

# EXTERNAL SAFETY AUDIT REPORT

## *Kochi LNG Terminal*

### **Petronet LNG Limited**

Survey No. 347, Puthuvypeen, Kochi 682508,  
District Ernakulam, Kerala



**Report No: ISSPL/PLL/Kochi LNG/ESA**



*Audit Date: 15<sup>th</sup> –16<sup>th</sup> December, 2022*

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## List of Abbreviations

AHU	Air Handling Unit
BBS	Behaviour Based safety
EOT crane	Electric Overhead Travelling Crane
FW	Fire Water
F&G	Fire and Gas
GAIL	Gas Authority of India Limited
HAZOPS	Hazard and Operability Study
HSE	Health, Safety and Environment
IS	Indian Standard
KFR	Kerala Factories Rule 1957
LEV	Local Exhaust Ventilation
LNG	Liquefied Natural Gas
LV	Low Voltage
LT	Low Tension
LPG	Liquefied Petroleum Gas
MCR	Main Control Room
MOC	Management of Change
MSIHC Rules	Manufacture, Storage, Import of Hazardous Chemicals Rule 1989
MSDS	Material Safety Data Sheet
NM	Nearmiss
OISD	Oil India Safety Directorate
PESO	Petroleum and Explosives Safety Organisation
PHA	Process Hazard Analysis
PLL	Petronet LNG Limited
PTW	Permit To Work
QRA	Quantitative Risk analysis
RLNG	Re-gasified LNG
SLD	Single Line Diagram
TLF	Truck Loading Facilities
UA	Unsafe Act
UC	Unsafe Condition
UPS	Uninterrupted Power Supply

## **1. PREAMBLE**

### **1.1 INTRODUCTION:**

This report presents the findings and recommendations of the Safety Audit carried out at Petronet LNG Limited, Survey no. 347, Putuvypeen, Kochi 682508 on 15<sup>th</sup> - 16<sup>th</sup> December 2022, by IRCLASS Systems and Solutions Private Limited.

The information presented in the report is based on the perusal of various documents and internal records pertaining to H & S, a sample inspection of the various processes of the complex, the associated infrastructure, and discussions held with various personnel.

The recommendations made herein in the report, are based on the conditions and systems prevalent at the LNG Terminal and hence applicable only to the said locations or mentioned otherwise. PLL may, however, replicate these recommendations in its other such other facilities after studying their implications, depending on the conditions and systems prevalent therein.

### **1.2 SCOPE:**

The Safety Audit has been carried out with reference to IS 14489 - 'Code of Practice on Occupational Safety and Health Audit' as well as Rule 10 of Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, OISD standards, Factories Act, Kerala Factories Rule 1957, Kerala Factories (Major Accident Hazard) Rules 2005, PNGRB guidelines and CEA Regulations. Annexure A has the attendance list of Audit Opening and Closing meetings. The audit also encompassed verification of legal compliance, which is attached as 'Annexure - B'. The prepared audit checklist used is also attached filled as Annexure C.

This is in line with PLL Kochi plant 's scope of work as stated in its 'Work Order'

### **1.3 OBJECTIVES:**

The main objectives of the audit were to particularly examine Health Safety and Environment (HSE) systems prevalent in all operations and processes of the Terminal including associated departments such as Fire and Safety, Occupational Health Centre etc, and identify the potential H & S hazards, apart from suggesting corrective actions, wherever necessary.

**The focus areas were as follows:**

- Examine the existing operations/maintenance and other work practices, safety systems, fire protection facilities, and control measures and check compliance with statutes, standards, and Terminal's Manuals.
- Identify potential Health & Safety (H&S) hazards not covered by the existing control procedures.
- Identify deficiencies and weaknesses, if any, that might have cropped up during modifications/additions of facilities.
- Recommend improvements for better effectiveness of the existing procedures, systems, and control measures for H & S hazards.
- Recommend procedures, systems, and control measures for the hazards identified.
- 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:**

- Study and analyze preliminary information provided by the PLL representatives.
- Conduct an Opening Meeting with concerned officials of the Terminal.
- Carry out sample inspection of the processes and infrastructure within the facility
- Discuss with key personnel as required, to understand the perceptions, views, and suggestions, and to verify the existence of the systems/procedures.
- Study relevant documents and records.
- Conduct a 'Closing Meeting' with the senior personnel of the site to present important observations and recommendations.
- Submit the draft report to the concerned HSE official to filter out any factual errors/discrepancies in its content.
- Submission of the Final Safety Audit Report.

## **1.5 OPENING MEETING:**

As intimated in advance to IRCLASS Systems and solutions Pvt. Ltd., the terminal representative arranged an opening meeting on 15<sup>th</sup> December 2022 at about 10:00 hrs at their site. The meeting was chaired by Vice President (Plant) Sri. Yogananda Reddy. Heads of departments of Operations, Mechanical, Electrical, Instruments, Technical, HR, Finance, Projects, Fire, HSE were also present.

During the meeting, the methodology of conducting the audit was explained to the participants. The Audit Team Leader highlighted the following items:

The Safety Audit was conducted at the request of the Management of the PLL Kochi Terminal. Hence, the need for the involvement and cooperation of the process owners was highlighted as very essential and important in carrying out the safety audit successfully.

The safety audit is a sample inspection of the workplace and processes as well as the study of key documents and records. The scope of the safety audit would be limited to the field visit of areas as planned and made available by PLL Kochi Terminal for inspection, the information provided to the auditors, and documents & records produced for verification.

The safety audit is a fact-finding exercise and aims at the identification of areas for improvement in safety performance based on observations, discussions at various levels, and reference to the records & documents made available for verification. The safety audit report would be a confidential document.

## **1.6 FIELD INSPECTIONS/PROCESS-RELATED AUDITS:**

The field inspections were undertaken with a view of focusing on key areas of safety. In order to help maintain uniformity and speed up the collection of information, inspections were facilitated by using a pre-designed checklist covering various elements of IS 14489 and OISD- STD -194.

Inspections/Audits were carried out in presence of the O & M personnel associated with the respective departments.

## **1.7 DISCUSSIONS:**

Information was also gathered through discussions with the onshore Terminal personnel at various levels from respective disciplines such as Fire and Safety, HR, Operation, Instrumentation, Maintenance, Electrical, and other departments. The

auditors also interacted with the personnel involved in the operation and maintenance of the LNG Unloading Jetty, Sewage Treatment Plant, and Occupational Health Centre.

## **1.8 STUDY OF DOCUMENTS**

In order to check and assess the status of the HSE Management System prevalent in the 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 perused.

## **1.9 CONCLUDING MEETING:**

The closing meeting was held on 16<sup>th</sup> December 2022 at 4:00 PM at the Terminal. VP (Plant), Department Heads, and other key management representatives were present during the closing meeting. The Audit Team Leader made a presentation and briefly narrated the key findings of the audit along with the proposed recommendations. The auditors also clarified the queries raised by the officers of PLL.

## **1.10 BRIEF DESCRIPTION OF KOCHI TERMINAL:**

Petronet LNG Limited, one of the fastest growing world-class companies in the Indian energy sector, set up the country's first LNG receiving and regasification Terminal at Dahej, Gujarat, in 2004 and another Terminal at Kochi, Kerala in 2013. While the Dahej Terminal has a nominal capacity of 17.5 MMTPA [equivalent to 70 MMSCMD of natural gas], the 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. PLL promoters are GAIL (India) Limited (GAIL), Oil & Natural Gas Corporation Limited (ONGC), Indian Oil Corporation Limited (IOCL) and Bharat Petroleum Corporation Limited (BPCL). The authorized capital is Rs. 3,000 crore.

Located along the shore of the Arabian Sea and surrounded by lush greenery, Puthuvypeen SEZ in Kochi which is a truly visual treat for visitors, the Company has set up South India's first LNG Receiving, Regasification and Re Loading Terminal with a 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). The Terminal has two full containment above-ground LNG storage tanks of a net capacity of 155,000 cubic meters each. The Terminal has been commissioned in August 2013. The first Reloading Operation of South Asia was carried out successfully in January 2015, under the model of an LNG Storage & Reload Facility. The first supply of LNG as a bunker to small ships was carried out successfully in February 2015.

The key facilities at the Terminal are jetties for vessel berthing, storage tanks, and regasification facilities. The supporting infrastructure for the operation of the Terminal includes a Jetty control room and Main Control Room completely equipped with UPS, electric substations, Flare, a Captive Power Plant, Laboratory, Fire Station and fire water pump house, Maintenance shops, Warehouse, Occupational Health Centre and Security building. The administrative office is also located on the Terminal campus.

The various Process units consist of :

- a) The cargo unloading jetty of the Terminal is 361.5 mt long. There are seven mooring dolphins and two tug berths. Four dolphins are located on the eastern (towards inner harbour) side and three on the Western (outer sea) side. There are five breasting dolphins equipped with super cone fenders to assist vessel berthing. The shore is connected to the jetty with an approach trestle of 310 mts.
- b) There are two storage tanks No 101 & 102 of 155,000 KL capacity each, constructed by IHI of Japan through its own patented technology. The full containment (above ground) type tanks are constructed on piles. Each tank has a diameter of 85 metres. The storage tanks of the Terminal are linked with 700 metres, 38" LNG pipeline made of SS 316 grade stainless steel from the jetty.
- c) LNG re-gasification facilities - constructed by M/s. CTCI Taiwan
- d) LNG tanker reloading facilities
- e) LNG road tanker loading facilities \_ Being expanded from one bay to 4 bays.
- f) Gas metering and send out to GAIL - Send out section
- g) Atmospheric Separation Unit (ASU) for Nitrogen generation
- h) Flare

### **Other Storage Tanks**

- a) Diesel Storage Tank, Diesel Transfer Pumps, Diesel Unloading Pump

b) Liquid Nitrogen (LIN) storage tanks 40 kL

There are separate sheds for the storage of gas cylinders, lube oil/chemicals, hazardous waste, used batteries, and e-waste under the C&P warehouse. An STP is also operated for the treatment of sewage from the Administrative building

### **1.11 Human Resources.**

The approved manpower as per the Factory license is 380. The number of employees working at the site is about 135. In addition to this number, approximately 70 nos of contract employees and other contractors' workers are employed for projects, maintenance and civil maintenance.

### **1.12 Licenses available**

- Factory license DO9/CHN/03/286/2013 Dt. 9/5/13 is valid till 3-12-2023.
- Consent to Operate from the Kerala State Pollution Control Board (KSPCB) - PCB/HO/EKM-I/ICO-R/12/2016 dt 28/2/2016 is valid up to 31/3/2023.
- The site also comes under the ambit of MSIHC Rules (Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 notified under the Environment Protection Act 1986 and Kerala Factories (MAH) Rules 2005 as a Major Hazard Installation as it stores a large quantity of 'Extremely flammable liquids'.
- LIN storage and HSD storage have licenses under SMPV Rules and Teroleum Rules respectively issued by PESO.
- The compliance status under licenses is mentioned in the report.

## **2. EXECUTIVE SUMMARY**

At the request of Petronet LNG Limited (Kochi Terminal), IRCLASS Systems and Solutions Pvt. Ltd. conducted a Safety Audit of their facility. The safety audit was conducted on the 15<sup>th</sup> and 16<sup>th</sup> of December 2022. The main objectives of the audit were to particularly examine the prevailing Health & Safety (H&S) systems, compliance to various statutes/standards related to H&S, identify potential H & S hazards, and suggest corrective actions, wherever necessary.

