in plants areas as well as in the offices.

The recommendations made herein in this report, are based on the conditions and systems prevalent at the terminal and hence applicable only to the said locations or mentioned otherwise. PLL may however, like to replicate or deploy the appropriate recommendations in such other facilities, after due consideration of its implications & applicability, depending on the conditions and systems prevalent therein.

1.2 SCOPE:

This safety audit has been carried out with reference to IS 14489:2018 – 'Code of Practice on Occupational Safety and Health Audit', Kerala Factory Rules, 1957, Kerala Factories (Major Accident Hazard Control Rules- 2005) relevant OISD as well as Rule 10 of Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules.

The broad aspects covered in the audit are given below:

1. HSE management
2. Regulatory compliance
3. Process safety
4. Storage and handling of hazardous chemicals
5. Fire prevention & protection
6. Electrical safety
7. Emergency planning, preparedness and response
8. Other physical hazards & control

1.3 OBJECTIVES:

The primary objectives of this audit were to particularly examine Occupational Health & Safety (OH&S) systems prevalent in all its operational areas and process plants & other processes of the terminal including other associated departments such as HSE & Fire, Technical Services, Contracts & Procurement, Maintenance etc. in order to identify the likely or potential OH&S hazards, which could be a risk and suggest corrective mitigation measures or corrective action, wherever necessary. In case there are other best practices elsewhere to share the same as suggestions for PLL to consider for its suitable adoption.

The focus areas were to:

1. Identify deficiencies and weaknesses, if any, that might have cropped up during modificationsadditions of facilities.
2. Examine the existing operations/maintenance and other work practices, safety systems, fire protection facilities and control measures which might have degraded over the time.
3. Identify potential Health & Safety (H&S) hazards not covered by the existing control procedures.
4. Recommend improvements for better effectiveness of the existing procedures, systems and control measures for H & S hazards.
5. Recommend procedures, systems and control measures for the hazards identified.
6. Study compliance with critical statutory provisions and relevant codes of practice and recommend actions to be taken wherever there is non-compliance.

1.4 METHODOLOGY:

The methodology followed is explained as under:

1. Study, review and analyze preliminary information provided by PLL officials.
2. Conduct an Opening Meeting with concerned officials of PLL
3. Carry out sample site visit and inspection of the processes, process plants and infrastructure within the Terminal.
4. Discuss with key personnel of various departments as required, to understand the modalities of operations being done, operating personnel's perceptions and views, suggestions or to verify existing systems/procedures.
5. Study relevant documents and records as maintained (on sample basis).
6. Conduct a 'Closing Meeting' with the Senior Management Personnel of PLL to present important observations and recommendations thereof. Also to suggest any other opportunities for improvements.
7. Submission of the "draft" of the audit report to PLL to review & filter out any factual errors/discrepancies in its content.

8. Submission of the "Final" Safety Audit Report to PLL.

1.5 OPENING MEETING:

Since BVIS had given an advance intimation to PLL concerned officials, the audit coordinator arranged for an opening meeting at about 10:00 hrs on 23rd November 2021. The opening meeting was chaired by Mr. Yogananda Reddy, Sr. Vice President (Plant Head), Operations, Contract and Procurement, Technical Services, Accounts, Finance, Security, HR & Admin, HSE & Fire and other Departmental/ Section Heads were present in the meeting.

1.6 FIELD INSPECTIONS:

The site visits or field inspections were undertaken with a view to focus on key areas of safety. In order to help maintaining uniformity and to speed up collection of information, inspections were facilitated by using a pre-designed checklist covering various elements of IS 14489.

Inspections / Audits were carried out in the presence of representatives from F&S and /or the respective O&M personnel associated with the Departments of PLL.

1.7 INTERACTIONS:

Information was also gathered through interactions and discussions with PLL officials at various levels from respective disciplines such as "Fire and Safety", "Operations", "Maintenance", "HR", "Instrumentation", "Electrical" and other departments. The auditors also discussed with the officials involved in the operations of Contract & Procurement, Technical Services, Security Ware House, Sub- stations and Occupational Health Centre, etc.

1.8 STUDY OF DOCUMENTS:

In order to check and assess the status of the HSE Management System prevalent in the plant & facility, many documents such as safety policy, safety manuals, safe work procedures, work permit system, operating & maintenance procedures, inspection schedules & reports, previous safety audit reports, calibration reports, records of testing of critical equipment, earthing systems, fire extinguishers, etc. were used. Certain documents like bio medical waste handling records, employees' medical record system werealso perused at OHC in the terminal.

1.9 CONCLUDING MEETING:

The concluding meeting was held on 25th November 2021 at about 15:00 hours at PLL. Mr. Yogananda Reddy, Senior Vice President (Plant Head), chaired the meeting. All concerned officials viz.Department/ Sectional Heads, and other key management representative from PLL were present duringthe closing

meeting. The Audit Team Leader made a presentation and briefly narrated the key findings of the audit along with the proposed recommendations/ suggestions.

The Plant Head appreciated the observations made by audit team & assured that recommendations / suggestions made by audit team will be suitably incorporated in due course.

1.10 BRIEF DISCRIPTION OF PLL:

Petronet LNG Limited, one of the fastest growing world-class companies in the Indian energy sector, has set up the country's first LNG receiving and regasification terminal at Dahej, Gujarat, and anotherterminal at Kochi, Kerala. While the Dahej terminal has a nominal capacity of 15 MMTPA, Kochi terminal has a capacity of 5 MMTPA [equivalent to 20 MMSCMD of natural gas].

Petronet LNG is at the forefront of India's all-out national drive to ensure the country's energy security in the years to come. Formed as a Joint Venture by the Government of India to import LNG and set up LNG terminals in the country, it involves India's leading oil and natural gas industry players. The promoters of PLL are M/s GAIL (India) Limited (GAIL), M/s Oil & Natural Gas Corporation Limited (ONGC), M/s Indian Oil Corporation Limited (IOCL) and Bharat Petroleum Corporation Limited (BPCL). The authorized capitalis Rs. 1,200 crores ($240 million).

The Company has set up South East Asia's first LNG Receiving and Regasification Terminal with an original nameplate capacity of 5 MMTPA at Dahej, Gujarat. The infrastructure was developed in the shortest possible time and at a benchmark cost. The capacity of the terminal has been expanded to 10 MMTPA and the same has been commissioned in June, 2009. The expansion involved construction of 2 additional LNG storage tanks and other vaporization facilities. The terminal is meeting around 20% of the total gas demand of the country. The Company has completed and commissioned the second LNG Jetty at Dahej. The second LNG Jetty is required for risk mitigation as well as to berth the higher capacity Q-Max and Q-Flex LNG.

The Company has set up South India's first LNG Receiving, Regasification and Re Loading Terminal with nameplate capacity of 5 MMTPA at Kochi, Kerala. The infrastructure was developed in the shortest possible time and at a benchmark cost. The terminal area is situated in the Special Economic Zone (SEZ) of Puthuvypeen near the entrance to Cochin Port. The jetty facility is designed to receive LNG tankers between 65,000 to 216,000 cubic meters (Q- Flex).Terminal has two full containment above ground LNG storage tanks of net capacity of 155,000 cubic meters each. The Terminal has been commissioned in August, 2013. First Reloading Operation of South Asia was carried out successfully in January 2015,under the model of LNG Storage & Reload Facility. First supply of LNG as bunker to small ships was carried out successfully in February 2015.

2. EXECUTIVE SUMMARY

At the request of M/s PLL, Bureau Veritas (BV) conducted a Safety Audit of its facility. This safety audit was conducted from 23th November to 25st November 2021. The main objectives of this audit were to particularly examine Occupational Health & Safety (OH&S) systems, identify potential H & S hazards and suggest corrective actions, wherever necessary.

The information contained in this report is based on perusal of various documents and internal records pertaining to H & S. A sample site visit or inspection of the various process units, plants & facilities at PLL Terminal was undertaken by the audit team members along with the PLL officials and also discussions held at various levels with officials working at these locations. Also the documents & records were perused both in the Field & Offices. The recommendations made herein in this report, are based on the conditions and systems prevalent in the Terminal & the gaps were identified with respect to actual practices being followed. Therefore, these recommendations or suggestions are applicable only to the specific facility/ plant or situation.

PLL, if so desired, may however, horizontally deploy these recommendations / suggestions in its other such facilities /plants after due study of its applicability and implications depending on the conditions and systems prevalent therein.

While formulating the recommendations and suggestions for improvements, due consideration have been accorded to make these simple, practical, feasible and thereby workable.

The key findings of the Safety Audit are summarized in the following paragraphs:

2.1 KEY STRENGTHS AND GOOD PRACTICES:

2.1.1. Main Control Room and Operational Areas (LNG Storage Tanks, STV, BOG Compressor, Booster Compressor, MSO Compressor, Air Heater Block, LNG Send out Pump, Truck Loading Area, Gas Metering Station & Flare):

1. The layout of LNG storage tanks, regasification facilities, associated utility services, metering station and truck loading station are as per established engineering practices. Optimum inter plant area and inter machinery/equipment space ensure safe personal movement and maintenance maneuverability. Conforming to OISD Standard-194, Standard for the Storage and Handling of Liquefied Natural Gas (LNG) [Clause 5].

2. There are two tanks for LNG storage, each having a capacity of 1, 55, 000 M^3. Safety protection systems as per National / International Standards have been incorporated in the design of the storage tanks to ensure full proof operation. Strict adherence to basic safety protection systems such as design based on sound engineering practices, primary containment, secondary containment, safeguard systems, separation distance and compliance with statutory & regulatory requirements/best industrial practices have been incorporated. Conforming to OISD Standard-194, Standard for the Storage and Handling of Liquefied Natural Gas (LNG) [Clause 4.4.1].
3. The storage tanks are of 'Full Containment' type. The material of construction is 9% Nickel – Stainless steel alloy capable of withstanding cryogenic impact. Conforming to BS 7777 Part -1:1993 & Part -2:1993 & OISD Standard -194 [Clauses 4.4.1.1, 6.1.5 & 6.33.2].
4. Both the storage tanks are thermally insulated to limit the boil off rate and to avoid cold spots on the outer shell. Conforming to OISD Standard-194 [Clauses 4.4.1.3 & 6.3.4].
5. The piping and appurtenances of the tanks are from the top of the tank penetrating from the tanks dome to eliminate the possible leaks from the tank shell. Conforming to BS 7777 Part -1:1993 & part -2:1993 & OISD Standard -194 [Clause 4.5.1].
6. LNG unloading lines to the storage tanks are at multiple levels so as to control density thereby eliminating 'Roll Over' hazard. Conforming to OISD Standard-194 [Clause 4.5.2].
7. It has been evidenced that after completion of the tank construction, the integrity of the storage tanks were checked by Hydro Test by applying a hydraulic load of 125% of the LNG at full capacity. Conforming to OISD Standard-194 [Clause 4.4.1.1].
8. Since, the 'in tank' pumps as well as the electric motor is submerged in LNG, the electrical penetration seal of the same are provided with Nitrogen purge so as to prevent back flow of LNG through electrical conduit to MCC/Substation which may result in fire due to arcing /sparking there. Conforming to Best Industrial Practice and Conforming to OISD Standard- 194 Clause 6.4.2 [Being followed among other corrections subsequent to the Maryland, USA, accident in 1979 in which LNG leaked through the seal, got vaporized, passed through 200 feet of underground electrical conduit and entered the substation where it caused an explosion resulting in one death, one injury & $ 3million damage.].
9. All tanks, vessels, pipelines and electrical equipment such as pumps, motors are providedwith separate earthing with redundancy. Conforming to IER, Central Electricity Regulations and OISD Standard -194.
10. LNG storage tanks are provided with water sprinkler system. Water sprays are provided on the tank shell including roof. The water application rate is as in Appendix 5 IP Model Code of

Safe Practice Part 9 of NFPA 15 and OISD -116 Standard, Fire Protection Facilities for Petroleum Refineries & Oil / Gas Plants. The water spays are divided into subsystems to provide protection to the different sections of the tank. i.e., one system to cover each segment of vertical wall and one to cove the doom roof. The deluge walls of the water spray systems are interlocked to the fire detection system provided there for automatic actuation withprovision for manual actuation from control room. Conforming to Clause 8.5.1 of OISD Standard-194.

11. Water spray systems are provided at other operational areas such as BOG Compressor shed, Booster Compressor shed, truck loading area, metering station etc. which also conform to OISD Standard-194.
12. Three independent liquid level gauging devices are provided to each LNG storage tank out of which one is a composite "level, temperature, density" (LTD) measuring device. High level alarms are provided and interlocked with ESD resulting in tripping of LNG pumping from unloading ship in jetty area. Conforming to OISD Standard-194 [Clause 6.3.9].
13. Four Nos safety relief valves are provided to each LNG storage tank to ensure high pressure protection of the tanks. Isolation valves of safety valves are kept open in locked position. The discharges from the relief valves are at a safe height from tank roof. Conforming to OISD Standard-194 [Clause 6.3.7].
14. Low pressure integrity of the storage tanks are protected by four Nos of vacuum relief valves provided to each storage tank. Isolation valves of relief valves are kept open in locked position. Conforming to OISD Standard-194 [Clause 6.3.7].
15. Temperature sensors for cool down process are provided at primary container shell and bottom plate of LNG storage tanks. The space above suspension deck is also provided with temperature sensors to monitor vapor temperature. Conforming to OISD Standard-194.
16. Leak detection facility is provided in the annular space between primary container and secondary container. RTD sensors are provided in the annular space of each storage tank; provision of optical cable around the annular space coupled with RTDs. Conforming to OISD Standard-194 [Clause 6.3.6].
17. All nozzles for the piping requirements are from the top of the storage tanks. No bottom nozzles are provided for the storage. Conforming to OISD Standard-194.
18. Automatic gas detection system for monitoring natural gas are installed on LNG storage tank roof in vicinity of roof nozzles and places where possibility of NG may occur. Conforming to OISD Standard-194 [Clause 6.4.4].