The information presented in the report is based on the perusal of various documents and internal records pertaining to H & S, a sample inspection of the facilities of PLL - Kochi Terminal, and discussions held with various personnel deputed at the location. The recommendations made herein in the report, are based on the conditions and systems prevalent in the Terminal, and hence applicable only to the said facility.

The key findings of the safety audit are summarized in the following paragraphs

### **2.1 NOTEWORTHY EFFORTS / STRENGTHS/GOOD PRACTICES**

1. PLL Kochi Terminal has declared its Mission and HSE Policy demonstrating top management's commitment to OHSE responsibilities. The policy referred to here is dated 14 June 2022 and approved by the incumbent Managing Director and Director ( Technical) and is displayed at various locations.
2. Safety review meeting is conducted & chaired by the VP (Plant), who is the Head and CEO of the Terminal.
3. The Terminal has well established Fire Department and HSE Department headed by Senior Managers.
4. The Terminal has established a robust HSE Management System which is certified to ISO 45001. The officers and employees are knowledgeable about the safety systems and committed to safety and its continual improvements. Digital access to HSE documents is available on the digital platform 'Surakshasethu', accessible with password control.
5. There are Safety Committees for employees and Contract workmen. Both are headed by the Unit Head. Meetings are conducted Quarterly and are regular.
6. Compliance with the statutory requirements including the regular external safety audits required under MSIHC Rules is found to be in order. The monthly safety

audit and the monitoring through a safety index by an external agency is a good practice.

7. The online (SAP ERP generated) work permit system conforming to OISD Std 105 is in place, and its compliance is found satisfactory. LOTO is also practiced for electrical isolation.
8. The procedure for Shut down interlock bypass is in place. The register to record bypass is maintained and updated.
9. Standard Operating procedures are prepared for almost all operations at the department level and available in the portal.
10. There is a well-developed procedure and system for Management of Change (MoC) to review any modifications made in the specifications of piping, equipment, process engineering, instrumentation, etc. So far, out of the 348 changes, 244 MOCs have been closed successfully.
11. The quality of the PPE provided (eg: hard hat with built-in safety goggles) and compliance thereto is very good.
12. The Asset Management system of the Terminal is certified to ISO 55001. The Preventive Maintenance and Inspection schedules are followed with the help of SAP ERP system.
13. As GTGs are not in continuous operation, there is a practice of trial run of each GTG once a month. EDG, trial run done once in a week.
14. The periodic testing of pressure safety valves, lifting hoists and tackles etc were found to be updated. Test dates / Due dates are marked on or near the devices. Corrosion prevention through a periodic painting of the jetty and other facilities is undertaken.
15. Modern inspection techniques like boroscopic camera inspection of LNG tanks and robotic internal inspection of the HSD tank are conducted.
16. Building stability certificates as per Rule 3(4) of KFR are available. Efforts to combat soil settlement below the air coolers / other area is undertaken.
17. The control room is located upwind, more than 60 M from the nearest LNG tanks. ESD is based on fail-safe dual redundant PLC. Provision of clean agent (Argon) flooding in MCR and CPP CR in case of fire. Dampers are installed in ducts entering CR so as to resist potential fire spread. (Meets OISD 194).
18. The PLC is provided with a watchdog timer for self-diagnosis, conforming to the best practices. F&G Overview Display Board (Zone / Group wise) are provided in MCR and Fire Station for quick response as per OISD 194.
19. Industrial hygiene measurements like noise and illumination were found to be conforming to statutes.

20. There is a system of Scaffolding inspection by competent / trained persons and only after inspection "Ready to Use" tags are displayed on scaffolds.
21. The Terminal has established an Incident reporting and investigation system through the internal web-based system. All incidents including near-misses are investigated.
22. Good housekeeping is maintained in Main Substation and it is equipped with the required tools and tackles. Electrical relay testing every 5 years. The last testing was carried out with a secondary injection in Aug-Sept. 2022 and records are also available.
23. Hazardous Area Classification is available. All electrical, and instrumentation equipment are suitable as per applicable zones and maintained. OISD-194.
24. OHC is following good practices. They are carrying out medical tests in-house like Audiometry, Optometry, PFT, ECG, and BMI every six months for their employees and bold test through an external agency every year. They are also carrying out Stereo Depth tests for contract workers who are working at heights and issuing cards. They also check the general medical fitness certificate for workers who are coming for work up to three months. Those contract workers who are coming for work for more than three months are asked to produce a medical certificate with Audiometry, Optometry, PFT, ECG, BMI.
25. The fire station is manned by trained operators and crew 24x7. The training to the fire engineer and the operators is imparted at reputed institutions like Gaz de France and the Airport Authority of India, and further training is planned at IPSHEM which is commendable.
26. The fire water network is augmented to meet the 'double contingency as specified in OISD Std 194 / OISD Std 116
27. An Emergency Response & Disaster Management Plan (ERDMP) for the Terminal is in place. It has been approved by a third party in 2021. Emergency mock drills are carried out Quarterly and records are also kept
28. Two emergency Control Centres, one primary and other secondary, at MCR and the Security building respectively are well maintained with adequate communication facilities.
29. A very good level of safety signages, safety posters. Emergency contact numbers and safety instructions / cautionary boards including those about ERDMP and are displayed conspicuously at vantage locations.
30. There is a well-established 'internal safety audit' system. The last internal safety audit was conducted on 12-12-2022 and the report is under preparation. Plant Safety Inspections are carried out through multifunctional teams. Different safety

inspections like (i) Area Owner and Senior Management (ii) External monthly safety audit (iii) Inspection of project sites by the Engineer-in-Charge are adopted which is appreciated. The audit/inspection recommendations are monitored for their implementation to mitigate the risks, to a very reasonable extent. The implementation is regularly followed up at Management Review meetings held quarterly. This is a good practice.

31. The OISD Safety audit was conducted on 28-11-2022 and the Inspection by the Factories Boilers department on 17-11-2022 and the reports are awaited. PNGRB T4S audit conducted in May 2022. The previous external safety audit as required under MSIHC Rules was conducted in May 2021. The recommendations are followed.
32. Periodic ambient air monitoring is carried out with an online system. Hazardous Waste is disposed of through an approved agency/contractor. Regular reports are sent to the KSPCB.
33. Fugitive gas leak tests at fittings by operations.
34. Piling of sinking areas is timely action.
35. Fixed Fire and Gas (F&G) detection system is in place at workplaces of the Terminal. F&G detectors (Combustible LEL: point and beam types; Flame/Fire: poin type), and spill detectors (cryogenic temperature detectors) covering a distance are installed at all strategic places like compressor house , send out section.
36. Good hygiene is witnessed in the canteen.

## 2.2 AREAS FOR IMPROVEMENT

The key findings of the audit are detailed below. It may be noted that the specific areas of audit during the site round have been considered. The audit findings are in reference of IS 14489, relevant OISD standards and statutes. The relevant standard reference is quoted in the bracket.

### A. HSE and Fire Safety Management

1. **Loading of LNG Road Tanker:** The LNG road tanker loading bays are being enhanced to 4 bays from the present 1 bay. The fabrication works are going on along with tanker filling operations. Two major Hot Permits were on when loading was on. One PTW was related to cutting and welding on the pipe rack just above the tanker (TLF expansion) and another one was a JCB excavator digging near the tanker. This is a violation of normally accepted Terminal Regulations globally. The Site and Business division should have provided some windows for such project hot work.

It is informed that a JSA has been conducted for this job and that works are suspended during the connection and disconnection of the loading arms. It is observed that the precautions taken are inadequate to conduct hot work along with tanker filling operations. A full height shielding of the loading bay shall be done to prevent sparks from the fabrication activities / accidental dropping of tools etc

2. Spray pattern of Eye-wash fountains in SS&EW station and near gas cylinder storage is not adequate. This shall be rectified to give the correct pressure and spray pattern.
3. HSE Manual needs to have headers & footers, with revision history, and an updated HSE organization chart.
4. The investigation procedure does not detail how root causes involving human errors will be addressed. It should further elaborate on the 'Just and Fair' culture.
5. Provide pictorial signage on cryogenic hazards such as frostbite, and cold brittleness of skin and bones. Provide more pictorial safety signages for workers where applicable.
6. MSDSs are available in a scattered way. Consider providing a central repository for all MSDSs. Provide in local language also.
7. MCPs and Fireman switches look similar. Provide information above the fireman switch outside control rooms. Label the lighting switches/ventilation blower at the entrance to MCR to avoid confusion.

8. Increase the frequency of heat stroke training before summer and make frostbite training more frequent.
9. Provide directions /signboards to phone booths, SS&EW stations, and escape route (Loading deck downwards)
10. Consider providing BBS Training, particularly to contract workers.
11. The number of near-misses reported is 9 and that of the minor incidents is 23 during the year 2022 till the date of the audit. The number of Near Miss Reporting can improve considering the pattern of incidents Launch a campaign on the advantages of reporting NMs, UAs & UCs.
12. In the maintenance building, a temporary cutting and welding shop is set up with a lot of spark coming out, despite the curtains provided which are found open partially. Nearby, used oil storage cans/drums were seen. Consider improving Risk Assessment for welding jobs in the maintenance shop
13. Fire water line to GAIL is painted in white and hence not easily identifiable. The colour of the fire water tie-up line to GAIL shall be changed to red and labeled properly. (OISD std 116 cl 5.8(vii) and IS 2379)
14. Turning radius of roads near the reception centre seems to be inadequate for long vehicles like LNG tankers. Also, the movement of such long slow moving vehicles through the main gate and in front of the Fire station and OHC / Ambulance can hinder the movement of emergency vehicles. The Terminal shall consider an alternate product movement gate and route for the LNG tankers coming in for filling. (OISD Std 118. Cl.5.1(l))
15. A better housekeeping is required in the fire water pump house (loose rubber seals found littered). FW Pump house has damaged/dilapidated louvers through which birds may enter and drop corrosive beats. The louvers shall be repaired.
16. It is observed that the signage for the long pipelines and utility points needs improvement to identify the services/contents of the pipelines easily (eg: pipe lines from jetty, utility points at jetty). A signage policy providing labeling of 'services' or contents on the pipes at regular intervals on long pipelines and at pre-selected places such as turnings, valve stations, etc shall be implemented. Labeling of utility points should be done in addition to the colour code. (IS 2379)

## **B. Maintenance :- Electrical & Instrumentation**

1. Metering Station:
  - i. EOT crane pendant (Push button station) is not flameproof. Hence, other Electrical equipment of EOT (like motors, control panels, limit switches) should be checked for suitability to the classified areas.
  - ii. Some Flanges joints in STV are not having continuity jumpers.



2. Flanges in STV area should be checked for bonding.
  
3. Jetty Control Room:
  - i. SLD to be displayed in the Substation.
  - ii. Access behind the electrical panels to be cleared.
  - iii. Housekeeping is required in S/S and AHU room.
  
4. Main Control Room :
  - i. UPS Battery: Proper passage to be provided around the battery rack.
  
5. Electrical relay test is being conducted with secondary injection. However, relay testing with a primary injection to be done for motor/ outgoing feeders whenever possible once in 5 years and for incomers and bus-couplers can be done on the basis of the availability of plant shutdown. (OISD 137 Cl.6.3)
  
6. Insulating mats shall be placed in front of the electrical panels in the FW Pump house.

### **C. Mechanical Hazards**

1. The RLNG lines in the metering station are of Carbon steel. These lines are cold and atmospheric condensation is seen. Corrosion under insulation is to be monitored.
  