19. Unloading lines as well as the other associated pipelines are having only the minimumrequired flange joints. The flange joints are bonded and grounded to prevent accumulation of static charge which may cause a fire accident. Conforming to OISD Standard-194 [Clause 8.2.5].
20. The LNG terminal is monitored and controlled from a continuously manned Main Control Room (MCR) which is safely located upwind of the storage and handling facilities. Emergency Shutdown System (ESD) is part of the functioning of MCR. The ESD system is based on fail safe dual redundant Program Logic Controller (PLC). All critical process parameters of main operations are monitored/measured and controlled from the main control Room. Conforming to OISD Standard-194.
21. The PLC is provided with a watch dog timer for self-diagnosis. Conforming to Best Industrial practices.
22. The construction of the control room is blast proof and shock proof. Conforming to OISD Standard-194.
23. Well defined plant operating procedures and a high level of plant automation are evident within the Process Control System of LNG Storage and regasification. Conforming to OISD Standard-194.
24. Effective Operational Procedures established to manage boil off and to maintain equipment and instruments in healthy condition even though the plant is being run on low throughput. Best Industrial Practice and OISD Standard-194 Clause 4.6.1.
25. An extensive detection system for abnormal conditions are well established. Fire detection systems and gas detection systems are provided at appropriate locations in the control room which are interlocked with the ESD. Minimum two gas detection units or fire detection units shall actuate to enable the trip mechanism. Provision of smoke detectors are located above false ceiling, below false ceiling and at floor level with indications at appropriate levels. Fire & Gas Overview Display (Zone / Group wise) Board for the entire terminal is provided in MCR and Fire Station for easy identification of location and quick response. Conforming to OISD Standard-194 [Clause 8].
26. Dampers are installed in ducts entering control room so as to resist potential fire spread through it. Conforming to OISD Standard-194.
27. Electrical classification of areas covered by LNG storage, regasification and associated facilities are evident to be carried out. Electrical equipment are of flame proof type and certified for Zone-II Gas group. Conforming to OISD Standard-194.

28. Electrical cables used in areas covered by LNG storage, regasification and associated facilities are of armored and fire resistant type. Conforming to OISD Standard-194.
29. The Lock-Out Tag-Out cable testing, transformer testing, panel testing are carried out as per OISD –STD-113 (Clause 5.9.6).
30. Main Control Room (MCR) is always kept under positive pressure so as to prevent entry of outside air which may be contaminated with natural gas. Conforming to Best Industrial Practice
31. An effective 'Permit to Work" System has been established in the factory which is controlled from MCR. All Permits are issued by Shift- in- Charge (on request from user department). Permits are signed by SIC (MCR) and concerned Officer of User Dept. Hot work permits and other permits of high hazards are re-verified and signed by Officer of HSE also. Entry into Confined Space Permit is certified by competent person as approved by the Departmentof Factories & Boilers. The three tier supervision established for issue of safety work permits enhance the adequacy of safety protection of people, equipment, machinery and the plant/factory as a whole. Conforming to Kerala Factories Rules, 1957 & OISD- STD-105, Work Permit System.
32. A 'Plant Work Permit Viewer' is displayed in MCR. Different colors for different type of works and permits issued are adopted for easy identification and better control. Conformingto Best Industrial Practice.
33. Provision of clean agent (Argon) flooding in MCR in case of fire (interlocked with smoke detectors) is provided for protection of the personnel and facilities in the control room. A 'Safe Evacuation Procedure' defines the subsequent activates to be undertaken by the operating personnel so as to bring the situation under control within the minimum possible time. Conforming to OISD Standard-194 and Best Industrial Practice.
34. Two Nos light weight Self Contained Breathing Apparatus (SCBA) of MSA make, 45minutes duration, are provided outside MCR but within the control room building. This enable the operating personnel to immediately respond to any emergency with safety protection. The skill and knowledge of the operating personnel on how to wear/use SCBAwas found to be satisfactory. Conforming to OISD Standard 194 [Clause 8.7.3].
35. Four No's portable gas detectors of flame proof type are provided in MCR which enable the operating personnel to monitor/measure the presence of natural gas as and when required. Conforming to Clause 8.7.3 of OISD Standard 194.

36. Explosion proof torches are available in MCR which can be used in the extreme eventuality of total black out or at places where there is limited light. Conforming to Best Industrial Practice.
37. Intrinsically safe walkie-talkie / hand held units of wireless system are found to be used by operating personnel for better and effective communication. The units are noted to be 'FM' approved for its intrinsically safe nature. Conforming to Best Industrial Practice.
38. A Public Address System (Pager System) is provided in plant areas with call back device to MCR/Fire Station. The same was tested and found to be working satisfactorily. Conforming to good practice suiting to the Terminal.
39. Inter plant areas are covered with PU sheet over which pebbles are spread to prevent growth of wild vegetation. It also helps to minimize hazard due to reptiles. Conforming to Best Industrial Practice.
40. The electrical cable entry points of flame proof light fittings and other equipment / connections (gland seal) are of good construction and seal proof which helps to prevent fire incidents due to arcing/sparking at cable joints. Conforming to Central Electricity Regulationsand also as per OISD-STD-163.
41. Housekeeping in plant area is good. There are no hazards and accidents due to poor housekeeping. Conforming to the Factories Act, 1948 & Kerala Factories Rules, 1957 [Section 7A (2), (d) & Section 11 of the Act].
42. EOT cranes in BOG Compressor shed and Booster Compressor shed are clearly identified, SWL and test details displayed. Conforming to Factories Act & Rules.
43. Monkey ladders of 10 feet height or more are provided with cages. This prevents/minimize fall hazard while climbing up or down the ladder. Conforming to Best Industrial Practices.
44. Pipelines carrying LNG are well insulated to prevent cold burn in addition to prevent ingress of heat into the system – Good industrial practice (Ref OISD –STD - 194 General clause 6.3.4).
45. Gas detectors are mounted at a height of 2.5 M as NG is lighter than air. Conforming to Best Industrial Practices.
46. An effective security regime are in place to enforce the designated ignition exclusion zone and prevent unauthorised entry of personnel into the terminal and jetty area, whether by land or by sea CCTV is provided in MCR. Full coverage of the plant/factory with joy stick enables effective safety and security coverage of the facilities. Conforming as per OISD – STD – 194. General clause 4.3.2.3 (v).

2.1.2 Jetty Head, Platforms, Jetty Control Room and Tug Berth:

1. At the receiving section of the LNG tankers are moored and berthed along the jetty specially designed for LNG handling. (Ref: OISD – STD - 194 Clause 4.3.0).
2. The jetty consists of berthing facility, unloading arms and other associated facilities. Confirming to OISD –STD - 194 Clause 4.3.1.
3. The berth , installed parallel to the bank , at the end of the jetty to include simple dolphins / concrete platform and the unloading arms to access the moored ships OISD – STD - 194 Clause 4.3.2 (ii).
4. The jetty with mooring points in an array to all LNG carriers using the terminal are confirming to OISD –STD - 194 Clause 4.3.2(iii) are held alongside in all conditions of wind and currents.
5. All mooring points are equipped with quick release hooks where multiple mooring lines are deployed to meet requirement as per OISD –STD - 194 Clause 4.3.2 (v).
6. Unloading arm consist of pipe length connected to each other by swivel joints, hydraulically actuated and connected by the arm with automatic ERC device, are as per OISD –STD - 194 Clause 4.3.2.2 (i).
7. Each unloading arm are fitted with an ERS system, able to be interlinked to the ship's ESD system conform to accepted industry standard (Ref OISD –STD - 194 Clause 4.3.2.2 (iii).
8. Interlocking between ship and terminal control room are established and the control of unloading operations are monitored from the terminal control room as per the OISD –STD - 194 General Clause 4.3.2.3 (v).
9. Tug Berths are provided with Emergency Release System (ERS) confirming to OISD –STD - 194 Clause 4.3.2.
10. Prior to the Ship's arrival at the terminal, the pressure of the storage Tanks will be lowered to 70 mbarg - 100 mbarg to enable the boil-off gas from the Ship to pass to the Tanks via vapour return arm before the unloading operation begins- the BOG system are designed OISD –STD - 194 Clause 4.6.1.
11. The jetty head is equipped with four 16" DCMA (double counter weight marine arm) with structure type arms to meet emergency situation as per the OISD –STD - 194 Clause 4.3.1.
12. Length of the unloading line are kept minimum for returning vapor from the onshore LNG storage Tanks back to the Ship cargo Tank during unloading/loading operation confirming to OISD –STD - 194 in General as per clause 4.3.2.3 and the Length of the unloading line will be kept minimum as per clause 4.3.2.4.
13. Mooring layout with Quick Release Hooks of the berths are as per OISD –STD - 194 Clause 4.3.2.

14. Safety Features of Vaporizers and Connected Piping. OISD –STD - 194 Clause 4.8.2.8 and with Thermal Insulation clause 4.4.1.3.
15. An effective security regime with biometrics, photo id cards of the visitor, issue of PPE to them, the multi-level vigilance arrangement with the presence of Naval support, coast guards ,contract tug availability arresting of untoward vehicle entry, regular bicycle musteringand weaponry arrangements OISD –STD - 194 General clause 4.3.2.3 (v).
16. The unloading and transfer lines for LNG are with minimum number of flange joints with consideration to provide cold sensors for flanges and as well as having clusters of flanges (Ref -OISD –STD - 194 General clause 4.3.2.4 (i).
17. The unloading line are kept in cold condition to avoid stress and cyclic fatigue by adequate systems along with alternate arrangement as per Ref -OISD –STD – 194 Clause 4.3.2.4(iii).
18. For returning vapor from the onshore LNG storage Tanks back to the Ship cargo tank during unloading / loading operation one arm (L-0102) are used.
19. The LNG receiving terminal facilities, which is divided into three sections i.e. receiving, storage and send out sections with the purpose to unload LNG tankers, store, re-gasify and send it out through the pipeline transmission network. (Ref: OISD –STD – 194 Clause 4.2.0).

2.1.3 Truck Loading Station

1. The safety requirements prescribed under Petroleum Rules are provided in the Truck Loading Station, and the area is covered under PESO license. Conforming to best practice in LNG Terminals.

2.1.4 Flare Tower:

1. The vapour pressure management system by continuously operating a flare tower with a pilot flame is found to be effective. The Nitrogen purge through the flare header prevents ingress of moisture and a water seal boot prevents backfire through the header. The essential engineering features of a vapour management system make the operation of the flare tower fool proof. Conforming to Best LNG/Petroleum/Petrochemical Industrial Practices.

2.1.5 Fire Water Pump House Station:

1. The fire water pumps which include two jockey pumps, two electric driven pumps and four diesel driven pumps are found well maintained. The pumps are sequentially interlocked to get them started one by one with a pressure drop of 0.5 kg/cm^2. The system was tested and found to be working well.

2.1.6 Main Diesel Storage:

1. Licensed storage for 193 KL diesel; Compliance with Petroleum Rules and conditions under license was evident.

2.1.7 Mechanical Maintenance:

1. Passenger lifts, electric hoists, EOT cranes, Jib cranes and pressure vessels being operated in the factory have been identified. Compliance with statutory requirements pertaining to hoists & lifts, lifting machines & tackles and pressure vessels are evident. Conforming to Sections 28, 29 and 31 of the Factories Act.
2. Provision of anti-collision device to the two EOT cranes moving on the same rails in Mechanical Maintenance Building. The same was tested and found effective. Conforming to Best Industrial Practice.

2.1.8 Warehouse:

1. Good ventilation and lighting.

2.1.9 Hazardous Waste Storage:

1. Good arrangement with separate storage for used oil, empty barrels/cans, waste residue containing oil, battery waste, e-waste and paints/plastic/ink. Secondary containers with collection pits for each waste provided. The storage/shed is covered. Conforming to Best Industrial practices.

2.1.10 Gas Cylinder Storage:

1. Provision of storage shed for storing different types of cylinders.

2.1.11 Chemical Storage:

1. Neatly stacked cans of chemicals; Chemicals separately kept item wise; Safety shower/eye wash provided nearby. Good systems and practices evident.

2.1.12 Oil Storage:

1. Neatly arranged drums/barrel; Good housekeeping maintained; No spillages. Good systems and practices.

2.1.13 Technical Services:

1. Management of Change (MOC): So far around 189 changes have been implemented through MOC process. Multiple level review of MOC evident. No untoward incidents or new hazards out of the changes already implemented occurred so far which reveals the effectiveness of the MOC process.
2. Last HAZOP Study was done in 2013 by M/s RRM, Hong Kong; status report available; 100% implementation reported. Internal review of Hazop study has been carried out by which was facilitiated by Technical Services department.

2.1.14 Contract & Procurement:

1. Critical items that may affect the safety and integrity of plant & machinery are procured from specified Original Equipment Manufacturers (OEM). It is followed as a policy of the organization.
2. Adequate control measures are exercised over contract work.

2.1.15 General:

1. The installation of the terminal is done in consideration of seismic variations as per IS 1893 (Ref OISD –STD 194-Clause 6.2.2).
2. Wind socks are found installed at suitable height at prominent locations with proper visibilities to check wind direction in case of gas leaks. Best Industrial Practice.
3. Safety shower/eye wash combinations are installed at locations were chemical hazards exist. Compliance with Rule 81 AL of Kerala Factories Rules, 1957.
4. All employees wear cotton clothes to eliminate the hazard of static electricity. Best Industrial Practice.
5. All vehicles moving inside factory premises are provided with spark arresters/mufflers. Compliance with motor vehicles Rules.
6. Adequate fire alerting and suppression equipment including Fire tenders , Foam trolleys and system (as per OISD –STD 194-Clause 8.1.2) and mounting of First Aid Fire Fighting Appliances are at 75 cm to 90 cm height .—Complying with Rule 79 of Kerala Factories Rules, 1957.
7. The eligibility criteria of all the personnel in their respective duties including theemergency situations and fire fighters are available under contract as per OISD –STD 194- Clause 8.1.13).
8. Good lane marking along the roads throughout the factory premises enable safe vehicle and pedestrian movement. Best Industrial Practice.