2. In the Gas cylinder storage shed under the C&P department, there is no separate marking/labeling for the segregation of different gas cylinders. (Gas Cylinder Rules Rule 21(4))
  
3. Hydrogen cylinder was seen stored among other cylinders in the Gas cylinder storage shed. N<sub>2</sub> cylinders used for inert gas flooding were also stored in the same shed and are painted red. Additional labeling of such N<sub>2</sub> cylinders shall be done. An empty cylinder was standing unsecured. No lighting is provided to respond to emergencies during the night.
  
4. LNG sampling bombs used in lab (3.75 L), though imported, have not been formally inspected and tested since inception 9 years back as per Gas Cylinder Rules 2016.
  
5. Housekeeping may be improved in the Maintenance shop. LEV may be used at the welding booth area for the removal of welding fumes from inside the building.
  
6. The adhesive vinyl flooring provided in the ramp of the warehouse is torn / loose and poses a tripping hazard. This shall be rectified.

7. Loose metal pieces such as pipes, poles etc are littered at certain places (e.g. metering shed area). They could be flying hazards during stormy weather. Remove all such loose littered metal pieces.

### **Others / Miscellaneous**

1. The pressure regulator for H<sub>2</sub> and He cylinders in the laboratory are not calibrated since the inception 9 years back. Make a list of all due and critical calibrations and carry out calibrations/validations.

## 2.3 ANNEXURE – A

### Electrical Safety Observations

#### Good practices :

- ✓ Emergency contact numbers are displayed at various locations.
- ✓ Online work permit system and LOTO system is in place.
- ✓ Proper signage boards are provided.
- ✓ All records like maintained properly like Safety Training records, MOM of Safety Committee, Periodical Medical examination, testing cycle & their reports.
- ✓ 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.
- ✓ 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.
- ✓ The PLC is provided with a watch dog timer for self-diagnosis. Conforming to Best Industrial practices. 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. 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.
- ✓ Dampers are installed in ducts entering control room so as to resist potential fire spread through it. Conforming to OISD Standard-194.
- ✓ Hazardous Area Classification document of plant is available and all electrical, instrumentation equipment are suitable for Zone-II Gas group. Conforming to OISD Standard-194.
- ✓ Provision of clean agent (Argon) flooding in MCR, CPP CR in case of fire is provided for protection of the personnel and facilities in the control room. Conforming to OISD Standard-194 and Best Industrial Practice.
- ✓ CPP : As GTGs are not in continuous operation, there is a practice of trial run of each GTG once in a month. EDG, trail run is being done once in a week.

- ✓ Main Substation is having good house keeping and is equipped with required tools tackles. Electrical relay testing is being carried out every 5 years. Last testing carried out with secondary injection in Aug-Sept. 2022 and records are also available.
- ✓ Management of Change (MOC): So far around 348 changes have been implemented through MOC process. Out of that 244 MOCs are closed. Multiple level review of MOC evident. No untoward incidents or new hazards out of the changes already implemented occurred so far.

**Areas for improvement :**

1. Metering Station:
  - iii. EOT crane pendant (Push button station) is not flameproof. Hence, other Electrical equipment of EOT (like motors, control panels, limit switches) should be checked for suitability to the classified areas.
  - iv. Some Flanges joints in STV are not having continuity jumpers.
2. Flanges in STV area should be checked for bonding.
3. Jetty Control Room:
  - iv. SLD to be displayed in the Substation.
  - v. Access behind the electrical panels to be cleared.
  - vi. Housekeeping is required in S/S and AHU room.
4. Main Control Room :
  - ii. UPS Battery: Proper passage to be provided around the battery rack.
5. Electrical relay test is being conducted with secondary injection. However, relay testing with a primary injection to be done for motor/ outgoing feeders whenever possible once in 5 years and for incomers and bus-couplers can be done on the basis of the availability of plant shutdown. (OISD 137 Cl.6.3)
6. Insulating mats shall be placed in front of the electrical panels in the FW Pump house.

**2.4 ANNEXURE – B**

**Attendance List of the Audit Opening and Closing Meetings**



**OPENING & CLOSING MEETING**

**ATTENDANCE FORM**

<b>JOB TITLE:</b>	EXTERNAL SAFETY AUDIT AT PETRONET LNG TERMINAL KOCHI
<b>CLIENT:</b>	PETRONET LNG LIMITED
<b>PLACE:</b>	KOCHI, KERALA

<b>Opening Meeting Date:</b> 15 DEC 2022	<b>Closing Meeting Date:</b> 16.12.22
------------------------------------------	---------------------------------------

Sr. No.	Name of Representative	Designation	Department	Signature	Signature
1.	DEEPAK ANJITA	Sr.Mgr.	OPERATIONS	[Signature]	
2.	DILIP MADHAVAN	Sr. Mgr	FIRE	[Signature]	[Signature]
3.	Mithikesh Singh	GM	Maintenance	[Signature]	[Signature]
4.	Debagyati Satpathy	GM	CCR	[Signature]	[Signature]
5.	Keerthi Singh	DGM	Port Ops	[Signature]	[Signature]
6.	Ashish Gupta	Sr. Mgr (CSO)	CCR	[Signature]	[Signature]
7.	Sujay K. Singh	DEPT HIR	HIR	[Signature]	[Signature]
8.	Ajay Nambiar	CM	LEGIS	[Signature]	
9.	Vishnu Nampoothiri	Manager	FSM	[Signature]	
10.	ASHWIN K DEV	MGR	Mechanical	[Signature]	[Signature]
11.	Alpesh Patel	CM	Instrument	[Signature]	[Signature]
12.	Sreejith Nair	Sr. Mgr	Projects	[Signature]	[Signature]
13.	Rafael...	Sr mgr	Lab Ops	[Signature]	[Signature]
14.	DANIL KUMAR	DE	CIVIL	[Signature]	
15.	Creemankumar	HSR	BIS	[Signature]	[Signature]
16.	Anant Kulkarni	CM	Electrical	[Signature]	[Signature]

Name of Auditors	Signatures	Name & Signature of Management Representative
ATUL SRIVASTAVA	[Signature]	
Raghunath M. Keli	[Signature]	
Damien Grosjean	[Signature]	



**OPENING & CLOSING MEETING**

**ATTENDANCE FORM**

<b>JOB TITLE:</b>	EXTERNAL SAFETY AUDIT AT PETRONET LNG TERMINAL KOCHI
<b>CLIENT:</b>	PETRONET LNG LIMITED
<b>PLACE:</b>	KOCHI, KERALA

<b>Opening Meeting Date:</b> 15 DEC 2022					<b>Closing Meeting Date:</b>
Sr. No.	Name of Representative	Designation	Department	Signature	Signature
17	Asst Comdt V R Raj	Manager	Security	[Signature]	
18	Jayaraman Dakshinamurti	CH	TS	[Signature]	[Signature]
19	Harshad Dangar	DGM	Ops	[Signature]	[Signature]
20	Ravichandran J	SM	HSE	[Signature]	[Signature]
21	Yogananda Reddy	Comdt V (PH)	PH	[Signature]	[Signature]
22	D Jeyap	Manager	HSE	[Signature]	[Signature]
23	Philip Varghese	SO	HSE	[Signature]	[Signature]
24	JEDW. G. VARGHESE	DM	Sec	[Signature]	[Signature]
25	KIRAN JOY	SM	SEC	[Signature]	[Signature]
26	<del>L. S. Ramesh</del> R. K. Arundhan	DM	CNLL		[Signature]
<b>Name of Auditors</b>		<b>Signatures</b>		<b>Name &amp; Signature of Management Representative</b>	
Arul SRIVASTAVA		[Signature]			
Raghunathan M. Koli		[Signature]			
Dimitris Grouvas		[Signature]			

**2.5 ANNEXURE – C (IS 14489: 2018)**

**(Clause 5.3.3)**

**Types of Records to be examined during the Safety Audit**

1	2	3	4	5
SR. NO.	ITEMS	PLANT SUBMISSION	AUDITOR'S OBSERVATION	AUDITOR'S RECOMMENDATION
1.	OS & H Policy	Yes	Revised as on 14-6-2022, signed by MD and Dir (Tech). Satisfactory	Nil
2.	Safety Organization Chart	Yes	Exists. Sr Mgr (HSE&F); Sr Mgr (Fire) Mgr HSE, Dy Mgr Fire Latest IMS HSE Manual does not have the latest HSE&F org.	The revised HSE Organization needs to be in HSE Manual. Include Revision sheet. Header & Footer
3.	Training Records on Safety, Fire & First Aid	Yes, Records are available with Learning & Development dept.	Records are available with Learning & Development dept.	Nil
4.	Record of Plant Safety Inspections	Yes, Surakshasetu	The inspection observations of (i) Area Audit jointly by HSE dept and owner, (ii) Plant Rounds by the safety officer or other officers, (iii) Monthly external safety Inspections are captured in an App named 'Surakshasetu'. Satisfactory	Nil
5.	Accident Investigation Reports	Yes, Surakshasetu	Yes. Investigation reports were witnessed. Investigation on for the 12 Dec-22 LTI : barricade fell hitting and injuring contract worker.	The investigation procedure should further elaborate on 'Just and Fair' culture.
6.	Accidents, Dangerous Occurrences, Statistics & Analysis.	Yes, Surakshasetu	Well reported and recorded. Q3 Personnel: NM-1; Minor 9; Major 0; Process Safety: NM 8, Minor 6, Major 0. In 2022 till date Personal Safety NM 9; Minor 23	Near-Miss reporting can improve in number. Launch a campaign on the advantages of reporting NMs, UAs & UCs.
7.	Record of Tests & Examinations of Equipment & Structures as per Statues	Yes	Records/certificates of pressure vessel inspection as per Rule 74 , and of lifting tackles/cranes EOT are available with Mech dept. Form -3 certificates for building and structural stability are available with Civil dept. Satisfactory	Nil
8.	Standard Operating Procedures (SOP) for various Operations	Yes	SOPS are available, dept-wise. Accessible to all digitally. A controlled copy is also available. SOPs are displayed at work locations	Operations dept to include Risk Assessments and Control measures in their SOPs.