9. Safety posters and boards are found displayed throughout the premises of the factory enabling to enhance the safety competence of the employees. Best Industrial Practice and also as a part of Specific Responsibility of the Occupier in relation to Hazardous Processes [Section 41-C]
10. Employees working in plant areas are found wearing required PPEs such as hard hat, safety shoes, safety goggles etc. Good safety culture evident among the employees. (Ref: Factories Act 1948).
11. Maintaining Resuscitators, Automated external defibrillators and ECG in addition to FirstAid Boxes of Pelican brand for meeting emergencies is a good practice (Ref OISD –STD194 - Clause 8.7.0).
12. Good HR practice is maintained by planning the Terminal towards growing it as a LNG academy, conducting CSR camps locally, hygienic canteen arrangements with air curtain.
13. Mutual aid arrangement with a few industrial units and the nearby hospital is a good system.
14. The system of calibration of around 3500 instruments as per OISD –STD-194 (Clause 6.4.0).
15. Sampling facilities for the operational and the daily water testing facilities are found good (Best Industrial Practices) (Sections 46 and 47 of Factories act).

2.2 AREAS OF CONCERN / AREAS FOR IMPROVEMENT:

2.2.1 Jetty, LNG Storage, Regasification & Associated Areas:

1. Jetty Area- While inspecting scaffolding it was observed that as per Green Tag issued its validity is till 22/11/2021. Auditors were informed that scaffolding dismantling activity is initiated on 24/11/202, while tag wasn't updated. Scaffolding inspection procedure shall be reviewed. [Requirement as per IS 2750:1964 Section07 (7.3)] **[Observation (Potential nonconformity)]**
2. Cause and Effect procedure could not be traceable at Control Room. It is recommended to develop company procedure. [Requirement as per PLL management system] **[Observation (Potential nonconformity)]**
3. Lone working procedure could not be traceable. As operations area been monitored by single field operator, it is recommended to develop Lone working procedure. [Requirement as per The Factories Act 1948, Section 41C (C)] **[Observation (Potential nonconformity)]**
4. LNG storage tank [T-101] had been visited to verify from the top by the auditors. While descending from lift observed algae formation on walkway which was result into slippery condition. [Requirement as per The Factories Act 1948, Section 11 (C)] **[Observation (Potential nonconformity)]**
5. High pressure pumps are located below ground level. This area has been classified as confined space as there is strong possibility of low oxygen level and possibility of other gases. Confined space signages at the entrance ladders are untraceable.
   [Requirement as per The Factories Act 1948, Section 33 and Section 36] **[Opportunity for Improvement]**
6. Ambubag / Resuscitation equipment has be very well kept in each section. Dust accumulation has been observed. While considering emergency equipment it shall be always available for emergency, mouth piece shall be covered with PVC bag. [Requirement as per The Factories Act 1948, Section 45] [Best Industrial Practice]
7. Eye cleaning bottle in turbine control room in First-Aid box was found empty. Being emergency equipment it shall be always available for use. [Requirement as per The Factories Act 1948 Section 45 and State Rules]. **[Opportunity for Improvement]**
8. Speed limit signages in the factory premises are untraceable. Signages shall be displayed as caution to drivers driving in the facility. [Requirement as per Central Motor Vehicles Rules 1989 Section 2.12]. **[Nonconformity]**
9. Holes / slots meant for fixing electrical 'on off' indicator bulbs on electrical panels of certain MCCs are found uncovered (e.g. jetty C/R). This may lead to entry of rodents / lizards into the panels possibly causing short circuit and fire. All such holes / slots are to be

covered/sealed. [Requirement as per CEA - Safety Regulations, 2010 & As per OISD 137 Sl.no 9.2.1]. **[Nonconformity]**

10. Scaffolding components were stored in open area at jetty area. Couplers, standards, ledger, transom were observed corroded. These components needs to be covered to prevent exposure. Scaffolding shall be erected strictly as per IS 3696 (Part I)-1987, Safety Code for Scaffolds and IS 4014 (Part II), Code of Practice for Steel Tubular Scaffolding. [Requirement as per IS 3686 (9.1)] **[Observation (Potential Nonconformity)]**

11. Diesel Storage tank jumpers were found missing at couple of places. It is recommended to provide jumpers for maintaining continuity which helps in carrying static charge to earth pit. [Requirement as per OISD 225 Sl.no 5.4] **[Nonconformity]**

12. The pendants of EOT cranes at certain locations are found hanging in open causing potential hitting hazard to passersby. (E.g. HP Pump shed, BOG Compressor Shed etc.). Besides the markings on the pendants are found faded. May cause erroneous operation. To be corrected in all such cases. Best Industrial Practices. [Requirement as per The Factories Act 1948 Section 29 (b)] **[Observation(Potential nonconformity)]**

2.2.2 Warehouse:

1. Escape route markings are untraceable on walls and floor. Markings directing towards assembly point shall be provided directing towards assembly point. [Requirement as per Kerala Factories Rules 1957, Rules 2A Section 2(ca)] **[Observation(Potential nonconformity)]**

2. Racks are been used for storage of mechanical components. Safe working Load (SWL) marking shall be painted on each rack which provides assurance on storing material below designed load. [Requirement as per The Factories Act 1948 section 29] **[Observation(Potential nonconformity)]**

3. Paint containers, water treatment chemicals and lubricants are stored on ground. Strong possibility of loss of containment. Secondary container shall be provided for containment. [Requirements as per Kerala Factories Rules 1957 (28)]. **[Nonconformity]**

4. Safety shower cum eye wash station located near chemical storage are drain was observed obstructed. It is recommended to carry out inspection cum maintenance of showers on periodic basis. [Requirements as Rule 81 AL of Kerala Factories Act 1957]. **[Nonconformity]**

5. Emergency Exit markings were untraceable. Exit signs shall be painted for easy identification. [Requirement as per Kerala Factories Rules Sub section (a) of Section 38 (10)] **[Nonconformity]**

2.2.3 Mechanical Maintenance:

1. LNG unloading line control valves at jetty (Tag- 01-XV-1101, 1102 and 1103) and vapour control valve (Tag-01-XV-1203) housing were observed heavily corroded. As a part of asset integrity preventive maintenance shall be initiated. [Requirement as per PLL company procedure] **[Opportunity for Improvement]**

2.2.4 Fire Department:

1. Fire water sprinklers are provided for LNG storage and other areas such as BOG compressor shed, Booster Compressor Shed, Truck Loading areas, etc. Present frequencyof testing is once in six months. This is generally conforming to Clause 16.4 of OISD -116 Standard, Fire Protection Facilities for Petroleum Refineries & Oil / Gas Plants. However, sprinklers for tanker loading area [TTLF] were tested on sample basis on 23-11-2021 it was observed that the water curtain formed wasn't covering skid area completely. It was informed by Fire department that it's due to strong wind gust. Design intent of sprinkler system is to protect tanker filling point but it wasn't served. Considering this gap sprinkler system coverage shall be reviewed. [Requirements as per OISD 194 (8.5.1)] **[Observation (Potential nonconformity)]**
2. High Speed Diesel storage tanks been used for supplying fuel to Diesel operated fire water pumps. Decantation procedure could not be traceable. It is recommended to display decantation procedure. [OISD 225 Sl.n.o 5.4] **[Observation (Potential nonconformity)]**

2.2.5 General:

1. Defensive driving training to drivers using company vehicles and drivers carrying LNG tankers shall be imparted. [Central Motor Vehicles Rules 1989 (9)] **[Observation (Potential nonconformity)]**
2. Working at Height working staff are undergoing medical examination at OHC, as per present practice only undertaking from employees has been practiced. It is suggested to conduct vertigo test in-house / from third party agency. [Requirement as per The Factories Act 1948 Section 32] **[Opportunity for Improvement]**
3. Cook and food handlers are observed without headgear and gloves. While considering good hygiene practice it shall be complied. [Requirement as per Kerala Factories Rules Sub section 91] **[Opportunity for Improvement]**
4. Settlement of floor and stretching of cables in plant areas are noticed. However, an IIT Rourkee study on this aspect indicate that the stability of nearby buildings are not affected. Corrective actions need to be expedited. [Recommendations from IIT study] **[Opportunity**

for Improvement]

5. Aluminum 'A' type ladder and Step ladders was found stored in FMC cabin of jetty control room without inspection tag and damaged shoe cover. Auditors were told that old ladders are been replaced with FRP type ladders in terminal. Ladders shall be inspected as per schedule. [Requirement as per PLL procedure] **[Observation (Potential nonconformity)]**
6. Ni-Cd battery in the plant area sub-station was not properly maintained and observed for many batteries vent plugs found open / missing. It is recommended that missing vent plugs be immediately put in place and inspection protocol be developed for maintenance by contractor personnel to check at regular frequency & replace missing/ damaged vent plugs. [Requirement OISD 137 Sub Clause 9.2.4 & NI CAD Battery OEM Manual) **[Observation(Potential nonconformity)]**
7. In the MCR room, materials are stored improperly rear side of panels. It shall be removed for obstructions. [Requirement as CEA regulation 2010] **[Opportunity for Improvement]**
8. Electrical relay tests were carried out Dtd 26.10.2017 and records are also available, Planned for every 5 years .However Earth leakage relay test schedule is missing in year 2017. . Feasibility of testing of electrical relays at least once in a year, should be explored for Electro mechanical relays. [Requirement as CEA regulation 2010 and OISD 137 Sub Clause 6.3.1] **[Nonconformity]**
9. For all the distribution Transformer OTI& WTI trip setting range not updated on the marshalling box. It is recommended that Transformer OTI & WTI trip setting range to be indicated on the marshalling box. Maintenance person/ contractor's persons should know the importance of reading "red pointer" and reading to be recorded daily, to ensure the safe operation of transformer. [Good Industrial Practice] **[Opportunity for Improvement]**

3. SAFETY AUDIT CHECKLIST

3.1 SAFETY AUDIT CHECKLIST:

The audit was conducted with the help of a checklist specifically developed and tailored for the processes, activities and operations carried out in M/s Petronet LNG Limited, Puthuvypu, Kochi, Kerala. The duly filled-in audit checklist is reproduced below;

FACTORY : Petronet LNG Limited
NAME OF OCCUPIER : Mr. Pramod Narang
NAME OF FACTORY MANAGER : Mr. Yoganand Reddy
NUMBER OF EMPLOYEES : COMPANY – MALE - 353 FEMALE- 27 TOTAL-380

SR. NO	QUESTION	STATUS	REMARKS
01	**OH & S MANAGEMENT**		
	OH & S Policy		
a)	Does the organization have OH & S policy?	Yes	--
b)	Who has signed the OH & S policy?	Yes	Director Finance has signed the policy. As per Factories Act it shall be signed by Occupier.
c)	Whether the OH & S policy is as per guidelines of the statutory provisions?	Yes	Complied
d)	When was the OH & S policy declared and adopted?	Year 2013	--
e)	Whether the OH & S policy reviewed periodically?	Yes	2019
f)	Whether the OH & S policy is available in local language and made known to all?	Yes	--
g)	What was the last date of updation?		November 2019
h)	Does the policy find a place in the annual report?	No	--
02	**OH & S ORGANIZATIONAL SET UP**		
	Safety Department		

SR. NO	QUESTION	STATUS	REMARKS
a)	Does the factory have a safety department and what is strength of safety department?	Yes	05 Persons
b)	Whether the strength and qualifications of Safety Officers are as per the statutes?	Yes	M Tech and B Tech in Safety and Fire
c)	Does the head of safety department report to the? Chief Executive?	No	He is reporting to Factory Manager
d)	How often are the safety officers retrained in the latest techniques of total safety management? What is the frequency of retraining?	Yes	2019
e)	What additional duties the safety officer is required to do?	--	--
f)	What is the power of safety officer vis-a-vis unsafe condition or unsafe act?	Yes	Stop Authority, Intervening in Unsafe Act and Condition.
	Safety Committee(s)		
a)	Does the factory has a safety committee(s)? What are the types, structures and terms of reference of the committees?	Yes	Good Practice.
b)	Is the constitution of the safety committee(s) as per the statute?	Yes	Equal employees from management and non-management
c)	How are the members of safety committee(s) selected? (elected / nominated)	Nomination from every department head	--
d)	How often are the meetings of safety committee(s) held?	Once in every quarter	complied
e)	Are the recommendations of the committees (s) implemented?	Yes	--
f)	Are the minutes of the safety committee(s) meetings	Yes. Through email	--

SR. NO	QUESTION	STATUS	REMARKS
	circulated among the members?		
g)	Are the minutes forwarded to the trade union(s) and chief executive and occupier?	Not Applicable	--
h)	Whether the management and trade union play their active roles in supporting and accepting the committee(s) recommendations?	Not Applicable	--
i)	How are the safety committee(s) members apprised of the latest development in safety, health and environment?	Yes. Appreciation during safety week celebration.	Good System
	Safety Budget		
a)	What is the annual safety budget?	Yes. 5.17 Crore.	--
b)	How much percentage is this budget of the total Turnover of the company?	-	--
c)	How much budget has been utilized till date?	FY 2020-2021. 1.98 Crore	--
d)	Is the safety budget adequate?	Yes	--
e)	How is the safety budget arrived at?	Year planning and previous expenditure.	--
f)	What is the pattern of expenditure for the last five years?	Procurement and monitoring	Complied
g)	What are the approved sanctions for the expenditure in this budget?	--	--
h)	Does this budget get reflected in the annual report of the company?	Yes	--
03	**SAFETY MANUAL**		
a)	What is the periodicity of updation / review of safety manual?	--	--

SR. NO	QUESTION	STATUS	REMARKS
b)	Does the safety manual adequately address all the hazards in the plant?	All hazards are addressed	Booster compressor has been added in the year 2016.
c)	Are the employee made aware of safety rules /instruction mentioned in the safety manual?	Yes. All employees are made aware through safety trainings on monthly basis.	Good Practice
04	**STANDARD OPERATING PROCEDURES(SOP)**		
a)	Are written Standard / safe operating procedures available for all operations and processes?	Yes. Every department is maintaining their SOP.	--
b)	Whether the written Standard / safe operating procedures are displayed or made available and explained in the local language to the workers?	Yes, In Malayalam language are displayed in factory premises	Good System
c)	Whether concerned section and safety department prepares standard / safe operating procedure jointly?	Yes	--
d)	Are standard / safe operating procedures reviewed and updated?	Yes. As per IMS document review tenure has been fixed after every 02 years.	--
e)	Have the workers been informed of the consequences of failure to observe the standard /safe operating procedures?	Yes. Consequence management procedure PLK/HSE/SOP/2	Complied
05	**PLANT MODIFICATION PROCEDURES**		
a)	What is the system for effecting any change in the existing plant, equipment or process?	MOC Procedure.	Complied
b)	Whether the P & I diagrams and other related documents are updated accordingly?	Yes. Technical service department is initiating changes.	Complied