9.	Record of Work Permits	Yes	Electronic PTW system. JSA & HIRA made available. PTW Dashboard in MCR. PTW # 130004446 seen in action. JSA, TBT and calibrated continuous gas monitor are in place.	Nil
10.	Record of Monitoring of Flammable & Explosives Substances at Work Place	Yes	Calibrated gas testers are available. MSA and Riken Keiki calibrated models witnessed. Due 16-Mar-23	Nil
11.	Maintenance & Testing Records of fire detection & firefighting equipment	Yes	Testing Records of fire detection & firefighting equipment are available with Instrument Dept.	Nil
12.	Medical records of employees	Yes, OHC	Medical tests of employees are conducted every six months. Medical records are available with OHC.	Nil
13.	Records of Industrial Hygiene surveys (noise, ventilation levels, illumination levels, airborne & toxic substances, explosive gases).	Yes	Records of Industrial Hygiene surveys for noise, ventilation levels, airborne & toxic substances, and explosive gases are available online. Illumination levels are available with the Electrical Dept.	Nil
14.	Material Safety Data sheets	Yes	16-Element MSDS's exist.	Central MSDS controlled depository needed
15.	On-site Emergency Plan & record of mock drills	Yes	ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass	Nil
16.	Records of storage of hazardous solid waste disposal	Yes	In the warehouse, it exists. Transfers are controlled through manifests	Nil
17.	Records of effluent discharges, gaseous emissions and to the environment	Yes, monitoring reports	SOP for environmental monitoring (PLK/HSE/SOP/13 Rev 02 ed 1-Mar-22. Last communication done with KSPCB for Nov 22. Dated 6-Dec-22, Ref PLL/Kochi/KSPCB/ Env Monitoring Report/2022-12/08. Monthly report # SEAAL2211177A dt 23-Nov-22.	Nil
18.	Housekeeping inspection records	Yes, AOA	Housekeeping inspection records are in place.	Nil
19.	Minutes of safety Committee meetings	Yes	Minutes of Safety Committee meetings are available on intranet as well as with Safety Dept.	Nil
20.	Approval of layouts & other approval from statutory authorities	Yes, F&B permits. PESO layout approvals	PESO layout# PV(SC) S-87/KL/I Dt 1-Jun-22. Storage Diesel: 193KL P283855 valid 31-Dec-26; 7KL P283851 valid Dec26; N2 X 2: S51446 valid til 30-Sep-2027	Nil
21.	Records of any modifications carried out	Yes, MOC	MOC is being done as per SIL requirements.	Nil



	in plant or process.			
22.	Maintenance procedure records	Yes	Standard Operating procedures for maintenance (about 25 Nos.) available. Satisfactory	Nil
23.	Instrumentation and equipment Calibration & testing records	Yes	The pressure regulator for H2 and He cylinders are not calibrated since inception 9 years back.	Make a list of all due and critical calibrations
24.	Planned Shutdown maintenance procedures	Not Applicable. Equipment shutdown procedures	There is no total shutdown maintenance for this plant. Breakdown, Preventive and Predictive maintenance are practiced and records are available in SAP. Satisfactory	Nil
25.	In-service inspection manuals, records including that of material handling	Yes	Records of in-service inspection of equipment and piping are available with the Maintenance and Tech Service departments. Satisfactory	Nil
26.	OH & S budget	Yes	Safety budget 3.73 Cr and Fire budget is 2 Cr. Total 5.73 Cr appx	Nil
27.	Inspection books & other Statutory records	Yes	Statutory records are kept. Also available in digital system. Satisfactory	Nil
28.	Records of previous audits.	Yes, suraksha setu	External Safety audit under MSIHC Rules- Last audit in Nov2021 29 points. All complied as per reports. External Safety Audit by BV in Dec 2021 as per BIS14489. Priority Inspection by Factories & Boilers Dept Nov 17, 2022 (Report is awaited); IMS Aug-22 by BV; OISD Safety audit conducted on 28/11/2022. Report to be received.; PNGRB T4S audit conducted in May 2022. 11 points. All complied. An Internal Safety audit is conducted yearly. Last IA conducted on 12/12/2022. Report under preparation.	Nil
29.	Procedure for Safe transportation of hazardous substances	Yes, ERDMP	LNG - ERV is available to take care of transport accidents. Transporter-specific ERDMP is prepared. The responsibility of transportation is with GAIL / IMC. Approved agencies, KEIL / CG Lubricants collect other hazardous waste.	Nil
30.	Records for breakdown of plants during the process of manufacture	Yes, Send out interruption	The break down maintenance records including equipment downtime is recorded in SAP module.	Nil

31.	Records for waste material generated and their disposal	Yes	C&P (Contracts & Procurement) Transfer Manifest Form-10 endorsed by HSEF	Nil
32.	SOP for disposal of waste materials	Yes	SOP for Hazardous Waste mgmt. PLK/HSE/SOP/13 ed 1-Mar-22	Nil
33.	Records for issue of PPE items to the personnel working in process building.	Yes	For own employees, directly issued. Registers are maintained at C&P dept. It is the contractor's responsibility to provide mandatory PPE's, Safety harnesses etc for their employees. Satisfactory	Nil

**2.6 ANNEXURE – D (IS 14489: 2018)**

**(Clause 5.3.4)**

**Safety Audit Checklist**

SR. NO.	ITEMS	PLANT SUBMISSION	AUDITOR'S OBSERVATION	AUDITOR'S RECOMMENDATION
<b>OH &amp; S MANAGEMENT</b>				
<b>OH &amp; S POLICY</b>				
1.	Does the organization have OH & S policy?	Yes	Yes.	-
2.	Who has signed the OH & S policy?	MD & CEO	Signed by MD and Director (Tech)	-
3.	Whether the OH & S policy is per guidelines of the statutory provisions?	Yes	Generally, as per ISO management system standards and Kerala Factories Rules. Forwarded to Director of Factories & Boilers.	-
4.	When was the OH & S policy declared and adopted?	2005	2005 at the Corporate level	-
5.	Whether the OH & S policy reviewed periodically?	Yes	Yes. Revised on 14/6/2022	-
6.	Whether the OH & S policy is available in local language and made known to all?	Yes	The policy is available in trilingual. It is also displayed at vantage locations.	-
7.	What was the last date of updation?	14.06.2022	14/6/2022	-
8.	Does the policy find a place in the annual report?	Yes	Annual report / Website	-
<b>OH &amp; S ORGANIZATIONAL SET UP</b>				
<b>SAFETY DEPARTMENT</b>				
9.	Does the factory have a safety department and what is strength of safety department?	Yes	Employees HSE 5; Fire 6. Fire Contractual 27	The revised HSE Organization needs to be in HSE Manual. Include Revision sheet. Header & Footer
10.	Whether the strength and qualifications of Safety Officers are as per the statutes?	Yes	2 safety officers are complying with KSFR (Kerala State Factory Rules)	-
11.	Does the head of safety department report to the Chief Executive?	Yes	Reporting to Plant Head who reports to Director (Technical). DT to MD	-

12.	How often are the safety officers retrained in the latest techniques of total safety management? What is the frequency of retraining?	Regularly	Yes, 1 man day is compulsory every year per employee. Annually as per needs and opportunity. 2 safety officers and 1 operations engineer were sent to IPSHEM Goa in Oct-22	-
13.	What additional duties the safety officer is required to do?	Nil	Related jobs. PTW, OH&S, Environmental Management System, Emergency response, training to the workforce	-
14.	What is the power of safety officer vis-a-vis unsafe condition or unsafe act?	To stop the work and take appropriate action	He can stop work and counsel. Train and do RCA.	-
<b>SAFETY COMMITTEE (S)</b>				
15.	Does the factory have a safety committee(s)? What are the types, structures and terms of reference of the committees?	Yes, as per the statute	Safety Committee is as per Factory Act-1948 and KFR-1957	Nil
16.	Is the constitution of the safety committee(s) as per the statute?	Yes	It is as per statute.	Nil
17.	How are the members of safety committee(s) selected? (nominated/nominated)	Nominated from each dept. & contractors as per Factory Rules requirements.	Safety Committee consists of total 27 members out of which 13 members are from management, 13 members from non-management and one member is a doctor who is external.	Nil
18.	How often are the meetings of safety committee(s) held?	Once in a quarter	Meetings of safety committee is carried out quarterly.	Nil
19.	Are the recommendations of the committees(s) implemented?	Yes	Recommendations of the Safety Committee implemented @ 90%.	Nil
20.	Are the minutes of the safety committee(s) meetings circulated among the members?	Yes	The minutes of the safety committee meetings are circulated among all HODs and copy also available on intranet.	Nil
21.	Are the minutes forwarded to the trade union(s) and chief executive and occupier?	No	There is no trade Union in Petronet LNG. The minutes are forwarded to all chief executives and the occupier.	Nil
22.	Whether the management and trade union play their active roles in supporting and accepting the committee(s)	Management is committed for all safety measures.	In the meeting, all safety committee members and HODs are present and they are following the committee recommendations.	Nil

	recommendations?			
23.	How are the safety committee(s) members apprised of the latest development in safety, health and environment?	Through email and HSE committee meetings	The safety committee members apprised of the latest development in safety, health and environment through HSE Committee meetings, emails and intranet.	Nil
<b>SAFETY BUDGET</b>				
24.	What is the annual safety budget?	Rs.3,73,47,400/- for the financial year 2022-23.	Yes, verified. Fire budget is 2 Cr, Total 5.73 Cr appx	-
25.	How much percentage is this budget of the total turnover of the company?	The budget is decided as per the actual requirement	0.15%	-
26.	How much budget has been utilized till date?	54%	verified	-
27.	Is the safety budget adequate?	Yes	Stated as yes	-
28.	How is the safety budget arrived at?	By calculating the amount for maintaining the current HSE management system and forecasting the amount for Improvements in HSE management system	Discussed as a positive aspect	-
29.	What is the pattern of expenditure for the last five years?	100 % Consumed at 2021-22.	Almost 100% is consumed every year	-
30.	What are the approved sanctions for the expenditure in this budget?	Management approval is sought for all expenditure.	Discussed as correct	-
31.	Does this budget get reflected in the annual report of the company?	Yes	yes	-
<b>SAFETY MANUAL</b>				
32.	What is the periodicity of updation / review of safety manual?	Periodically	As per need. Currently once in 3 years.	Header, footer & Revision history to be included
33.	Does the safety manual adequately address all the hazards in the plant?	Yes	Generally, yes	-

34.	Are the employee made aware of safety rules / instruction mentioned in the safety manual?	Yes	Generally, yes	-
<b>STANDARD OPERATING PROCEDURES (SOP)</b>				
35.	Are written Standard / safe operating procedures available for all operations and processes?	Yes	SOPS are available department-wise. It is accessible to all digitally. Controlled copies also available.	-
36.	Whether the written Standard / safe operating procedures are displayed or made available and explained in the local language to the workers?	Yes	Many SOPs are displayed at work place.	-
37.	Whether concerned section and safety department prepares standard / safe operating procedure jointly?	Yes	Yes. Each department prepares their SOPs as per a common format under the guidance of the Safety department	The SOPs of the Operations department shall include the safety risks and control measures in their SOPs.
38.	Are standard / safe operating procedures reviewed and updated?	Yes	Yes. Once in two years. Revised in 2022, as directed by OISD safety auditors	-
39.	Have the workers been informed of the consequences of failure to observe the standard / safe operating procedures?	Yes, Tool box talks	Yes. Tool box talks, displays and trainings are utilized to inform of the consequences of non-observance of SOPs	-
<b>PLANT MODIFICATION PROCEDURES</b>				
40.	What is the system for effecting any change in the existing plant, equipment or process?	MOC	SOP for MOC: PLK/Tech/SOP/01 ed 1-Jan-22	-
41.	Whether the P & I diagrams and other related documents are updated accordingly?	Yes	Yes, verified.	-
42.	Whether hazard assessment is done before implementation of modification?	HAZOP	Yes, verified.	-
<b>WORK PERMIT SYSTEM</b>				
43.	What types of work permits exist in the factory?	Cold work permit. Hot work permit. Confined space/hot work in	Cold, Hot, WAH, CS, Excavation, Potential to Spark.	-

		confined space/excavation Permit. Electrical Isolation and Energizing permit. Work at height/jobs that have potential to produce sparks/camera usage Permit. Instrument Isolation and Energizing permit.	PTW Procedure PLK/HSE/SOP/01 ed 1-Mar-22	
44.	Are the necessary forms detailing required safety precautions have been prepared and used for each type of work-permit?	yes	JSA, Method Statements, SOPs, Work Instructions, drawings exist as supporting docs for the PTW	-
45.	Is the responsibility assigned to authorize person for issuing of safety work permit?	yes	Operations are authorized as PTW Issuers	-
46.	Is the copy of safe work permit sent to safety officer before execution of the job?	yes	Hot Work, WAH, CS PTWs are endorsed by HSE	-
47.	Is the validity period specified in the safety work permit?	Yes	Revalidation every shift. Cold & HW PTW can be revalidated up to 1 week shift-wise. CS PTW 1 day-time.	-
48.	Are the records of work permit available and maintained in proper order?	yes	SAP records available.	Nil
<b>CONTROL MEASURES FOR WORK AT HEIGHT</b>				
49.	Is adequate safe access provided to all places where workers need to work?	yes	Scaffolds are inspected by Safety Dept for scaffolding design, planks, proper erection, and adequate safe access and tags are issued before starting the job.	Nil
50.	Are all such access in good condition?	yes	Refer 49	Nil
51.	Are all scaffolds are properly designed and erected?	yes	Refer 49	Nil
52.	Are scaffolds inspected every day before work begins?	yes	Scaffolds are inspected every day before work begins.	Nil
54.	Are planks in good condition?	yes	Refer 49	Nil
55.	Are scaffold walkways, platforms, runs or stairs free of debris, grease, any unnecessary obstruction and projecting nails?	yes	Scaffold walkways, platforms, runs or stairs are free of debris, grease, any unnecessary obstruction, and projecting nails.	Nil

56.	Are the scaffolds higher than 20 m.? If yes, is a netting or intermediate railing provided between toe-boards and hand railings?	yes	For Scaffolds higher than 20 m, the practice of providing netting and intermediate railing between toe-boards and hand railings is being followed.	Nil
57.	Are folding stepladders properly used?	Not available	Step ladders are provided.	Nil
58.	Are ladders set up at the proper slope of about 1:4?	yes	Proper slope of about 1:4 is being followed.	Nil
59.	Do workers use hand lines to lift tools or materials?	yes	Handlines are used to lift tools/ materials.	Nil
60.	Are proper ladders used around electrical hazards?	yes	Proper ladders are used for electrical works.	Nil
61.	On sloping roofs, are crawling boards, lifelines, safety belts and edge protection provided where needed?	Yes	Or work on sloping roofs, practice of using crawling boards, lifelines, safety belts and edge protection is followed.	Nil
62.	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?	yes	Before commencement of work the weak spots for roofs made from MS sheets have been identified and safety nets are used. Asbestos-cement boards are not being used for roof tops.	Nil
63.	Are the workers being medically examined for their fitness to work at height?	yes	Workers working at heights have to undergo medical test of stereo-depth test in OHC and cards for working at heights are issued only those workers.	Nil
<b>WORK IN CONFINED SPACE</b>				
64.	Is work permit system followed for working in confined space?	yes	Yes, verified.	-
65.	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	Yes. LEL 0%, O2 monitored. No toxic in the area	-
66.	Whether the person entering the confined space is using suitable personal protective equipment (PPE)?	yes	Yes, verified.	-



67.	Is rescue team available in case of any emergency?	yes	Yes, verified. Emergency contact numbers are displayed at various locations	-
<b>CONTRACTORS' SAFETY SYSTEM</b>				
68.	Is there any system for selection of contractors?	yes	The system does not include provisions to prequalify contractors on the basis of safety performance.	-
69.	Are there any guidelines on contractor's safety and training?	Yes, Contractor safety manual, SOP for contract safety management	Yes. Contractors Safety Manual is given to contractors at the Tender stage.	-
70.	Whether contract document includes necessary safety and welfare clauses as per statutes?	yes	Yes. Contractor's safety guidelines are signed and returned by the contractor as part of the contract.	-
71.	Is there any programme to ensure use of PPE by contractors personnel?	yes	It is the contractor's responsibility to provide mandatory PPE to their employees. Enforcement of PPE is done through and supervision, work permit, work inspection and BBS.	-
72.	Do the contractors have their own safety organization?	yes	Contractor's safety guidelines ask for safety officer for more than 100 workers. Otherwise, supervisor is responsible for safety function.	-
73.	Are the contractors reporting all accidents and injuries?	yes	All injuries and accidents of contractors are reported. The incident reporting card is kept at all places. Also, Engineer-In- Charge reports incidents. Reporting of near-miss incidents is found to be low.	Improvement in reporting of near-miss incidents by contractors is required.
74.	Are contractor workers trained to observe safety at work place?	yes	Induction training through video and answering a questionnaire is compulsory every three months. Training is linked to gate pass. Onsite training for workers is given on every Wednesday.	It is informed that the video shown for the visitors and contract workmen are the same. The video shown for contract workmen shall be more detailed than the one for visitors
75.	Whether contractor workers are engaged in process / operations? If yes, are they aware of safe operating procedures?	yes	Contract workmen are not involved in the Process. However, they are engaged for assisting in maintenance.	-
<b>PLANT DESIGN AND LAYOUT</b>				

76.	Whether hazardous operations in the plant are segregated?	yes	PESO-certified layout. OISD 118 was followed.	-
77.	Whether occupational health & safety aspects are considered during the design?	yes	Yes. LNG tanks designed by IHI Japan. Other zones by COC & CINDA consortium, (CTCI Taiwan)	-
78.	Are all the equipment provided with adequate space for working, maintenance etc.?	yes	Yes. Drawing # 6719-DWG-PP-A000-01001Rev 13	-
79.	Are the storage tanks provided with enough space/clearance between them?	yes	Yes. Drawing # 6719-DWG-PP-A000-01001Rev 13	-
80.	Whether the plant layout has taken care of the movement of fire-fighting equipment and emergency exits?	yes	Yes, Drawing # 6719-DWG-PP-A000-01001Rev 13	-
<b>MEDICAL MANAGEMENT OF ACCIDENTS</b>				
81.	Are medical facilities available with trained first aid staff and equipment in round the clock shift for all including contractors?	Yes, OHC	One Medical attendant is kept in every shift and one doctor in the general shift.	Nil
82.	Is the ambulance van available for round the clock basis with the dedicated driver?	yes	Kept near OHC.	Nil
83.	Is there any mutual aid scheme available with the nearest hospitals to manage and treat injuries during emergency?	No	They have tie up with nearby hospitals.	Nil
84.	Are the workers /contractor workers aware of emergency medical facilities?	yes	They are made aware of emergency medical facilities before issuing gate passes.	Nil
<b>MANAGEMENT OF EMERGENCIES (NATURAL / MAN-MADE)</b>				
85.	Does the system exist to detect and control these Emergencies?	yes	PLL is within Cochin Port Authority whereby natural calamities are managed in coordination with them,	-
86.	Are the employees aware of the measures to be taken during emergencies?	yes	Yes, ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass. There is a Mutual Aid agreement with BPC	-

			(STF) and FACT Udyogmandalam and DP World	
<b>EMPLOYEES SELECTION AND PLACEMENT</b>				
87.	Whether norms are available for selection of different category of employees?	yes	Yes. Operators are diploma. Technicians are diploma / ITI certificate holders.	-
88.	Whether pre-employment medical examination is being conducted for employees?	yes	Yes. Sampled and verified.	-
89.	Is there any procedure to evaluate safety awareness and record of the employees during their promotion?	yes	In promotion interviews of staff, safety topics / safe work performance are part.	-
<b>SAFETY CULTURE</b>				
<b>ATTITUDES OF MANAGERS</b>				
90.	Do the managers follow the plant safety rules at all times?	yes	Yes, as per audit observation and as per interviews with HSEF personnel	-
91.	What are their attitudes towards safety reviews and audits?	Managers regularly participate in safety audits and reviews.	They are positive and cooperative	-
92.	What is the response of management to safety violation?	Safety violations shall be complied immediately.	They believe in Just and fair culture. Incident Reporting & Investigation PLK/HSE/SOP/03 ed 1-Mar-22	The investigation procedure should further elaborate on Just and fair culture
93.	Whether safety related decisions are taken in consultation with the workers?	Yes	Two Safety committees involve both employee and contractor workers respectively	-
94.	What is the attitude of the managers towards non-use of personal protective equipment?	Not permitted	PPE violation is almost nil.	-
<b>ATTITUDES OF WORKERS</b>				
95.	Whether workers are aware of the consequences of their wrong actions?	yes	During HSE training, workers are made aware of the consequences of their wrong actions.	Nil
96.	Are laid down safe working procedures followed strictly?	yes	Laid down safe working procedures are being followed strictly.	Nil
97.	What is the attitude of the workers towards their own mistake, which	Workers are very well aware about the safety	They share the mistake with others so that same mistake can be avoided by others.	Nil

	can prejudice safety?	procedures		
98.	Do the workers report near miss incidents and suggest safety improvements?	yes	They report it through online near system.	Nil
99.	Are the workers aware of the system of rewards and sanctions relating to safety matters?	yes	They participate in the safety awareness quiz.	Nil
100	What is the attitude of workers towards use of personal protective equipment?	Workers ensure compliance to all PPE.	Workers are more vigilant about the safety practices and they follow them strictly.	Nil
<b>STATUTORY LICENSES, APPROVALS AND RECORDS</b>				
101	Whether all the safety related Acts / Rules (with latest amendments) applicable to your organization identified, informed to all employees and complied?	yes	Legal register is maintained. LNG sampling bombs (3.75 L), though imported, have not been formally inspected and tested since inception 9 years back as per PESO Gas Cylinder Rules.	Explore how it can be regularized.
102	Whether the licenses have been validated?	yes	Factories License upto 31-12-2023, Consent to Operate by KSPCB upto 31March 23 PESO Diesel tank, Nitrogen vessel, LNG dispenser are also valid. Licence for use of walkie-talkie is valid	-
<b>MOTIVATIONAL AND PROMOTIONAL MEASURES FOR OH &amp; S</b>				
103	Does the factory have occupational health and safety suggestion scheme?	yes	For suggestions on safety and occupational health, various forums are kept open like safety meetings, near miss reporting etc.	Nil
104	Are occupational health and safety contests organized in the factory?	Yes, as part of celebrations	The programs like Safety week, F&S week, Road safety week are being observed.	Nil
105	Does the factory participate in National Awards?	Yes, NSC, F&B, CII etc.	The factory is participating in National awards of NSC, F&B, CII etc.	Nil
106	Has the factory been awarded during last five years?	Yes,, NSC & F&B Award for FY 2021-22	The factory has been awarded for NSC, F&B in the year 2021-22.	Nil
107	Does the organization publish safety bulletin / newsletters?	Yes, Urja quarterly bulletin	Safety bulletin/ newsletters are published in the Urja Magazine.	Nil
108	Whether the safety bulletins are widely distributed?	Yes, online	Safety bulletins are published through online and hard copy to all HODs.	Nil