SR. NO	QUESTION	STATUS	REMARKS
c)	Whether hazard assessment done before implementation of modification?	Yes. Hazop study has been carried out	Complied
06	**WORK PERMIT SYSTEM**		
a)	What types of work permits exist in the factory?	05 Nos. Cold Work, Hot Work, Working at height, Confined space, LOTO	--
b)	Are the necessary forms detailing required safety precautions have been prepared and used for each type of work-permit?	Yes. JSA are part of work permit.	Complied
c)	Is the responsibility assigned to authorized person for issuing of safety work permit?	Yes. Shift Manager has issuing authority responsibility. Attended work permit training.	Complied
d)	Is the copy of safe work permit sent to safety officer before execution of the job?	SAP system has been used. E-Permit system is process.	--
e)	Is validity period specified in the safety work permit?	Yes. Validity is 07 days and for each shift.	--
f)	Are the records of work permit available and maintained in proper order?	Retention period for work permit is 03 years.	
6.1	**CONTROL MEASURES FOR WORK AT HEIGHT**		
a)	Is adequate safe access provided to all places where workers need to work?	Yes. Fixed platform, scaffolding, scissor lift.	Complied
b)	Are all such access in good condition?	Yes. Scissor lifts are undergone examination through external agency as per Rule 73 of section 29 of Kerala Factories Rules 1957. Frequency is yearly basis.	Verified for SSL No- SPL 14-2164
c)	Are all scaffolds are properly designed and erected?	Scaffolding are erecting as per request from user department. Verification of training	--

SR. NO	QUESTION	STATUS	REMARKS
		certificates are been done by safety department.	
d)	d) Are scaffolds inspected every day before work begins?	User department verifies scaffolding physically.	
e)	Are ladders securely clamped or lashed in place?	Yes. Green tag been issued after verification of accessories of scaffolding.	
f)	Are planks in good condition?	Only metallic platforms are allowed.	Complied
g)	Are scaffold walkways, platforms, runs or stairs free of debris, grease, any unnecessary obstruction and projecting nails?	Yes. Its been covered through inspection	Complied
h)	Are the scaffolds higher than 20 m.? If, is a netting or intermediate railing provided between toe-boards and hand railings?	Yes.	Complied
i)	Are folding stepladders properly used?	Yes.	Complied
j)	Are ladders set up at the proper slope of about 1:4?	Yes. User departments are maintaining ladders	
k)	Do workers use hand lines to lift tools or materials?	Yes. Leather belt, tag lines are been used.	
l)	Are proper ladders used around electrical hazards?	Glass reinforced ladders are been used in facility.	Complied
m)	On sloping roofs, are crawling boards, lifelines, safety belts and edge protection provided where needed?	Yes. We have fall arrestor system.	Complied
n)	Whether the weak spots, skylights, or deteriorated asbestos-cement boards through which a worker might fall while working in the roof has been identified and safety net provided appropriately?	We have complete roofing.	

SR. NO	QUESTION	STATUS	REMARKS
o)	Are the workers being medically examined for their fitness to work at height?	Yes	Complied
6.2	**WORK IN CONFINED SPACE**		
a)	Is work permit system followed for working in confined space?	Yes.	
b)	Whether monitoring of the atmosphere inside the confined space is carried out and ensured that there is no flammable or toxic gas in the area?	Yes.	Complied
c)	Whether the person entering the confined space is using suitable personal protective equipment (PPE)?	Yes. SCBA, Gas Detector, Walkie Talkie.	Complied
d)	Is rescue team available in case of any emergency?	Yes. Fireman and attendant are available at site.	
07	**CONTRACTORS' SAFETY SYSTEM**		
a)	a) Is there any system for selection of contractors?	Yes. Based on tender document and technical qualifications.	Complied
b)	b) Are there any guidelines on contractor's safety and training?	Yes. Contactor safety manual	Complied
c)	Whether contract document includes necessary safety and welfare clauses as per statutes?	Yes	Complied
d)	Is there any programme to ensure use of PPE by contractors personnel?	Contractor Safety Manual in place.	Complied
e)	Do the contractors have their own safety organization?	No. We have insisting on safety officer for major projects at site.	
f)	Are the contractors reporting all accidents and injuries?	Yes. Forms are made available for reporting	

SR. NO	QUESTION	STATUS	REMARKS
		incidents in all departments.	
g)	Are contractor workers trained to observe safety at work place?	Yes. Contractor safety training has been carried On monthly basis by safety department.	Complied
h)	Whether contractor workers are engaged in process / operations? If, are they aware of safe operating procedures?	No.	--
08	**PLANT DESIGN AND LAYOUT**		
a)	Whether hazardous operations in the plant are segregated?	Yes.	Complied
b)	Whether occupational health & safety aspects are considered during the design?	Yes.	
c)	Are all the equipment provided with adequate space for working, maintenance etc.?	Yes. It is as per design of plant	
d)	Are the storage tanks provided with enough space/ clearance between them?	Yes.	
e)	Whether the plant layout has taken care of the movement of fire fighting equipment and emergency exits?	Yes.	Complied
09	**MEDICAL MANAGEMENT OF ACCIDENTS**		
a)	Are medical facilities available with trained first aid staff and equipment in round the clock shift for all including contractors?	Yes	
b)	Is the ambulance van available for round the clock basis with the dedicated driver?	Yes	
c)	Is there any mutual aid scheme available with the nearest hospitals to manage and treat injuries during emergency?	Yes. Tie up with Aster and Lourds hospitals	

SR. NO	QUESTION	STATUS	REMARKS
d)	Are the workers / contractor workers aware of emergency medical facilities?	Yes. OHC is located near plant gate.	
10	**MANAGEMENT OF EMERGENCIES (NATURAL / MAN-MADE)**		
a)	Does the system exist to detect and control these Emergencies?	Yes. We have ERDMP in place	
b)	Are the employees aware of the measures to be taken during emergencies?	Yes. All employees have to attend mandatory training.	
11	**EMPLOYEES SELECTION AND PLACEMENT**		
a)	Whether norms are available for selection of different category of employees?	Yes. As per HR procedure.	--
b)	Whether pre-employment medical examination is being conducted for employees?	Yes	As per Form 29 of Kerala Factories Rules
c)	Is there any procedure to evaluate safety awareness and record of the employees during their promotion?	Yes. Performance appraisal.	--
12	**SAFETY CULTURE**		
12.1	**Attitudes of Managers**		
a)	Do the managers follow the plant safety rules at all times?	Yes.	Complied
b)	What are their attitudes towards safety reviews and audits?	Yes. All managers are assigned internal auditor role.	Complied
c)	What is the response of management to safety violation?	Reporting is been done through Suraksha Setu portal. Its been discussed during leadership meeting.	Complied
d)	Whether safety related decisions are taken in consultation with the workers?	Yes. HSE Committee is in place.	Complied
e)	What is the attitude of the managers towards non-use of	--	--

SR. NO	QUESTION	STATUS	REMARKS
	personal protective equipment?		
12.2	**ATTITUDES OF WORKERS**		
a)	Whether workers are aware of the consequences of their wrong actions?	Yes. Awareness is been developed through training and TBT.	Complied
b)	Are laid down safe working procedures followed strictly?	Yes. Monthly area ownership audits are in place.	Complied
c)	What is the attitude of the workers towards their own mistake, which can prejudice safety?	Positive attitude	Complied
d)	Do the workers report near miss incidents and suggest safety improvements?	Yes. Through their supervisors.	Complied
e)	Are the workers aware of the system of rewards and sanctions relating to safety matters?	Yes. Competitions are been conducted during safety week, Environment day, Fire service week, BBS system	--
f)	What is the attitude of workers towards use of personal protective equipment?	Positive Attitude	--
13	**STATUTORY LICENSES, APPROVALS AND RECORDS**		
a)	Whether all the safety related Acts / Rules (with latest amendments) applicable to your organization identified, informed to all employees and complied?	Online statutory tool is been used. Email has been shared by safety department on monthly basis on reminding on current compliance and monthly review meeting been conducted by technical service department	
b)	Whether the licences have been validated?	Yes.	

SR. NO	QUESTION	STATUS	REMARKS
14	**MOTIVATIONAL AND PROMOTIONAL MEASURES FOR OH & S**		
a)	Does the factory have occupational health and safety suggestion scheme?	Yes	--
b)	Are occupational health and safety contests organized in the factory?	Yes. During safety week, fire service week.	--
c)	Does the factory participate in National Awards?	Yes. National safety council Kerala chapter.	--
d)	Has the factory been awarded during last five years?	2018, 2019 and 2020	--
e)	Does the organization publish safety bulletin / newsletters?	Yes. Urja magazine is been published on quarterly basis.	Complied
f)	Whether the safety bulletins are widely distributed?	Yes. Soft copies through website and hard copies are been distributed at different locations.	--
g)	How is the occupational health and safety information including accident statistics disseminated in the factory? (Bulletin boards, Newsletter etc.)	LED display board is been in place near plant entrance gate.	--
h)	What are the activities conducted during National Safety day / week?	Competitions for employees and contractors,	--
i)	What is the percentage of Workers participating in the various safety promotional activities?	50 % employees are participating in safety promotional activities.	Good Practice
15	**HAZARD IDENTIFICATION AND JOB SAFETY ANALYSIS**		
a)	Was an initial process hazard analysis (PHA) completed?	Yes.	--

SR. NO	QUESTION	STATUS	REMARKS
b)	What are the stages of PHA? Whether a dedicated group is identified for PHA?	Technical Services. Employee from each department been nominated.	--
c)	Was the PHA appropriate for the complexity of the process and identify, evaluate, and control the hazards involved in the process?	Yes.	--
d)	Does the hazard evaluation use one or more of the following PHA methodologies: What-If Analysis, Process Checklist, Hazard and Operability Study(HAZOP), Failure Mode and Effects Criticality Analysis (FMECA), Fault Tree Analysis (FTA) or any other appropriate equivalent methodology?	Hazid and Hazop study been carried out by external agency	--
e)	Does PHA assure addressing issues of inherent safety features with respect to material and their properties?	Yes	--
f)	Does the PHA address the hazard identification, incidents history, consequences of failures (engineering and administrative controls), human factors, consequent analysis with respect to possible safety and health effects of failure of controls?	Yes. MOC procedure is in place.	--
g)	What are the stages of PHA? Whether a dedicated group is identified for PHA?	Yes. Under technical services leadership.	--
h)	h) Does the system exists to promptly address findings and recommendations of PHA?	Yes. Through Suraksha Setu portal.	--

SR. NO	QUESTION	STATUS	REMARKS
i)	Are the PHA's updated and revalidated at least every five years by a qualified team to assure that the PHA is consistent with the current process?	Hazop review had been done by external agency.	--
j)	Whether the activities requiring Job Safety Analysis have been identified?	Yes. SOP for JSA is in place number-PLK/HSE/SOP1	--
k)	Whether the identified jobs for Hazard Identification have been carried out by trained and experienced persons?	Yes. JSA training sessions are conducted by safety department.	--
l)	Whether the checklists have been prepared on each Job Safety Analysis and are being used while carrying out the job?	Yes.	Complied
16	**PRODUCT SAFETY**		
a)	Whether hazards arising from use of the products are identified?	Yes. LNG hazards are communicated and documented.	Good System
b)	Whether material safety data sheet prepared for the products?	Yes. With laboratory department. Display has been made near respective storage tanks.	--
c)	Are all the products labelled and packed appropriately?	Yes.	Complied
d)	Whether safety instructions are given along with products?	Yes. TREM card is been issued with tankers. It's very well documented in Three languages.	--
e)	Whether policy exists for recall of products?	Not Applicable	--
17	**SAFETY TRAINING**		
a)	Whether training needs have been identified?	Yes. HR department has maintained Training schedule for each employees.	--

SR. NO	QUESTION	STATUS	REMARKS
b)	Is there any programme of induction training, its duration and topics covered?	VDO has been displayed at security as part of induction to employees.	Complied
c)	Whether the assessment of the trainees has been carried out?	Yes. GET training assessment is in place.	Good Practice
d)	What are the infra-structural facilities available for training?	LNG Academy is in place at facility	--
e)	Whether training is conducted by qualified person?	Yes. External faculties are also invited	--
f)	Whether trainers are being re-trained from time to time?	Yes. Train the trainer program been followed.	--
g)	Whether proper records of training program conducted are maintained?	Yes. Evaluation and feedback module is in place with HR	Good System
h)	How training programs are evaluated?	Evaluation through assessment	--
i)	Whether schedule for training on occupational health and safety is available and maintained?	Yes. At the beginning of every month it's been circulated by HR team.	--
j)	Whether the training programmes are reviewed?	Yes	--
k)	Are all the employees periodically trained / retrained and what is the frequency of such training?	Topics are proposed to HR department by HSE and other departments	--
l)	Are the retraining needs identified whenever a new process / products and change in existing process introduced?	Yes. Training record is a part of each MOC.	Good System
m)	Whether training covers top management?	Yes.	--
n)	How many hours of safety training is given to different employees?	40 Hours / year.	--
18	**CHANGE MANAGEMENT**		
18.1	**Management of Change**		
a)	Are there written procedures for managing change to	Yes. MOC procedure in place.	Complied