109	How is the occupational health and safety information including accident statistics disseminated in the factory? (Bulletin boards, Newsletter etc.)	Display boards, Safety Committee meetings, E mail, toolbox talks, weekly trainings	Occupational health and safety information are being communicated to all contract workers as well as employees through display boards and online portal.	Nil
110	What are the activities conducted during National Safety day / week?	Safety competitions for employees and contractors, Pledge taking ceremony.	During the safety competitions for employees and contractors, Pledge taking ceremony is there.	Nil
111	What is the percentage of Workers participating in the various safety promotional activities?	70-80%	About 70-80 % Workers are participating in the various safety promotional activities.	Nil
<b>HAZARD IDENTIFICATION AND JOB SAFETY ANALYSIS</b>				
112	Was an initial process hazard analysis (PHA) completed?	Initial QRA conducted	HAZOP and SIL assessments were done during project stage, ReHAZOP was done in 2019 by BV	-
113	What are the stages of PHA? Whether a dedicated group is identified for PHA?	QRA conducted through an external party	Standard stages of PHA are met. A technical team with rep from ops, maint and HSE reviews and monitors this front.	-
114	Was the PHA appropriate for the complexity of the process and identify, evaluate, and control the hazards involved in the process?	yes	As per standard PHA procedures conducted internally for minor MOC and externally for major MOC/Projects	-
115	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?	Yes, HAZOP, HAZID, QRA	Yes, it is done as per situations and needs.  Loose metal pieces such as pipes, poles etc are littered at certain places (e.g. metering shed area). They could be flying hazards during stormy weather.	Remove all such loose littered metal pieces
116	Does PHA assure addressing issues of inherent safety features with respect to material and their properties?	yes	Yes, as per ISD principles	-

117	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	Yes, the hierarchy of controls is applied as per history. Two major Hot Permits were on when loading was on. One PTW (# 130004446) was related to cutting and welding on the pipe rack just above the tanker (TLF expansion) and another one was a JCB excavator digging near the tanker. This is a violation of normally accepted terminal regulations globally.	The Site and Business division should have provided some windows for such project hot work. A full shielding of the loading bay shall be done to prevent sparks / accidental dropping of tools etc
118	What are the stages of PHA? Whether a dedicated group is identified for PHA?	Conducted externally. In house team conduct PHA when there is a MOC requirement	A dedicated group headed by technical dept	-
119	Does the system exist to promptly address findings and recommendations of PHA?	yes	Yes, the closeout is followed up and reported in management meetings	-
120	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?	Yes, HAZOP updated in 2019	Yes, verified, By BV	-
121	Whether the activities requiring Job Safety Analysis have been identified?	Yes	Yes, mostly non-routine ones.	-
122	Whether the identified jobs for Hazard Identification have been carried out by trained and experienced persons?	yes	Yes, generally.	-
123	Whether the checklists have been prepared on each Job Safety Analysis and are being used while carrying out the job?	yes	Yes, JSAs are attached as part of PTW or under a controlling environment if without PTW	-
<b>PRODUCT SAFETY</b>				
124	Whether hazards arising from use of the products are identified?	NA	Yes.	Provide pictorial signage on cryogenic hazards such as frost bite, and cold brittleness of skin and bones.

125	Whether material safety data sheet prepared for the products?	NA	Yes, it is there	Provide a central repository for all MSDS
126	Are all the products labeled and packed appropriately?	NA	Generally, yes.	Provide stenciled services names on the pipeline
127	Whether safety instructions are given along with products?	NA	Generally, yes for LNG	Provide pictorial signage for workers where applicable
128	Whether policy exists for recall of products?	NA	Not Applicable	-
<b>SAFETY TRAINING</b>				
129	Whether training needs have been identified?	yes	Need identification comes from individual dept.	Nil
130	Is there any programme of induction training, its duration and topics covered?	yes	There is a training calendar for induction training, duration. Training covers the operation of fire extinguisher, fire hydrants, first aid etc.	Nil
131	Whether the assessment of the trainees has been carried out?	yes	The assessment of the trainees has been carried out based on the practical training.	Nil
132	What are the infra-structural facilities available for training?	Training centre	Training is conducted at reception bldg., conference room. and field.	Nil
133	Whether training is conducted by qualified person?	yes	Training is conducted by safety engineers.	Nil
134	Whether trainers are being re-trained from time to time?	yes	Trainers are sent for external training.	Nil
135	Whether proper records of training program conducted are maintained?	yes	Records of training conducted for employees as well as contract workers is maintained properly.	Nil
136	How training programs are evaluated?	Post training questionnaires	After training, tests are conducted for evaluation of trainee.	Nil
137	Whether schedule for training on occupational health and safety is available and maintained?	Yes, training calendar	Training schedule on occupational health and safety is available and maintained.	Nil
138	Whether the training programmes are reviewed?	yes	Training programs are reviewed internally.	Nil
139	Are all the employees periodically trained / retrained and what is the frequency of such training?	yes	Employees are trained yearly.	Nil

140	Are the retraining needs identified whenever a new process / products and change in existing process introduced?	Yes, as part of MOC	The retraining needs are identified whenever a new process / products and change in existing process introduced based on MOC.	Nil
141	Whether training covers top management?	Yes,	Training covers all employees including top management.	Nil
142	How many hours of safety training is given to different employees?	Mandatory 5 man days per year	Every year, minimum five man-days of safety training is given to different employees.	Nil
<b>CHANGE MANAGEMENT</b>				
<b>MANAGEMENT OF CHANGE</b>				
143	Are there written procedures for managing change to process chemicals, technology, equipment and procedures and changes to facilities that affect the plant process / system operation?	yes	There is a written procedure for managing the changes to the process, chemicals, technology, equipment and procedures and changes to facilities that affect the plant process / system operation.	Nil
144	Do the procedures assure that the technical basis for the proposed change addressed prior to any change?	yes	The procedure assures that the technical basis for the proposed change addressed prior to any change.	Nil
145	Do the procedures assure that the impact of the change on safety and health addressed prior to any change?	yes	The procedure assures that the impact of the change on safety and health addressed prior to any change.	Nil
146	Do the procedures assure that modifications to operating procedures are addressed prior to any change?	yes	The procedure assures that modifications to operating procedures are addressed prior to any change.	Nil
147	Do the procedures assure that the necessary time period for the change is addressed prior to any change?	yes	The procedure assures that the necessary time period for the change is addressed prior to any change.	Nil
148	Do the procedures assure that the authorization requirements for the proposed change are addressed prior to any change?	yes	The procedure assures that the authorization requirements for the proposed change are addressed prior to any change.	Nil



149	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	Prior to the start-up of Change of Process, Employees and contract employees who are involved in operating a process, and maintenance are well informed and trained accordingly.	Nil
150	Is the safety information is reviewed and updated on changes?	yes	The safety information is reviewed and updated on changes if applicable.	Nil
151	Are the operating procedures or practices updated?	yes	The operating procedures or practices are updated.	Nil
<b>MECHANICAL INTEGRITY</b>				
152	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	29 pressure vessels are identified. Competent person's inspection certificates are valid till 8/6/2023. (Rule 74 of Kerala Factories rules). Certificates of lifting tackles, cranes, EOTs are maintained by the Mechanical department. PM check schedule is created in SAP and followed for equipment and relief devices. Technical Services takes care of the thickness measurement and integrity of pipelines while the vessels and tank thickness measurements are done through competent person's inspection.	-
153	Are there written procedures to maintain the on-going integrity of process equipment?	yes	The site is certified to ISO 55001. There is an Asset Management Manual and Maintenance Manual, SOPs are available for functions of Technical Service and Mechanical Maintenance with respect of checking the integrity of process equipment.	-
154	Whether training been provided to each employee involved in maintaining the on-going integrity of process equipment?	yes	Training on Asset Management systems is done.	-

155	Are inspections and tests performed on each item of process equipment included in the program?	yes	Yes. Documentation is maintained.	-
156	Does the inspection and test frequency meet the manufacturer's recommendation and good engineering practice?	yes	Yes. Meets the statutory requirements, OISD standards, and manufacturer's recommendations	-
157	Are inspections and tests performed more frequently if determined necessary by operating experience?	yes	Yes. Condition-based inspection / RBI is followed.	-
158	Are deficiencies in equipment that are outside limits corrected before further use so as to assure safe operation?	yes	Replacements are done for parts outside safe limits.	-
159	In the construction of new plants and equipment, whether quality assurance programmer is implemented to ensure that equipment fabricated is suitable for the process?	yes	The site has an MOC procedure and PSSR procedure. ASME / API or equivalent standards are specified for fabrication. Quality Control is done either in-house or by third party.	-
160	Are appropriate checks and inspections made during equipment installation stage?	yes	Yes. Through third-party inspection and PSSR.	-
161	Are the suitability of maintenance materials, spare parts and equipment ensured during maintenance?	yes	Only OEM spares and original material specifications are used to ensure the suitability of maintenance materials.	-
<b>PHYSICAL HAZARD</b>				
<b>HOUSEKEEPING</b>				
162	Are all the passages, floors and the stairways in good condition?	yes	Housekeeping of all the passages, floors and the stairways are done on daily basis hence they in good condition.	Nil
163	Is glass door taped or otherwise marked to make it visible to workers?	yes	Glass doors are taped or otherwise marked to make it visible to workers.	Nil

164	Do you have the system to deal with the spillage?	yes	System is in place to deal with the spillage.	Nil
165	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	Sufficient disposable bins with clear markings are suitably located. Containers of refuse (waste) and trash emptied daily.	Nil
166	Are drip trays positioned wherever necessary?	Yes	Drip trays are provided wherever necessary.	Nil
167	Do you have adequate localized extraction and scrubbing facilities for dust, fumes and gases? Please specify.	Yes, LEV in maintenance building	Adequate localized extraction and scrubbing facilities for dust, fumes and gases has been provided in the maint. Building.	Nil
168	Whether walkways are clearly marked and free from obstruction?	yes	Walkways are clearly marked and free from obstruction.	Nil
169	Do you have any inter-departmental competition for good housekeeping?	Yes, AOA	There is a practice of Inter-departmental competition for good housekeeping. Trophy is given to the department for best housekeeping.	Nil
170	Has your organization elaborated good housekeeping practices and standards and made them known to the employees?	yes	For the awareness of good housekeeping practices and standards, display boards and signage, instructions are provided at various locations.	Nil
171	Are there any working conditions, which make the floors slippery? If so, what measures are taken to make them safe?	NO	For slippery floors, instruction boards are being displayed till measures are taken.	Nil
172	Does the company have adequate measures to suppress polluting dust arising out of materials stored on the roadside?	NA	It is not applicable as this plant is not handling any materials which produces polluting dust.	Nil
<b>MACHINE AND GENERAL AREA GUARDING</b>				
173	Whether machinery and equipment which can cause physical injuries to operator have been identified?	Yes	Machinery like pumps, compressors which can cause physical injuries.	Nil