SR. NO	QUESTION	STATUS	REMARKS
	process chemicals, technology, equipment and procedures and changes to facilities that affect the plant process / system operation?		
b)	Do the procedures assure that the technical basis for the proposed change addressed prior to any change?	Yes	--
c)	Do the procedures assure that the impact of the change on safety and health addressed prior to any change?	Yes	--
d)	Do the procedures assure that modifications to operating procedures are addressed prior to any change?	Yes.	--
e)	e) Do the procedures assure that the necessary time period for the change is addressed prior to any change?	Yes	--
f)	Do the procedures assure that the authorization requirements for the proposed change are addressed prior to any change?	Yes	--
g)	Are employees involved in operating a process, and maintenance and contract employees whose job tasks will be affected by change informed of, and trained in, the change prior to the start-up of process or affected part of process / operations?	Yes	--
h)	Is the safety information is reviewed and updated on changes?	Yes. After MOC process risk register is made updated.	--

SR. NO	QUESTION	STATUS	REMARKS
i)	Are the operating procedures or practices updated?	Yes. After any incident investigation.	Good System
18.2	**MECHANICAL INTEGRITY**		
a)	Does the mechanical integrity program include for all mechanical equipment including pressure vessels and storage tanks, piping and components, relief devices and vent systems, emergency shutdown systems, pumps, control systems?	Yes. Asset integrity ISO 55000 is in place with Asset Integrity.	Complied
b)	Are there written procedures to maintain the ongoing integrity of process equipment?	--	--
c)	Whether training been provided to each employee involved in maintaining the on-going integrity of process equipment?	Yes. IMS training has been provided.	--
d)	Are inspections and tests performed on each item of process equipment included in the program?	Yes. Preventive Maintenance program in place	--
e)	Does the inspection and test frequencies meet the manufacturer's recommendation and good engineering practice?	Yes. OEM recommendations are followed and other maintenance has been carried out in presence of OEM.	Complied
f)	Are inspections and tests performed more frequently if determined necessary by operating experience?	SOP are in place for mechanical activities.	--
g)	g) Are deficiencies in equipment that are outside limits corrected before further	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
	use so as to assure safe operation?		
h)	In the construction of new plants and equipment, whether quality assurance programme is implemented to ensure that equipment fabricated is suitable for the process?	Quality Assurance program	--
i)	Are appropriate checks and inspections made during equipment installation stage?	Yes. PSSR procedure in place.	Verified
j)	Are the suitability of maintenance materials, Spare parts and equipment ensured during maintenance?	Yes. Shelf life of spares are communicated to user departments on each month through email by C&P department.	Complied
19	**PHYSICAL HAZARD**		
19.1	**HOUSEKEEPING**		
a)	Are all the passages, floors and the stairways in good condition?	Yes.	--
b)	Is glass door taped or otherwise marked to make it visible to workers?	Yes	--
c)	Do you have the system to deal with the spillage?	No	Spill kit shall be made available
d)	Do you have sufficient disposable bins clearly marked and whether these are suitably located? Are containers of refuse (waste) and trash emptied at the end of every day or soon after they are full? Are the containers or bins regularly cleaned?	Yes	--
e)	Are drip trays positioned wherever necessary?	Not Applicable	--

SR. NO	QUESTION	STATUS	REMARKS
f)	Do you have adequate localized extraction and scrubbing facilities for dust, fumes and gases? Please specify.	Yes. Fume hood has been made available in maintenance building.	Good Practice
g)	Whether walkways are clearly marked and free from obstruction?	Yes	--
h)	Do you have any inter-departmental competition for good housekeeping?	Yes. Area ownership audit is in place, which awards winner with trophy.	Good System
i)	Has your organization elaborated good housekeeping practices and standards and made them known to the employees?	Yes	--
j)	Are there any working conditions, which make the floors slippery? If so, what measures are taken to make them safe?	Yes. LNG tank top area was slippery due to algae formation.	Slippery area shall be cleaned on regular interval.
k)	Does the company have adequate measures to suppress polluting dust arising out of materials stored on the roadside?	Not Applicable	Not Applicable
19.2	**MACHINE AND GENERAL AREA GUARDING**		
a)	Whether machinery and equipment which can cause physical injuries to operator have been identified?	Yes	--
b)	Are all moving parts and point of operation of machinery adequately guarded?	Yes	--
c)	Are all fixed guards securely bolted in position and in good condition?	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
d)	Are all interlock guards for prevention of physical injury in good condition?	No Applicable	--
e)	Are all emergency stop buttons effective and Clearly labelled?	Yes.	Labelling of ESD switch shall be carried out.
f)	Are the operators for machines having moving parts aware of the danger of working with loose clothing?	Yes. Loose clothing are not allowed	--
g)	Are the openings where there is free fall hazard covered or fenced securely?	Yes.	--
19.3	**MATERIAL HANDLING**		
a)	Are adequate equipment available for handling materials?	Yes. Forklift, Stacker	--
b)	Are the workers aware of the hazards associated with material being handled?	Yes. Crane operators, forklift operators are undergone training.	--
c)	Where manual handling is necessary, are the workers been trained? Do they practice this? Are workers warned for lifting of excessive weight? (Maximum weight of material for adult male and female are 55 Kg and 30 Kg respectively)	Yes. Maximum weight board has been displayed at warehouse.	--
d)	Do workers follow safe procedures for storage of materials?	Yes.	--
e)	Is the register maintained to record particulars of examination of all lifting machines, tools and tackles?	Yes. Register has been maintained for lifting machines.	Excellent
f)	Are all the statutory examinations and tests carried out and certified by competent person(s)?	Yes.	--

SR. NO	QUESTION	STATUS	REMARKS
g)	Are the operators of crane, lifts, hoists and other mechanized operations adequately qualified?	Yes.	--
h)	Is the safe working load clearly marked?	Yes. SWL mark has been clearly market.	Good System
i)	Has the person employed to operate crane, forklift, or to give signals to crane been medically examined for sight and colour vision?	Yes.	As per Form 43 of Kerala Factories Rules 1957
j)	Is the frequency of sight and colour vision examination as per the latest rules?	Yes. Employees age below 45- criteria is once in a year and above 45 years criteria is once in six month.	Complied
19.4	**ELECTRICAL SAFEGUARDING**		
a)	Are licensed electricians available for electrical work?	Yes.	--
b)	Whether area classification for electrical equipment has been carried out?	Yes.	--
c)	Do the electrical fittings conform to area classification for electrical equipment?	Yes	--
d)	Is a ground fault current interrupter system (ELCB) in use?	Yes	--
e)	Are all connections made by using appropriate plugs, receptacles or enclosures? Are fuses provided?	Yes	--
f)	Are there any make shift connection bare wires or damaged cables?	Yes	--
g)	Is there a system of ensuring periodical inspection of hand tools, extension boards used for electrical work?	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
h)	Do the workers use proper types of PPE during the working on live line?	Not Applicable	--
i)	Is the separate work permit issued for working on high voltage line?	Not Applicable	--
j)	Whether the process(s) and equipment that generate and accumulate static charge have been identified?	Yes	--
k)	Whether all such equipment including pipelines for flammable materials are properly bonded and earthed?	Yes. Bonding needs to be carried out at Diesel storage area.	Ensure that missing bonding shall be carried out which is statutory requirement as per OISD.
l)	Whether earth pit resistance is measured and the record maintained?	Yes	--
m)	Whether lightning arrestor has been installed and is adequate?	Yes	--
19.5	**SAFETY IN STORAGE AND WAREHOUSING**		
a)	Whether the Material Safety Data Sheet for all chemicals is available?	Yes. Boiler dosing chemicals shed doesn't have MSDS.	MSDS shall be displayed which is statutory requirement as per Factories Act
b)	Are the chemicals stored as per their hazardous properties including the incompatibility?	Yes. Incompatibility chart shall be displayed at chemical storage shed.	Chemical compatibility chart shall be displayed
c)	Are all containers clearly, indelibly labelled? Are all chemicals stored as per safety regulations?	Yes	--
d)	Whether all racks and steel cages have sufficient load bearing capacity?	Yes. In warehouse SWL shall be marked in racks.	SWL shall be marked which is statutory requirement as per Factories Act
e)	Is adequate natural ventilation provided to store room? Is there any emergency exit?	Yes. Oil storage shed Emergency Exit sign to be painted.	

SR. NO	QUESTION	STATUS	REMARKS
f)	Whether adequate fire fighting arrangement existing in flammable chemical storage?	Yes	--
g)	Whether methodology for handling spillages of hazardous chemical available along with the equipment required handling the spillage?	No.	Spill kit shall be provided
h)	Whether aisles are marked and emergency exits displayed?	Yes.	Escape route signages shall be marked
19.6	**HAZARD ASSESSMENT FOR NEW EQUIPMENT**		
a)	What is the system for effecting any change in the existing plant, equipment?	MOC process in place	--
b)	Is there system for evaluating hazards from new equipment?	MOC	--
c)	Whether the P and I diagrams and other related documents are updated accordingly?	Yes. Technical services are maintaining P&I diagrams	--
d)	Is any Job Hazard Analysis (JHA) carried out after installation of new equipment?	Risk Assessment has been carried out	--
19.7	**HAZARDS FROM RADIATION SOURCES**		
a)	Whether licences have been obtained for storage / handling of radioactive material?	Not Applicable	
b)	Whether approved Radiological Safety Officer appointed?	Not Applicable	
c)	Whether appropriate PPEs are used against radiation hazards?	Not Applicable	
d)	Is the flooring of the radioactive material handling area amenable for proper decontamination?	Not Applicable	

SR. NO	QUESTION	STATUS	REMARKS
e)	Is the storage room of radiation source as per the licence condition?	Not Applicable	
f)	Are all persons working in the facility have radiation safety training?	Not Applicable	
g)	Is the operators handling devices using radioactive materials qualified and possess the necessary certificate?	Not Applicable	
h)	Is the periodical radiation monitoring carried out?	Not Applicable	
i)	Are the records of inventory of radioactive material maintained in the standard format and submitted to the competent authority as per the period specified?	Not Applicable	
j)	Are emergency handling tools available?	Not Applicable	
k)	Are the personnel monitoring badges (TLD, Pocket dosimeter etc.) assigned and worn by each radiation worker?	Not Applicable	
l)	Are the radiation symbol and red light displayed as required?	Not Applicable	
20	**CHEMICAL HAZARD**		
20.1	**TRANSPORTATION OF HAZARDOUS SUBSTANCES**		
a)	What potentially hazardous materials are transported to or from the site (including wastes)	Yes	Complied
b)	What mode of transport are used?		
	1) Road,	Yes	--
	2) Rail, and	Not Applicable	
	3) Pipelines	Not Applicable	

SR. NO	QUESTION	STATUS	REMARKS
1)	**ROAD**		
i)	Does the company employ licensed vehicle of its own / outside sources?	Yes	Complied
ii)	Are the loading / unloading procedures in place and safety precautions displayed?	Yes	--
iii)	Is there a provision to check the healthiness of road tanker with respect to explosives rules?	Yes	--
iv)	Are loaded tankers or trucks parked in a specific area on-site?	Yes	--
v)	Do all truck and tanker drivers carry transport emergency (TREM) card or instruction booklet?	Yes	--
vi)	Do all truck and tanker drivers get training in handling emergencies during transport?	Yes	--
vii)	Are all the tankers marked for proper Hazchem code?	Yes	--
2**)**	**RAIL**		
i)	What hazardous materials are transported by rail?	NA	
ii)	Does the company have a direct siding on site?	NA	
iii)	Are tankers or other wagons used in transportation?	NA	
3)	**PIPELINES**		
i)	What materials are transported to and from the site by pipelines?	NA	
ii)	ii) Are the pipelines underground or over ground?	NA	

SR. NO	QUESTION	STATUS	REMARKS
iii)	iii) Are corrosion protection measures employed in pipelines?	NA	
iv)	Whether intermediate booster pumps are used?	NA	
v)	What is the maximum, minimum and average transfer rates?	NA	
vi)	Are the pipelines extended in the public domain?	NA	
vii)	Are the pipelines dedicated for each type of chemicals?	NA	
viii)	Are the pipelines fitted with safety equipment such as leak detectors, automatic shut-off valves etc.?	NA	
ix)	What is the frequency and method of testing of the pipeline?	NA	
x)	Is there written procedure for tackling leakages in pipeline?	NA	
20.2	**HANDLING OF HAZARDOUS SUBSTANCES**		
a)	What are the hazardous substances handled in the factory?	LNG, Diesel, Liquid Nitrogen, Glycol	--
b)	Whether quantity of hazardous substances is above the threshold limit specified in the Manufacture, Storage and Handling of Hazardous Substances Rule, 1989? If, then required documentation is available as per the rule.	Yes. This factory falls under MAH due to hazardous processes.	--
c)	Whether written procedure for handling the hazardous substance is available and operators are trained for	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
	handling such substances including actions required in case of leakages and spillages?		
d)	Are the employees aware of the hazards arising from hazardous substances and safety precautions to be taken during handling of these?	Yes.	--
20.3	**MATERIAL SAFETY DATA SHEETS (MSDS)**		
a)	Are the material safety data sheets available for all the chemicals handled, used and manufactured in the factory?	Yes.	--
b)	Whether the latest MSDS are displayed at strategic locations?	No	MSDS shall be displayed at chemicals storage location.
c)	Is it available in local language?	No	Shall be complied
20.4	**SPILL CONTROL MEASURES**		
a)	Whether spill control procedure is available?	Yes. It's included in ERDMP	--
b)	Whether spill collection pit / sump is available at the workplace?	Yes	--
c)	Whether methodology for recovery / disposal of collected material has been established?	No	Spill kit shall be provided
20.5	**STORAGE OF HAZARDOUS SUBSTANCES**		
a)	Whether storage vessels are identified with the capacity as required under MSIHC, Rules 1989.	Yes.	--
b)	What are the storage pressure and temperature?	LNG stored below 1.5 kg/cm2 pressure at -162 deg C. Liquid nitrogen and HSD stored at atmospheric pressure.	LNG stored below 1.5 kg/cm2 pressure at -162 deg C. Liquid nitrogen and HSD stored at atmospheric pressure.