174	Are all moving parts and point of operation of machinery adequately guarded?	Yes	All moving parts and point of operation of machinery which are exposed are adequately guarded.	Nil
175	Are all fixed guards securely bolted in position and in good condition?	Yes	All fixed guards are securely bolted in position and in good condition.	Nil
176	Are all interlock guards for prevention of physical injury in good condition?	Yes	All interlock guards are for prevention of physical injury in good condition.	Nil
177	Are all emergency stop buttons effective and clearly labelled?	Yes	All emergency stop buttons are effective and clearly labelled.	Nil
178	Are the operators for machines having moving parts aware of the danger of working with loose clothing?	Yes	Operators for machines having moving parts are aware of the danger of working with loose clothing.	Nil
179	Are the openings where there is free fall hazard covered or fenced securely?	Yes	The openings where there is free fall hazard are covered or fenced securely.	Nil
<b>MATERIAL HANDLING</b>				
180	Are adequate equipment available for handling materials?	Yes	Adequate equipment are available such as forklift, hydras etc	-
181	Are the workers aware of the hazards associated with material being handled?	Yes	Generally, yes	-
182	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	TILE (Task, Individual, Load Environment) training is provided. Attendance verified for March 2022 (16 people)	-
183	Do workers follow safe procedures for storage of materials?	Yes	Generally, yes.	-
184	Is the register maintained to record particulars of	Yes	Yes. Mechanical Inspection is in charge of it. All Hoists as seen at the site have SWL tested and due dates	-

	examination of all lifting machines, tools and tackles?		written. Found in order.	
185	Are all the statutory examinations and tests carried out and certified by competent person(s)?	Yes	Yes, various disciplines are assigned as focal points for statutory compliances; however, consolidation is carried out by HSEF and presented to management quarterly.	-
186	Are the operators of crane, lifts, hoists and other mechanized operations adequately qualified?	Yes	A list of such authorized persons is available with the maintenance dept. Crane forklift operator is trained and licensed /certified	-
187	Is the safe working load clearly marked?	Yes	Yes, verified at the site. Example H070 EOT in metering shed. SWL 2T. Tested 20-Mar-2022 Due 19-Mar-2023.	-
188	Has the person employed to operate crane, forklift, or to give signals to crane been medically examined for eyesight and color vision?	Yes	Form 47 is filled. This is true for employees and contractors,	-
189	Is the frequency of eyesight and color vision examination as per the latest rules?	Yes	Yes. In compliance.	-
<b>ELECTRICAL SAFE GUARDING</b>				
190	Are licensed electricians available for electrical work?	Yes	Electricians are having electrical license for electrical work.	Nil
191	Whether area classification for electrical equipment has been carried out?	Yes	Area classification has been carried out for electrical equipment.	Nil
192	Do the electrical fittings conform to area classification for electrical equipment?	Yes	In general, Electrical fittings are conforming to area classification.	Electrical fittings like pendant (Push button station), motors, control panel of EOT in metering Station to be rechecked for the suitability of use in classified area.
193	Is a ground fault current interrupter system (ELCB) in use?	Yes	For ground fault current interrupter system (ELCB) has been used.	Nil
194	Are all connections made by using appropriate plugs, receptacles or	Yes	All connections made are made by using appropriate plugs, receptacles or enclosures. Proper fuses have been provided wherever required.	Nil

	enclosures? Are fuses provided?			
195	Are there any make shift connection bare wires or damaged cables?	Yes	No make shift connection bare wires or damaged cables have been found.	Nil
196	Is there a system of ensuring periodical inspection of hand tools, extension boards used for electrical work?	Yes	The system of ensuring periodical inspection of hand tools, extension boards used for electrical work is in place.	Nil
197	Do the workers use proper types of PPE during the working on live line?	Yes	Workers use proper types of PPE like insulated hand gloves, shoes during the working on live line. Safety gloves, resuscitator are kept in the substation.	Nil
198	Is the separate work permit issued for working on high voltage line?	Yes	The separate work permit issued for working on high voltage line through online permit system & LOTO is also followed.	Nil
199	Whether the process(s) and equipment that generate and accumulate static charge have been identified?	Yes	The process(s) and equipment that generate and accumulate static charge have been identified.	Nil
200	Whether all such equipment including pipelines for flammable materials are properly bonded and earthed?	Yes	In general, all such equipment including pipelines for flammable materials are properly bonded and earthed.	Some Flanges joints in metering station to recheck for continuity jumpers.
201	Whether earth pit resistance is measured and the record maintained?	Yes	All earth pits resistances are measured and the record maintained.	Nil
202	Whether lightning arrestor has been installed and is adequate?	Yes	Lightning arrestors have been provided as per design.	Nil
<b>SAFETY IN STORAGE AND WAREHOUSING</b>				
203	Whether the Material Safety Data Sheet for all chemicals is available?	Yes	Material Safety Data Sheet for all chemicals is available.	Nil
204	Are the chemicals stored as per their hazardous properties including the incompatibility?	Yes	Chemicals are stored as per their hazardous properties including the incompatibility.	Nil
205	Are all containers clearly, indelibly labeled? Are all chemicals stored as per safety regulations?	Yes	All containers are clearly, indelibly labeled. All chemicals are stored as per safety regulations.	Nil

206	Whether all racks and steel cages have sufficient load bearing capacity?	Yes	All racks and steel cages have sufficient load bearing capacity.	Nil
207	Is adequate natural ventilation provided to store room? Is there any emergency exit?	Yes	Store room is provided with adequate natural ventilation. Emergency exit has been provided wherever required.	Nil
208	Whether adequate fire-fighting arrangement existing in flammable chemical storage?	Yes	Adequate fire-fighting arrangement is existing in flammable chemical storage.	Nil
209	Whether methodology for handling spillages of hazardous chemical available along with the equipment required handling the spillage?	Yes	The methodology for handling spillages of hazardous chemical is available along with the equipment required handling the spillage.	Nil
210	Whether aisles are marked and emergency exits displayed?	Yes	Aisles are marked and emergency exits displayed wherever required.	Nil
<b>HAZARD ASSESSMENT FOR NEW EQUIPMENT</b>				
211	What is the system for effecting any change in the existing plant, equipment?	MOC	MOC is being followed for effecting any change in the existing plant, equipment.	Nil
212	Is there system for evaluating hazards from new equipment?	MOC	Refer 211	Nil
213	Whether the P and I diagrams and other relate documents are updated accordingly?	YES	Refer 211	Nil
214	Is any Job Hazard Analysis (JHA)?	YES	Refer 211	Nil
<b>HAZARDS FROM RADIATION SOURCES</b>				
215	Whether licenses have been obtained for storage / handling of radioactive material?	NA	During the project stage, third party carries out Radiography tests whose safety is controlled by a checklist PLK/HSE/FRM/14 Radiography Testing inspection checklist	-
216	Whether approved Radiological Safety Officer appointed?	NA	Not Applicable, Contractor officer credentials are verified by PLL	-
217	Whether appropriate PPEs are used against radiation hazards?	NA	Yes, when applicable	-

218	Is the flooring of the radioactive material handling area amenable for proper decontamination?	NA	Storage is not at the PLL site	-
219	Is the storage room of radiation source as per the license condition?	NA	Not Applicable	-
220	Are all persons working in the facility have radiation safety training?	NA	Not Applicable. Workers are warned through announcements when radiation is exposed.	-
221	Is the operator handling devices using radioactive materials qualified and possess the necessary certificate?	NA	Yes. As per contract approval process by EPC company at site	-
222	Is the periodical radiation monitoring carried out?	NA	Not applicable	-
223	Are the records of inventory of radioactive material maintained in the standard format and submitted to the competent authority as per the period specified?	NA	Not Applicable	-
224	Are emergency handling tools available?	NA	Provide by contractors when needed	-
225	Are the personnel monitoring badges (TLD, Pocket dosimeter etc.) assigned and worn by each radiation worker?	NA	Provide by contractors when needed	-
226	Are the radiation symbol and red light displayed as required?	NA	Provide by contractors when needed	-
<b>CHEMICAL HAZARD</b>				
<b>TRANSPORTATION OF HAZARDOUS SUBSTANCES</b>				
227	What potentially hazardous materials are transported to or from the site (including wastes)	Yes	The main product, LNG is a hazardous material. Hazardous waste (used oil, paint drums, empty chemical barrels, oil-soaked cotton waste) are transported to authorized parties, KEIL and Ceejee Lubricants Aluva. HSD is brought in PESO-approved tanker trucks.	-
228	What modes of transport are used?	Yes	LNG received in ship / LNG sent out in road tanker trucks.	-



	1) Road, 2) Rail, and 3) Pipelines		Natural Gas sent out through pipe line. Other materials by road	
<b>1) ROAD</b>				
229	Does the company employ licensed vehicle of its own / outside sources?	Yes	Vehicles licensed by PESO are used for LNG. Trucks are placed by other parties.	-
230	Are the loading / unloading procedures in place and safety precautions displayed?	Yes	Loading procedure (SOP No.PLK/OPS/SOP/39). Pre-filling check list is available.	-
231	Is there a provision to check the healthiness of road tanker with respect to explosives rules?	Yes	Pre-filling Check list followed for inspection which includes the validity of the road tanker license.	-
232	Are loaded tankers or trucks parked in a specific area on-site?	Yes	Inside the plant parking space is given for the trucks permitted for loading. Turning radius of roads near reception centre seems to be inadequate for big vehicles like tankers.	Explore how turning radius can be improved.
233	Do all truck and tanker drivers carry transport emergency (TREM) card or instruction booklet?	Yes	TREM card in trilingual is given	-
234	Do all truck and tanker drivers get training in handling emergencies during transport?	Yes	Training thru video and road safety training is given. Cards valid for one year are issued to permit entry of the drivers. Also, hazardous cargo license from RTO is ensured.	-
235	Are all the tankers marked for proper Haz Chem code?	Yes	Yes. Included in the checklist.	-
<b>2) RAIL</b>				
236	What hazardous materials are transported by rail?	NA	NA	-
237	Does the company have a direct siding on site?	NA	NA	-
238	Are tankers or other wagons used in transportation?	NA	NA	-
<b>3) PIPELINES</b>				
239	What materials are transported to and from the site by pipelines?	NA	Only LNG	-
240	Are the pipelines underground or over	NA	Over ground. FW lines are generally U/G, except when they are feeding to	-

	ground?		FW outlets	
241	Are corrosion protection measures employed in pipelines?	NA	Yes, CPS (cathodic protection system) is in place	-
242	Whether intermediate booster pumps are used?	NA	Yes, in LNG system	-
243	What is the maximum, minimum and average transfer rate?	NA	As per design of the LNG terminal	-
244	Are the pipelines extended in the public domain?	NA	No. Out of public domain.	-
245	Are the pipelines dedicated for each type of chemicals?	NA	Not Applicable	-
246	Are the pipelines fitted with safety equipment such as leak detectors, automatic shut-off valves etc.?	NA	Yes, as per HAZOP recommendations and basic process design basis.	-
247	What is the frequency and method of testing of the pipeline?	NA	As per applicable requirements	-
248	Is there written procedure for tackling leakages in pipeline?	NA	Yes, maintenance procedures/SOPs.	-
<b>HANDLING OF HAZARDOUS SUBSTANCES</b>				
249	What are the hazardous substances handled in the factory?	LNG, NG, HSD, LIQ. NITROGEN, GLYCOL	LNG, NG, HSD, LIQ. NITROGEN, GLYCOL	-
250	Whether quantity of hazardous substances is above the threshold limit specified in the Manufacture, Storage and Handling of Hazardous Substances Rule, 1989? If yes, then required documentation is available as per the rule.	LICENSED STORAGE AND APPROVAL OBTAINED FOR STORAGE.	Yes, all statutory compliances are in place.	-
251	Whether written procedure for handling the hazardous substance is available and operators are trained for handling such substances including actions required in case	YES	As part of SOPs (SOP for Handling of Hazardous Chemicals): PLK/HSE/SOP/07 ed 1-3-22.	-