SR. NO	QUESTION	STATUS	REMARKS
c)	Whether vessels are above ground / underground?	Above Ground	Above Ground
d)	If any of the tanks storing flammable material, whether electrical equipment and fittings are as per electrical area classification?	Yes	--
e)	Is the bunded area takes into account the total quantity of the largest tank?	Yes	--
f)	Whether the bund perimeter takes into consideration of trajectory of leak from tank?	Yes	--
g)	Are the vessels properly bonded and earthed and whether periodically checked and record maintained?	Yes	--
h)	Are the vessels fitted with remotely controlled isolation valves?	Yes	--
i)	Are vessels provided with emergency vent, relief valve, bursting disc, level indicator, pressure gauge, and overflow line?	Yes	--
j)	Where do such vents discharge?	Yes. Atmospheric venting	--
k)	Are the vessels provided with alarms for high level, high temperature and high pressure?	Yes	--
l)	Are standby empty tanks or any other alternate systems provided for emptying / transfer in case of emergencies?	Not Applicable	--
m)	What are the provisions made for fire fighting / tackling emergency situations around the storage vessels?	Fire Hydrants, Fire Monitors and Extinguishers	--

SR. NO	QUESTION	STATUS	REMARKS
n)	q) Has any consequence analysis for loss of containment been carried out?	Yes	--
o)	Whether the vessels are tested as per statute?	Yes	--
p)	Whether log sheets are filled up on daily basis for recording the parameters of these vessels?	Yes	--
q)	Whether monitors for detection of leakage of flammable / toxic material installed?	Yes	--
r)	Whether the chemicals stored are as per their compatibility?	No	Compatibility chart shall be provided
20.6	**GAS CYLINDERS**		
a)	What are the various gas cylinders used in the plant?	Nitrogen, Argon, Oxygen, Helium and LPG	Verified
b)	Are valid licenses available for storing all these cylinders?	No	Quantity is below maximum threshold
c)	Are the cylinders stored and segregated as per their compatibility?	Yes	--
d)	What are the measures taken for combating any emergency in the cylinders storage area?	Yes. Requirement as per ERDMP	--
e)	Whether integrity test certificates are obtained from the suppliers of the cylinders?	Yes. Filling permission and HPT certificates are received from vendor.	--
f)	Are the cylinders chained and secured properly along with the valve caps and proper identification colour code?	yes	--
g)	Are the cylinders protected from heat or sun and rain?	Yes. They are stored in shed	--
h)	Whether monitors for detection of leakage of flammable / toxic gas installed?	No. Cylinders are non-flammable	--
20.7	**LABELLING AND COLOUR CODING**		

SR. NO	QUESTION	STATUS	REMARKS
a)	Are all the containers, vessels and storage tanks labelled for its content and capacity?	Yes	
b)	Whether the pipelines are colour coded as per IS 2379?	Yes. Colour code board has been displayed near STV and Metering station	Good Practice
c)	Is any plant specific colour code followed?	No. It's as per IS standard	--
d)	Whether the colour codes are displayed conspicuously in the working areas?	Yes.	--
20.8	**HAZARDOUS WASTE MANAGEMENT**		
a)	Is identification done for various types of hazardous wastes?	Yes. As per KSPCB consent	--
b)	Are these quantities less than those specified by the Hazardous Wastes (Management & Handling) Rules, 1989?	Yes. It's as per KSPCB consent.	--
c)	What are their disposal modes?	Landfill, Recycling and reuse	--
d)	What are the systems / measures adopted for controlling air / water / land pollution?	Monitoring	--
e)	Whether the solid waste like combustibles, plastic metals etc. segregated?	Yes.	--
21	**FIRE & EXPLOSION HAZARD**		
21.1	**ORGANISATIONAL SET-UP FOR FIRE FIGHTING**		
a)	What is the total strength of fire station and fire crew?	01 Fire station, 29 Crew	--
b)	How many fire crews are available in each shift?	07 Numbers	--
c)	Is there fire squad identified in each shift?	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
d)	Standing fire order is available with latest revision	Yes	--
e)	How is the communication with fire station?	Walkie Talkie and Public Address system	--
f)	Does fire safety inspections carried out?	Yes	--
g)	g) Does emergency procedure available for leakage or combustion of flammables?	Yes	--
h)	What measures are available to control the fire load in the plant area?	Fire protection measures	--
i)	Whether technical knowledge and skills of the manager and staff responsible for overall fire safety of the plant is adequate?	Yes	--
j)	How many major and minor incidents / fires were there in the factory during the last five years? Give department / plant wise.	No fire incident in last 05 years.	--
k)	Have all the fires / incidents been investigated and corrective actions taken? Give break-up.	Yes. Investigation as per procedure and maintained in Suraksha Setu online portal	--
l)	Resources:		
1)	Adequacy of protective clothing (coat, trouser, gloves, boots and helmets);	yes	--
2)	Availability of SCBA for fire fighting operations and spare cylinders (at least 2 for each SCBA);	Yes	--
3)	Adequacy of hose, nozzles, ladders, lighting equipment and pumps;	yes	--
4)	Communication facility at fire station, walkie talkie sets during fire fighting.	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
21.2	**BUILT IN SAFETY IN CIVIL DESIGN AND CONSTRUCTION**		
a)	Whether the two safe means of escape available? Are they in separate directions?	Yes	--
b)	Is emergency exits provided to the building handling flammables?	Yes	--
c)	c) Whether emergency lights are provided?	Yes	--
d)	Whether fire / smoke detectors are installed in fire prone areas?	Yes	--
e)	Whether fire call points are provided in different areas?	Yes	--
f)	Whether Fire hydrants are provided near the buildings?	Yes	--
g)	Is ventilation system in plant handling flammables is adequate to prevent formation of flammable mixtures?	Yes	--
h)	Is adequate separation is provided between combustible / flammable materials and other material to restrict the fire growth?	Yes	--
i)	Access routes for fire fighting operations is available for areas having high fire load	Yes	--
j)	Whether building changes interferes with fire detection and / or fire suppression systems?	Yes	--
k)	Whether building changes cause unreasonable fire loading / openings in the fire rated walls?	Yes	--
21.3	**BUILT IN SAFETY IN ELECTRIC CIRCUITS AND EQUIPMENT**		

SR. NO	QUESTION	STATUS	REMARKS
a)	Are the electrical equipment in areas where flammables mixture is likely to be present of flame-proof type?	Yes	Good Practice
b)	Are lightning arrestors are provided to the buildings / structures storing flammable materials?	Yes.	--
c)	Whether adequate bonding and grounding of electrical equipment / pipelines provided?	No	Diesel storage tank pipes shall be bonded at couple of places.
21.4	**EXPLOSIVE SUBSTANCES**		
a)	Whether necessary license / approval taken from concerned statutory bodies?	Not Applicable	--
b)	Whether systems for explosion suppression, high speed fire detection with deluge, sprinklers, explosion venting etc. are provided?	Not Applicable	
c)	Whether explosion resistant walls or barricades are provided around explosive storage?	Not Applicable	
d)	Whether explosive substance storage areas are restricted for entry?	Not Applicable	
e)	Whether only trained persons are handling explosive substances?	Not Applicable	
f)	Whether explosive substances are stored and transported in approved containers only?	Not Applicable	
g)	Whether electrical fixtures in areas handling explosives are explosion proof type?	Not Applicable	
h)	Whether adequate measures are taken to prevent any	Not Applicable	

SR. NO	QUESTION	STATUS	REMARKS
	sources of ignition where explosive substances are handled?		
21.5	**FIRE SAFETY IN HANDLING FLAMMABLE AND EXPLOSIVE MATERIALS**		
a)	Whether emergency procedure is available for control of leakage?	Yes	--
b)	Whether emergency measures are displayed locally in case of accidental spillage / leakage?	Yes. Do and Don't are displayed at LNG storage area.	Good Practice
c)	Whether facility is provided for safe drainage of combustible or flammable liquids in case of leakages?	Dyke Walls	--
d)	Whether highly flammable liquids are stored under inert atmosphere?	Not Applicable	
e)	Whether flammable storage tanks are provided with flame arrestors?	Yes. Breather valves are in place for diesel day tanks	--
f)	Whether suitable PPEs are provided?	yes	--
21.6	**FIRE DETECTION AND ALARM SYSTEM**		
	What type of fire detection and alarm system provided?	Gas Detector- IR type and Flame Detectors	--
a)	Whether all fire prone areas of the plant are covered with fire detection system?	Yes	--
b)	Whether fire detection equipment and smoke alarms in good operating condition?	Yes	--
c)	d) Whether the number of fire call points are adequate and free from obstruction?	Yes	--
d)	Whether regular inspection / maintenance / testing of fire detection and alarm system	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
	carried out and records maintained		
e)	Whether any atmospheric monitoring is carried out for explosive mixture of gases or vapours?	Yes	--
f)	Whether emergency power supplies are provided to fire detection and fire alarm system?	Yes. Diesel Generator has been provided	--
g)	Whether smoke detectors are located considering ventilation pattern?	Yes	--
h)	Whether annunciation of fire is local or in the control room or in both places?	Yes	--
i)	Whether fire panel is constantly attended?	Yes. It's located in Fire Station near to fireman.	Verified
1.7	**PASSIVE AND ACTIVE FIRE PROTECTION SYSTEM**		
a)	What are the passive fire protection measures available? (barriers, doors, dampers etc.)	Yes.	Complied
b)	Are the areas requiring fire barriers identified?	yes	--
	Whether the fire barrier provided is of adequate ratings?	Yes	--
	Whether ventilation ducts in flammable areas have been provided with isolation dampers of suitable fire rating?	Yes	--
c)	Whether sprinklers / deluge are installed wherever necessary?	Yes	--
d)	Whether regular inspection / maintenance / testing of fire protection system carried out and records maintained?	Yes By Fire department.	Good System

SR. NO	QUESTION	STATUS	REMARKS
21.8	**FIXED FIRE EXTINGUISHING SYSTEM**		
a)	What are the sources of firewater and whether they are dedicated to the fire extinguishing system?	Fire water reservoir	Fire water reservoir
b)	Whether the capacity of dedicated water reservoir is adequate to supply to hydrants for minimum2 h?	Yes	PLL has capacity for 04 hours of water supply
c)	Whether un-interrupted power supply is provided to the firewater pumps?	Yes, EDG	Complied
d)	Whether the extinguishing medium selected is appropriate to the class of fire (water, gaseous, foam, and dry powder)?	Yes	Complied
e)	Whether fire hydrants layout is available?	Yes	Verified
f)	Whether additional (over minimum requirement) fire hoses, nozzles are available?	Yes	Complied
g)	Whether the hydrants lines are kept pressurized?	Yes	Verified
h)	Whether regular inspection / maintenance / testing of fixed fire extinguishing systems carried out and records maintained?	Yes	Monthly Basis servicing has been carried out inspection tags were inspected during audit.
21.9	**PORTABLE FIRE EXTINGUISHING SYSTEM**		
a)	Whether suitable type and numbers of fire extinguishers provided?	Yes	Verified
b)	Whether the fire extinguishers are located at conspicuous position and easily accessible? Are they fully charged and tagged?	Yes	Auditors have verified by inspecting couple of fire extinguishers during audit

SR. NO	QUESTION	STATUS	REMARKS
c)	Whether fire extinguishers periodically inspected, tested, refilled and records maintained?	Yes	Extinguishers are inspected on monthly basis
d)	Whether defective / unchecked fire extinguishers present at site?	No	Verified
e)	Whether additional fire extinguishers are available?	Yes	10 % of fire extinguishers are available at site as spare.
21.10	**FIRE FIGHTING EQUIPMENT AND FACILITIES**		
a)	Whether fire tenders (water / foam) are available?	Yes	Yes
b)	Whether the fire-fighting system and equipment approved, tested and maintained as per relevant standard?	Yes	Complied
c)	Whether the SCBA / fire suit provided to fire fighting team for immediate action?	Yes	Complied
d)	What is system for maintenance / recharge of SCBA?	In house refilling	Approval from statutory bodies shall be obtained
e)	Is proper access available for fire fighting equipment?	Yes	Sinking slabs around process equipment's shall be rectified as these seems to be limitations for fire tender to approach in case of emergency.
f)	Whether fire hose cabinets are in good condition, easily visible, and accessible?	Yes	Verified
g)	Whether drill tower is available? Are fire personnel carrying out regular fire drill?	Yes	Weekly drills are in practise
h)	What is the communication facility at fire station? Is it adequate?	Public Address, Telephone, Walkie Talkie	Verified

SR. NO	QUESTION	STATUS	REMARKS
21.11	**FIRE DRILL**		
a)	Whether mock fire drills are conducted? What is the frequency of drills?	Yes	Weekly
b)	Whether fire drills are also performed in night shift	No	Fire drills shall be planned in silent hours.
c)	Whether feedback of fire drill is documented?	No	Feedback shall be obtained
d)	What is the system of mutual-aid scheme?	PIL has made agreement with neighbouring industries	Verified
21.12	**FIRE FIGHTING TRAINING**		
a)	Whether there is a system of providing fire fighting training to plant personnel?	Yes	Verified
b)	What is the frequency and duration of such training? Whether training records are maintained?	Yes	Weekly training has been in place. Verified
c)	Whether fire squads are identified for different areas for first-aid fire fighting and rescue, and suitably trained?	Yes	Complied
d)	Are all personnel conversant with the fire prevention and protection measures?	Yes	Verified
e)	Whether the fire staff are sent for refresher / advanced training courses?	Yes	Staff shall be nominated to external training programs.
21.13	**STATIC ELECTRICITY AND LIGHTNING**		
a)	Whether all vessels and pipes are provided with suitable bonding and grounding?	Yes	Complied
b)	Whether arrangement has been made for grounding the tanker containing flammable liquid during loading / unloading?	Yes. Crocodile clamps are made available.	Complied

SR. NO	QUESTION	STATUS	REMARKS
c)	Whether spark resistant tools are provided?	Yes	Make habit of using spark resistant tools in live plant.
d)	Whether lightning protection is provided and is adequate?	Yes	Complied
e)	Whether antistatic clothing, hand gloves and footwear are provided?	Yes	Complied
21.14	**PRESSURE RELIEF SYSTEM**		
a)	Whether the listing of all 'pressure plants' [as defined under *Factories Act*] has been done?	Yes	Pressure vessels test records been carried out by competent person has been verified.
22	**INDUSTRIAL HYGIENE / OCCUPATIONAL HEALTH**		
22.1	**VENTILATION, ILLUMINATION, NOISE, VIBRATION, HEAT STRESS AND NON-IONIZING RADIATIONS**		
22.1.1	**VENTILATION**		
a)	Whether any ventilation study has been carried out?	Yes	Complied
b)	Whether natural ventilation is adequate or not?	Yes. Plants are open to atmosphere	Complied
c)	Whether dust / fumes / hot air is generated in the process?	Yes	--
d)	Is there any exhaust ventilation system in any section of the plant?	No	--
e)	Is periodic / preventive maintenance of ventilation system carried out and record is maintained?	Not Applicable	--
f)	Does any ventilation system re-circulate the exhausted air in work areas?	No	--
g)	Is the work environment assessed and monitored for chemical and physical hazards?	Yes	Complied

SR. NO	QUESTION	STATUS	REMARKS
h)	Whether PPE are provided to workers exposed to dust / fumes and gases?	Yes	Complied
2.1.2	**ILLUMINATION**		
a)	Whether illumination study has been carried out for the assessment of illumination level?	Yes	Complied
b)	Is there any system of periodical cleaning and replacing the light fittings / lamps in order to ensure that they give the intended illumination levels?	Yes	Complied
c)	Are the workers subject to periodic optometry tests and records maintained?	Yes	Complied
d)	Are emergency lighting available at first aid centre.	Yes	Complied
22.1.3	**NOISE**		
a)	Whether any noise study conducted?	Yes	Verified
b)	Are there any machines / processes generating high-noise?	Yes	--
c)	Whether engineering and administrative controls been - implemented to reduce noise exposure below the permissible limits?	Yes. Acoustic enclosure in place. Use of ear defenders signage has been displayed at the entrance of compressor area.	Verified
d)	Is there a system of subjecting all those employees to periodic audiometric test who work in high level noise areas?	Yes. Yearly testing in place.	Records are verified
e)	Whether the workers are made aware of the ill effects of high noise?	Yes. Through regular training programs.	Verified

SR. NO	QUESTION	STATUS	REMARKS
f)	Whether ear muffs / plugs are provided and used?	Yes. Ear plug dispensers are provided at high noise areas.	Complied
22.1.4	**VIBRATION**		
a)	Are there equipment which contribute excess level of vibrations and whether they are identified?	Yes	Verified Preventive Maintenance records.
b)	Whether any vibration study has been carried out?	Yes	Complied
c)	Are the measures taken to combat vibration to acceptable levels?	Yes	Complied
d)	What is the frequency for measurements of vibration?	Periodically as per SAP notifications.	Complied
e)	Are the records of measurements and maintenance of equipment / system maintained?	Yes. Records are maintained with mechanical department	Documents are verified
22.1.5	**HEAT STRESS / COLD STRESS (Extremes of Temperature)**		
a)	Are there sources from equipment increasing the heat load in work places?	No	--
b)	Whether evaluation of heat stress is carried out?	Yes	Complied
c)	Whether natural ventilation is adequate to minimize the heat stress in work environment?	Yes.	--
d)	Are resources available to deal with very hot or very cold conditions (drinking water, lined gloves insulated boots)?	Yes	--
e)	Do workers know the symptoms of heat cramps / heatstroke or frost bite / hypothermia?	No	Awareness campaign shall be rolled out during summer season.
f)	Are the personal protective equipment suitable for	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
	reducing the effects of heat stress available?		
22.1.6	**NON-IONISING RADIATIONS**		
a)	Does the work involve likely exposure to non-ionising radiations (ultraviolet, infrared, radiofrequency, microwaves, lasers, etc.)	Not Applicable	--
b)	Whether risk assessment have been done for all work areas involving presence of non-ionising radiations?	NA	--
c)	Are the work areas displayed with relevant safety signs?	NA	
d)	Are the employees aware about the hazards of non-ionising radiations?	NA	
e)	Does written procedures exists for working in non-ionising radiations?	NA	
f)	Is the work environment monitored periodically for physical hazards and control measures initiated whenever deviation from permissible values is observed?	NA	
g)	Whether suitable personal protective equipment are provided to workers exposed to non-ionising radiations?	NA	
22.2	**WORK PLACE MONITORING FOR HAZARDOUS CHEMICALS**		
a)	Whether the dust, fumes, smoke aerosols and mist are monitored as per statute and records maintained?	Not Applicable	--
b)	What are the types of detectors used for monitoring	GSP, GSB, FSD	Complied

SR. NO	QUESTION	STATUS	REMARKS
	concentration of hazardous chemicals?		
c)	Is any alarm system installed for any leakage of hazardous chemicals?	Yes. Leak detector is in place	Verified during field visit
d)	Are antidotes available for toxic chemicals?	No. No toxic chemicals are handled	--
e)	Are control measures initiated whenever deviation from permissible values is observed?	Not Applicable	--
22.3	**FIRST AID FACILITIES AND OCCUPATIONAL HEALTH CENTRE (OHC)**		
a)	Are adequate numbers of first aid boxes provided? Give location details?	Yes.	Medicines consumption record shall be maintained in each box, this will help to track incidents.
b)	Are qualified / trained first aiders available in each shift?	Yes	Complied
c)	How many qualified / trained first aiders are available at each plant / department?	40 Nos	Ensure that 10 % total employees are trained in First Aid as per The Factories Act 1948
d)	How many persons are trained / given refreshers training in first aid in a year?	40 Nos	--
e)	Whether occupational Health Centre is provided?	Yes	--
f)	Does OHC conform to the provisions of the existing statutes?	Yes	Complied
g)	Are the Medical Attendants / Doctors available in each shift?	No. Doctor is available in General shift	Complied
h)	What facilities are available for transportation of the injured to hospital?	Ambulance	Good Practice, auditors have appreciated.
i)	Are the names of the trained first aiders displayed?	No.	Suggested to display First Aiders name with contact

SR. NO	QUESTION	STATUS	REMARKS
			numbers in Emergency Control Centre, Security and Plant control room. This is statutory requirement as per MSIHC rules
j)	Are the name of nearest hospitals and its telephone number available in OHC?	Yes	Complied
k)	Does the plant have any special preventive medicine program?	No	Ensure that preventive medicine program shall be think of.
l)	Is ambulance posted in proper place and is it available whenever required?	Yes	Complied
m)	Are sufficient numbers of anti-dotes available in case of any emergency?	No	Anti venom shall be made available in OHC.
n)	Are fire safety measures provided in first aid centre?	Yes. Portable Fire Extinguishers are installed.	Verified during visit to OHC.
o)	Are emergency lighting arrangements available at first aid centre?	Yes	Complied
22.4	**PERIODIC MEDICAL EXAMINATION**		
a)	Whether the periodical medical examination of employees, required under relevant statute is carried out?	Yes	Verified at OHC
b)	Whether it is ensured that contractors employee are medically examined during pre-employment as well as during the course of employment?	Yes. SOP is in place.	Verified during audit.
c)	During the periodical medical examination of the workers, are they examined as per the hazardous process in which	Yes	Complied

SR. NO	QUESTION	STATUS	REMARKS
	they work? (First schedule of *The Factories Act,* 1948)		
d)	Are the records of all such examination maintained?	Yes. Records are available.	Complied
22.5	**PERSONAL PROTECTIVE EQUIPMENT AND EMERGENCY EQUIPMENT**		
a)	Whether list of required PPE for each hazardous activity is available?	Yes	Complied
b)	Whether feedback from workers obtained during selection of PPE?	Yes. Safety committee members are been involved in selection.	Good Practice.
c)	Have the workers been trained in proper use of PPE including BA sets?	Yes	Complied
d)	What is the system of procurement, inspection, issue, maintenance and replacement of PPE?	PPE are stocked at warehouse. PPE cupboards are at each building. PPE cupboards are inspected every month.	Good Practice
e)	Whether qualitative and quantitative fit-check for respirators is ensured prior to use?	Yes.	Verified
f)	What are the arrangements for safe custody and storage of PPE?	Individual lockers are provided for all employees	Complied
g)	Are the contractor's workers provided with the required PPE?	Yes	Complied
h)	Do the PPE conform to any standard?	Yes. IS and CE standards.	Complied
j)	Are sufficient eye wash fountains and safety showers available?	Yes	--
k)	Whether appropriate respiratory protective devices	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
	are available in accordance to the hazard potential?		
m)	Are the staff members trained in the right uses of respiratory protective devices?	Yes	--
22.6	**OCCUPATIONAL DISEASES**		
a)	Whether pre-employment medical check-up data available?	Yes. Available with HR department	Complied
b)	During the medical check-up, is any person found having occupational diseases mentioned in 3rd schedule of *The Factories Act*, 1948?	No	Ensure compliance with The Factories Act 1948
c)	Whether the medical practitioner informed the Chief Inspector of Factories about the occurrence of the occupational disease?	Not Applicable	--
23	**ACCIDENT/INCIDENT REPORTING, INVESTIGATION AND ANALYSIS**		
23.1	**ACCIDENT REPORTING AND DATABASE MANAGEMENT**		
a)	What is the procedure for accident / incident / dangerous occurrence reporting?	Incident Reporting Tool [IRIS] is available	Good Practice
b)	Whether the accident data for the last *five* years for reportable and non-reportable accidents are available?	Yes	Records are verified during audit.
23.2	**ACCIDENT INVESTIGATION**		
a)	Are all the accidents investigated?	Yes	--
b)	Whether accident investigation procedure is documented?	Yes. SOP is available.	Verified
c)	Whether accident investigation reports are submitted to top management?	Yes. Reports are shared with leadership team	Complied

SR. NO	QUESTION	STATUS	REMARKS
d)	How are the findings from accident investigation reports communicated to workers?	Through Safety Committee meetings	Verified MOM of Safety Committee
23.3	**ANALYSIS OF ACCIDENTS**		
a)	Whether accident analysis is done as per IS 3786?	Yes	Complied
b)	Whether root causes of accidents are analysed?	Yes	Verified
c)	Is the accident statistics effectively utilized? If, how?	Yes	Verified
d)	What nature of injuries occurred during the last five years?	Human Injury	Employee got fracture
23.4	**IMPLEMENTATION OF RECOMMENDATIONS**		
a)	How does the management ensure implementation of the recommendations to avoid recurrence of accidents and incidents?	Accident Investigation and analysis is been carried out through online portal “Suraksha Setu Portal”. This portal monitor the entire stages of accidents investigation including the implementation of recommendation.	Good Practice.
23.5	**REPORTING AND INVESTIGATION OF NEAR-MISS INCIDENTS**		
a)	Are all near-miss incidents reported and investigated?	Yes	Complied
b)	Is there any system of classifying and analyzing the near-miss incidents?	Yes	Complied
24	**C-24 EMERGENCY PREPAREDNESS**		
24.1	**SITE SPECIFIC DETAILS**		
a)	Are the site area maps (including layout, access roads and assembly points) available in control room / emergency control centre?	Yes	--

SR. NO	QUESTION	STATUS	REMARKS
24.2	**DUTIES AND RESPONSIBILITIES OF KEY PERSONNEL**		
a)	Is the hierarchy of emergency response personnel right from site emergency controller downward, and alternative officials identified?	Emergency Response Team has been developed and roles and responsibilities are assigned.	--
b)	Are the duties and responsibilities assigned to the designated officials during emergency, both during and outside normal working hours clearly identified and understood by them?	Yes	--
24.3	**IDENTIFICATION OF EMERGENCIES AND ACCIDENT SCENARIO**		
a)	Are the possible accident scenarios leading to emergency identified and known to the operating personnel?	Yes. Mock Drill schedule with scenarios has been developed.	Verified. Good Practice.
b)	Are approved emergency preparedness plans (onsite and off-site) in place?	Yes.	--
24.4	**DECLARATION AND TERMINATION OF EMERGENCY**		
a)	Is the list of designated officials who are to be communicated about declaration and termination of emergency available in the control room / emergency control centre?	Emergency Response Plan in place.	--
b)	Are the methods of communication (siren, public address system etc.) for declaration and termination of an emergency known to all the workers?	Yes. During weekly training this information is been shared with employees.	Good Practice.
24.5	**RESOURCES-EVACUATION / TRANSPORT**		

SR. NO	QUESTION	STATUS	REMARKS
a)	Are the following resources (equipment, personnel and procedures) required to handle emergency available?		
1.	Communications,	Yes	Complied
2.	Public announcement systems		Complied
3.	Monitoring of hazardous releases into the environment,	Yes	Complied
4.	Emergency shelters at the facility,	Yes	Complied
5.	Emergency exits with proper illumination, with uninterrupted power supply ,	Yes	Complied
6.	Direction for emergency exit / escape route marked in haulage / Alleyways,	Yes	Complied
7.	Transport for evacuation of plant personnel,	Yes	Complied
8.	Medical care including administration of antidotes	Yes	Complied
9.	Security / maintenance of law and order.	Yes	Complied
24.6	**COMMUNICATION FACILITIES**		
a)	Does the emergency control centre have direct communication links with the fire station and the plant control room?	Yes	Complied
b)	Are there adequate alarm points from which an emergency alarm can be raised?	Yes	Complied
c)	Is there infrastructure available for ensuring backup electric power supply for communication links where required.	Yes. Diesel Generator	Complied
24.7	**MEDICAL CARE**		

SR. NO	QUESTION	STATUS	REMARKS
a)	Is the procedure for emergency medical care available?	Yes. Emergency response plan in place.	Verified.
b)	Whether the system has been tested at regular frequency through mock drill / exercises for its adequacy?	Yes	Complied
c)	Does the system of periodic replacement of antidotes and medicines required in emergency exist?	NO. Antidotes are not available in OHC.	Antidotes shall be kept in OHC, while considering poisonous snakes in the vicinity.
24.8	**UPDATION OF EMERGENCY PLAN**		
a)	Is the emergency plan updated based on the feedback from the periodic drills / exercises?	Yes	--
b)	Are the contact details of all concerned officials kept updated in the emergency plan?	Yes	Complied
24.9	**PERIODIC DRILLS / EXERCISES**		
a)	Are mock-exercises conducted at stipulated intervals?	Yes. Schedule is in place	--
b)	Are the scenarios varied in the mock-exercises to ensure that all possible factors including meteorological conditions, affected plant personnel covered?	Yes	Complied
c)	Whether emergency preparedness Plans have been tested and reviewed at regular frequency through mock drill for its adequacy	Yes. After every modifications and incidents.	Good Practice
24.10	**TRAINING OF PLANT PERSONNEL**		
a)	Are the plant personnel trained in handling emergency equipment?	Yes. As per training schedule.	--
24.11	**PUBLIC AWARENESS PROGRAMMES**		

SR. NO	QUESTION	STATUS	REMARKS
a)	Are public awareness programs conducted for the people around the site regarding the actions to be taken in case of off-site emergency?	No	--
24.12	**MUTUAL-AID PROGRAMME**		
a)	Are the types of accidents where external organizations would be involved in remedial actions identified? Are their responsibilities defined?	Yes	--
b)	Is the plant responsible for rendering mutual aid assistance to any other external organizations? Does this assistance effect the plant's emergency preparedness?	Yes. Always extend support to neighbouring industries. As only fire crew are deployed so Emergency Response Team members are always available at site for any kind of emergency.	Good Practice.
c)	Whether the communication channels for mutual assistance identified and known with and between two organizations?	Yes. As per ERDMP procedure.	Good Practice
24.13	**EMERGENCY CONTROL CENTRE-**		
a)	Is the Emergency Control Center located beyond the effective distances of identified emergency scenarios?	--	--
b)	If the Emergency Control Center is located within the effect distance, is it suitably protected that it will be available in case of emergency?	--	--
25	**C-25 SAFETY INSPECTION**		
25.1	**INSPECTION PROGRAMME**		

SR. NO	QUESTION	STATUS	REMARKS
a)	Are checklists available for inspections? For example availability of checklists like:	Yes	Complied
1.	Handling, Storage and Transportation of hazardous chemicals;	Yes	--
2.	Electrical hazards;	Yes	--
3.	Fire safety;	Yes	--
4.	Hand and portable power tools;	Yes	--
5.	Machine hazards;	Yes	--
6.	Lifting equipment;	Yes	--
7.	Ladders and scaffolding;	Yes	--
8.	Environmental Monitoring;	Yes	--
9.	Civil structure;	Yes	--
10.	House keeping;	Yes	--
11.	Emergency equipment	Yes	--
12.	Gas cylinder and other pressure vessels used / available in the organization.	Yes	--
25.2	**SAFETY RELATED DEFICIENCY (SRD) Report**		
a)	Are SRDs generated based on the area wise checklists?	Yes	--
b)	What is the procedure for resolving the SRDs?	-	--
c)	Whether the procedure exists for notification and root cause analysis of non-conformities and action taken on them?	--	--
25.3	**SAFETY INSPECTION RECORDS**		
a)	Are the safety inspection records maintained?	Yes. As per document retention process.	Verified.
25.4	**METHODOLOGY AND INSPECTION TEAM**		
a)	Is there written procedure for safety inspection?	Yes	
b)	Whether safety inspection is carried out by a designated team?	Yes. Internal inspection with in-house discipline leads are in place.	Good Practice

SR. NO	QUESTION	STATUS	REMARKS
c)	What is the frequency of safety inspections?	Monthly	--
d)	Whether an inspection report is generated?	Yes.	--
25.5	**COMPLIANCE OF RECOMMENDATIONS**		
a)	To whom the recommendations are submitted	Plant Head	--
b)	Are recommendations of safety inspections complied in time?	Yes. Tracking sheet has been developed.	--
c)	Is compliance of recommendations sent to top management?	Yes	--
d)	Is compliance of recommendations reviewed by safety committee?	Key issues are discussed during safety committee meeting.	--
e)	Does top management follows-up the compliance?	Yes. During leadership meetings.	--

3.2 LEGAL COMPLIANCE CHECKLIST:

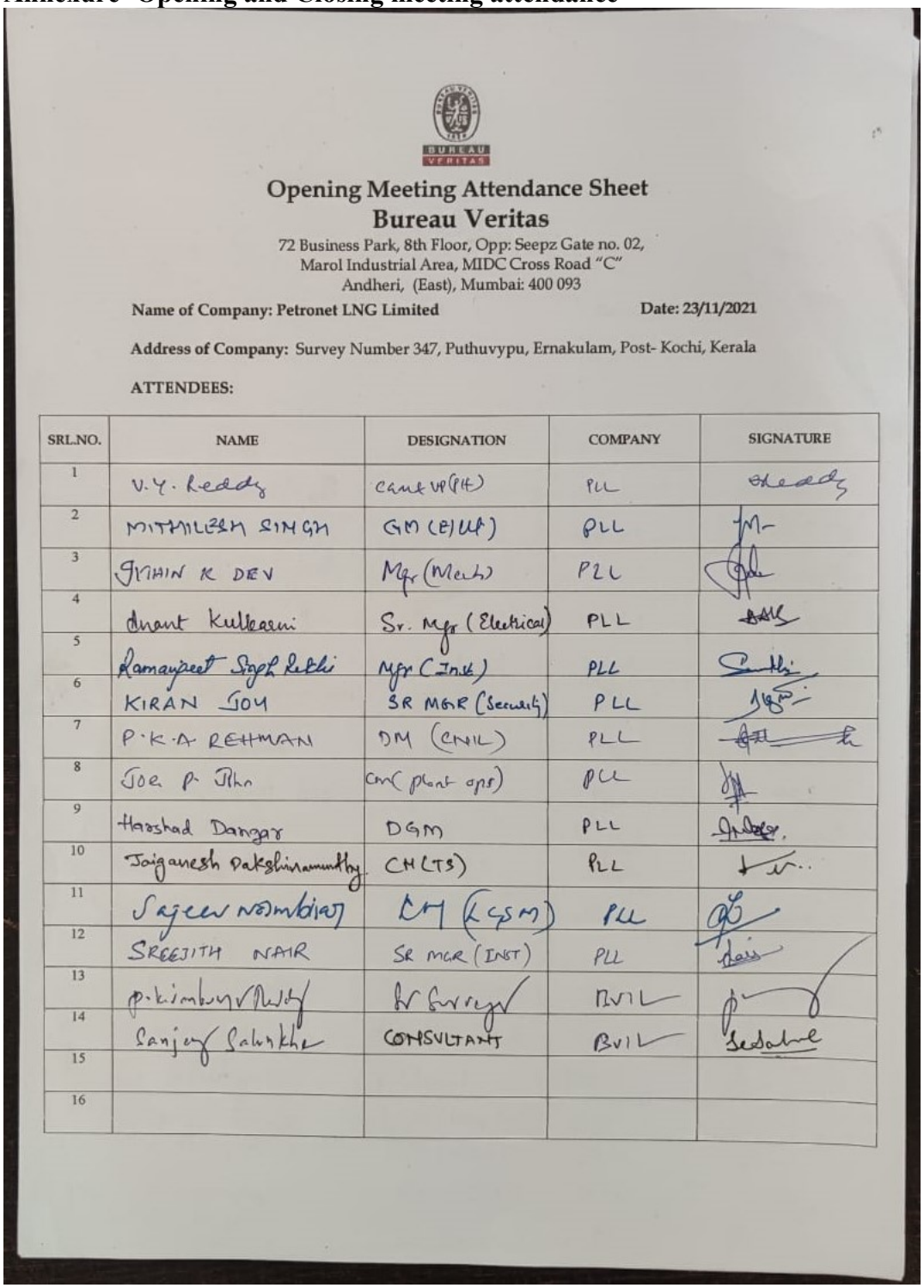
Verification of Statutory Licenses/Approvals/Documents:

The following Statutory Licenses/Approvals/Documents were verified by the audit team and found to be in compliance.

Sl. No.	Document Name	Document No. & Date	Valid up to	Remarks
1	Factory License	D/09/CHN/03/286/2013, dated 09.05.2013	31st December 2022	--
2	Air Consent	PCB/HO/EKM/ICO-R/12/2016, dated 10.10.2018	31-03-2023	Integrated Consent to operate
3	Water Consent	PCB/HO/EKM/ICO-R/12/2016, dated 10.10.2018	31-03-2023	Integrated Consent to operate
4	Authorization for Handling Hazardous waste	PCB/HO/EKM/ICO-R/12/2016, dated 10.10.2018	31-03-2023	Integrated Consent to operate
5	Public Liability Insurance	93000036183300000003, dated 2-06-2018.	01-06-2022	Total sum insured Rupees 15 Crores
6	Factory Plan Approval	92/2016	---	Last updation on 19-03-2019
7	License for Diesel Storage	P/HQ/ KL/15/1309(P283855) dated 17/11/2016	31-12-2026	
8	License for Liquid Nitrogen Storage	S/HO/KL/03/154 (S51446) dated 05/12/2017	30-09-2022	
9	PESO Approval for Jetty Operations	G 22 (47) 175 dated 4/2/13	One time Permission	Approval for permission for commissioning of LNG unloading and Handling jetty.

Sl. No.	Document Name	Document No. & Date	Valid up to	Remarks
10	PESO Approval for LNG Storage	PV (SC)S-87/KL/I dated 4/2/2013	One time Permission	Permission for LNG storage, regasification & LNG tanker loading Terminal.
11	PESO Approval for Truck Loading Station	PV (SC)S-87/KL/I dated 4/2/2013	One time Permission	Permission for LNG storage, regasification & LNG tanker loading Terminal.
12	Fire NOC	D1-20/2013, dated 27-03-2013	One time Permission	NOC from fire & Rescue services department for the occupation of the buildings.
		D1/3049/2013, dated 18/6/2013	One time Permission	NOC from fire & Rescue services department for LNG storage tanks T101 and T 102.
		D1/3049/2013, dated 18/6/2013	One time Permission	NOC from fire & Rescue services department for HSD storage.
13	Certificate of stability	VS/Nov/6/2017 series &VS/July/3/2018 series	07/11/2022 & 05/07/2023	Stability certificates for all plant buildings
14	Emergency Plan Approval	00037, dated 18.02.2017	17/02/2020	
15	Approved Plan of Electrical Substation	Zb3-11037/2010/CEI dated 22/09/2011	One time Permission	Scheme approval
16	Electrical Inspector Approval for Energization	B3-11037/2010/CEI dated 22/05/2012	One time Permission	
17	NOC for Running DG set	B3-11037 / 10 / CE dated 22/09/2011.	One time Permission	NOC from electrical inspectorate for GTG A, B, C and EDG Installation.

3.3 Annexure- Opening and Closing meeting attendance



Opening Meeting Attendance Sheet
Bureau Veritas
72 Business Park, 8th Floor, Opp: Seepz Gate no. 02,
Marol Industrial Area, MIDC Cross Road "C"
Andheri, (East), Mumbai: 400 093

Name of Company: Petronet LNG Limited **Date: 23/11/2021**

Address of Company: Survey Number 347, Puthuvypu, Ernakulam, Post- Kochi, Kerala

ATTENDEES:

SRL.NO.	NAME	DESIGNATION	COMPANY	SIGNATURE
1	V.Y. Reddy	Cmt VP(PH)	PLL	
2	MITHILESH SINGH	GM (E) HP	PLL	
3	JITHIN K DEV	Mgr (Mech)	PLL	
4	Anant Kulkarni	Sr. Mgr (Electrical)	PLL	
5	Ramanpreet Singh Rekhi	Mgr (Inst)	PLL	
6	KIRAN JOY	SR MGR (Security)	PLL	
7	P.K.A REHMAN	DM (CNIL)	PLL	
8	Joe P. Jha	Cm (plant ops)	PLL	
9	Harshad Dangar	DGM	PLL	
10	Jaiganesh Dakshinamurthy	CH (LTS)	PLL	
11	Sajeev Nambiar	CM (QSM)	PLL	
12	SREEJITH NAIR	SR MGR (INST)	PLL	
13	P. Kimbuy Reddy	Dr Surveyor	BVIL	
14	Sanjay Sakhalkar	CONSULTANT	BVIL	
15				
16				

Close Out Meeting Attendance Sheet
Bureau Veritas

72 Business Park, 8th Floor, Opp: Seepz Gate no. 02,
Marol Industrial Area, MIDC Cross Road "C"
Andheri, (East), Mumbai: 400 093

Name of Company: Petronet LNG Limited **Date: 25/11/2021**

Address of Company: Survey Number 347, Puthuvypu, Ernakulam, Post- Kochi, Kerala

ATTENDEES:

SRL.NO.	NAME	DESIGNATION	COMPANY	SIGNATURE
1	Sanjay Salunkhe	CONSULTANT/AUDITOR	BVIPL	
2	P. Kivankuyar Reddy	Sr Surveyor	BVIPL	
3	Yogananda Reddy	CM & VP (PLL)	PLL	
4	Ravichandran J	Senior Manager	PLL	
5	Harshad Dangar	DGM (Ops)	PLL	
6	Jaiganesh Dakshinamurthy	CM (TS)	PLL	
7	Anant Kulkarni	Sr. Mgr (Electrical)	PLL	
8	Sanajeet Singh Sekhi	Mgr	PLL	
9	Dilip Madhavan	Manager (Fire)	PLL	
10	Dileep A.V	DM (HSE)	PLL	
11	CHARLS	DM (HSE)	PLL	
12	KIRAN JOY	SR. MGR [SECURITY]	PLL	
13	P. K. A. REHMAN	Dy. Mgr. (CIVIL)	PLL	
14	JITHIN K DEN	Mgr. (Mechanical)	PLL	
15	Dr. Selsa Rajesh	Sr Chemist	PLL	
16	Sanjay Singh	DGM (HR & LAW)	PLL	
17.	MITHILESH SINGH	GM (Elect)	PLL	
18	Sunil	CM (C&P)	PLL	
19	Sreejith	Sr. Manager (Mech)	PLL	

DISTRIBUTION

Mr. J. Ravichandran,
Manager - HSE

Mr. Deelip A V
Deputy Manager - HSE