	of leakages and spillages?			
252	Are the employees aware of the hazards arising from hazardous substances and safety precautions to be taken during handling of these?	YES	Generally, yes. Last training provided on 'hazardous chemicals handling safety' and Hazardous Materials in June 2022	-
<b>MATERIAL SAFETY DATA SHEETS (MSDS)</b>				
253	Are the material safety data sheets available for all the chemicals handled, used and manufactured in the factory?	YES	Generally, yes.	-
254	Whether the latest MSDS are displayed at strategic locations?	YES	Generally, yes.	-
255	Is it available in the local language?	No	Normally, not.	MSDS to be provided in the local language
<b>SPILL CONTROL MEASURES</b>				
256	Whether spill control procedure is available?	YES	Generally, yes.	-
257	Whether spill collection pit / sump is available at the workplace?	YES	Generally, yes.	-
258	Whether methodology for recovery / disposal of collected material has been established?	YES	Generally, yes.	-
<b>STORAGE OF HAZARDOUS SUBSTANCES</b>				
259	Whether storage vessels are identified with the capacity as required under MSIHC, Rules 1989.	YES	Yes. verified	-
260	What are the storage pressure and temperature?	LNG stored below 1.5 kg/cm <sup>2</sup> pressure at -1620c. Liquid Nitrogen and HSD stored at atmospheric pressure.	Verified	-
261	Whether vessels are above ground /	ABOVE GROUND	Above ground.	-

	underground?			
262	If any of the tanks storing flammable material, whether electrical equipment and fittings are as per electrical area classification?	YES	Designed as per HC Hazardous Zone Area Classification.	-
263	Is the bunded area takes into account the total quantity of the largest tank?	YES	For HSD tank, yes. Also, in LNG dispenser for internal consumers as vehicle fuel.	-
264	Whether the bund perimeter takes into consideration of trajectory of leak from tank?	YES	Yes. Designed to contain.	-
265	Are the vessels properly bonded and earthed and whether periodically checked and record maintained?	YES	Yes, by electrical maintenance	-
266	Are the vessels fitted with remotely controlled isolation valves?	YES	Yes, wherever applicable	-
267	Are vessels provided with emergency vent, relief valve, bursting disc, level indicator, pressure gauge and overflow line?	YES	Yes, wherever applicable	-
268	Where such do vents discharge?	Emergency	To safe locations, mostly connected to flare at safe height	-
269	Are the vessels provided with alarms for high level, high temperature and high pressure?	YES	As per HAZOP	-
270	Are standby empty tanks or any other alternate systems provided for emptying / transfer in case of emergencies?	Not applicable. This LNG tank design is full containment type, which is the safest design till date.	Agreed with PLL statement	-
271	What are the provisions made for fire-fighting / tackling emergency situations around the storage vessels?	Fire hydrant monitors & Extinguishers are provided.	Agreed with PLL statement. Fire Protection philosophy # 6719-SPC-PP-A000-10003 Rev 07 ed 7-Nov-22	-

272	Has any consequence analysis for loss of containment been carried out?	YES	Coarse QRA RTeport # 6719-SD-00-0000-0008 Dated 3-Apr-2013 conducted by ERM on behalf of CTCI EPC contractor	-
273	Whether the vessels are tested as per statute?	YES	Yes. Maintenance is the coordinator	-
274	Whether log sheets are filled up on daily basis for recording the parameters of these vessels?	YES	Yes. Operations are the incharge	-
275	Whether monitors for detection of leakage of flammable / toxic material installed?	YES	F&G detectors are laid out in the operational areas. 132 Fixed LEL/combustible detectors. (106 Point type and 26 Open paths). 52 Spill detectors (temperature). 56 Flame detectors.	-
276	Whether the chemicals stored are as per their compatibility?	YES	Yes, generally done.	-
<b>GAS CYLINDERS</b>				
277	What are the various gas cylinders used in the plant?	Nitrogen, Argon, Hydrogen, LPG	Nitrogen, Argon, Hydrogen, Medical oxygen, 2 Nos. of Acetylene.	Nil
278	Are valid licenses available for storing all these cylinders?	NA	Not required as quantities are less.	-
279	Are the cylinders stored and segregated as per their compatibility?	YES	Generally, yes. But one hydrogen cylinder was seen kept along with other cylinders in the cylinder storage shed of C&P warehouse.	The red-colored Nitrogen cylinders shall be labeled. The segregation of gases in the cylinder storage shed shall be properly marked.
280	What are the measures taken for combating any emergency in the cylinders storage area?	All requirements as per ERDMP plan.	Cylinders are kept chained /restrained in a cylinder storage shed, separated from other buildings. ERDMP is in place.	-
281	Whether integrity test certificates are obtained from the suppliers of the cylinders?	YES	Yes. Own cylinders for clean agent flooding system are tested.	-
282	Are the cylinders chained and secured properly along with the valve caps and proper identification colour code?	YES	Yes. Cylinders in storage shed are kept vertical and chained.	-
283	Are the cylinders protected from heat or	YES	Cylinders are kept inside sheds	-

	sun and rain?			
284	Whether monitors for detection of leakage of flammable / toxic gas installed?	YES	Not required in the storage shed as the number of toxic or flammable gas cylinders is very less. Monitors are available at workplaces.	-
<b>LABELING AND COLOR CODING</b>				
285	Are all the containers, vessels and storage tanks labeled for its content and capacity?	YES	All containers, vessels and storage tanks are labeled for its content and capacity.	
286	Whether the pipelines are colour coded as per IS 2379?	YES	Pipelines are colour coded as per IS 2379.	Nil
287	Is any plant specific colour code followed?	YES	There is no multiple plants.	Nil
288	Whether the color codes are displayed conspicuously in the working areas?	YES	The color codes are displayed conspicuously in the working areas.	Nil
<b>HAZARDOUS WASTE MANAGEMENT</b>				
289	Is identification done for various types of hazardous wastes?	YES	SOP for Hazardous Waste Management PLL/HSE/SOP/13 Rev02 ed 1-Mar-22	-
290	Are these quantities less than those specified by the Hazardous Wastes (Management & Handling) Rules, 1989?	YES	Agreed with PLL statement	-
291	What are their disposal modes?	Disposal through approved vendors	Using Hazardous Materials Transfer Manifest Form -10	-
292	What are the systems / measures adopted for controlling air / water / land pollution?	yes	SOP for environmental monitoring (PLK/HSE/SOP/13 Rev 02 ed 1-Mar-22. Last communication done with KSPCB for Nov 22. Dated 6-Dec-22, Ref PLL/Kochi/KSPCB/ Env Monitoring Report/2022-12/08. Monthly report # SEAAAL2211177A dt 23-Nov-22.	-
293	Whether the solid waste like combustibles, plastic, metals etc. segregated?	yes	Verified at the site	-
<b>FIRE AND EXPLOSION HAZARD</b>				
<b>ORGANIZATIONAL SET-UP FOR FIRE FIGHTING</b>				
294	What is the total strength of fire station and fire crew?	Yes, full-fledged fire department with 6 PLL fire staff, 29 contract	One Senior Manager, 6 PLL fire staff, 29 contract fire crew.	-

		fire crew, two fire tenders and one fire -cum-utility jeep is available.		
295	How many fire crews are available in each shift?	7	Per shift 1 PLL fire operator/ driver, and 7 out sourced fire crew.	-
296	Is there fire squad identified in each shift?	yes	Yes. 3 shift operations are followed.	-
297	Standing fire order is available with latest revision?	yes	Turn out procedure available. (SOP No. PLK /FIRE/SOP/12 and Fire Manual)	-
298	How is the communication with fire station?	Telephone, PA, Walkie talkie	Telephone, PA, Walkie talkie	-
299	Does fire safety inspections carried out?	yes	Fire crew checks firefighting facilities as per schedule.	-
300	Does emergency procedure available for leakage or combustion of flammables?	yes	SOP No.PLK/HSE/SOP/12	-
301	What measures are available to control the fire load in the plant area?	Fire protection system	Stores flammable material, ie.LNG. Strict process safety controls are provided. In other areas like HSD, lubes etc. the inventory is optimized.	-
302	Whether technical knowledge and skills of the manager and staff responsible for overall fire safety of the plant is adequate?	yes	Yes. Manage and staff are trained in AAI, Gas De France, IPSHEM (ONGC).	-
303	How many major and minor incidents / fires were there in the factory during the last five years? Give department / plant wise.	Nil	NIL fire incidents	-
304	Have all the fires / incidents been investigated and corrective actions taken? Give break-up.	yes	NA	-
305	Resources: 1) Adequacy of protective clothing (coat, trouser, gloves, boots and helmets); 2) Availability of SCBA for fire-fighting operations and spare	Yes	Adequate. Fire entry suit - 1 No. Fire Proximity suits about 10 Nos. 27 full sets SCBA and spare cylinders Adequate numbers of hoses, hose reels, pumps, smoke blowers etc. available. Verified the lists. Walkie talkie is available to fire crew	-

	cylinders (at least 2 for each SCBA) 3) Adequacy of hose, nozzles, ladders, lighting equipment and pumps; and 4) Communication facility at fire station, walkie talkie sets during fire-fighting.		also.	
<b>BUILT IN SAFETY IN CIVIL DESIGN AND CONSTRUCTION</b>				
306	Whether the two safe means of escape available? Are they in separate directions?	yes	Adequate escape routes are available	-
307	Is emergency exits provided to the building handling flammables?	yes	Yes, available as seen during site visits	-
308	Whether emergency lights are provided?	yes	Yes, Powered by UPS	-
309	Whether fire/ smoke detectors are installed in fire prone areas?	yes	Yes, provided	-
310	Whether fire call points are provided in different areas?	yes	Yes, provided.	MCPs and Fireman switch look similar. Provide info above the fireman switch outside control rooms
311	Whether Fire hydrants are provided near the buildings?	yes	Yes, provided.	-
312	Is ventilation system in plant handling flammables is adequate to prevent formation of flammable mixtures?	Yes	Yes, provided.	-
313	Is adequate separation is provided between combustible / flammable materials and other material to restrict the fire growth?	yes	Yes, provided.	-
314	Access routes for firefighting operations is available for areas having high fire load?	yes	Yes, available	-
315	Whether building changes interferes with fire detection and / or fire suppression	no	As per MOC procedure, HSE risk assessment takes care of it.	-



	systems?			
316	Whether building changes cause unreasonable fire loading / openings in the fire rated walls?	no	No. As per MOC procedure, HSE risk assessment takes care of it.	-
<b>BUILT IN SAFETY IN ELECTRIC CIRCUITS AND EQUIPMENT</b>				
317	Are the electrical equipment in areas where flammables mixture is likely to be present of flame-proof type?	yes	Electrical equipment in areas where flammables mixture is likely to be present are of flame-proof type.	Refer point 200. EOT related electrical fittings to be checked for area classification in Metering Station.
318	Are lightning arrestors are provided to the buildings / structures storing flammable materials?	yes	Lightning arrestors are provided to the buildings / structures storing flammable materials as per design.	Nil
319	Whether adequate bonding and grounding of electrical equipment / pipelines provided?	yes	In general, adequate bonding and grounding of electrical equipment / pipelines provided.	Refer point 192
<b>EXPLOSIVE SUBSTANCES</b>				
320	Whether necessary license / approval taken from concerned statutory bodies?	NA	There are no direct conventional explosive substances. However, substances which can cause indirect explosion such as HSD storage has PESO license: PESO layout# PV(SC) S-87/KL/I Dt 1-Jun-22. Storage Diesel: 193KL P283855 valid 31-Dec-26; 7KL P283851 valid Dec26	-
321	Whether systems for explosion suppression, high speed fire detection with deluge, sprinklers, explosion venting etc. are provided?	NA	LNG/gas-associated fire and explosion has all necessary detection and fire suppression systems in place	-
322	Whether explosion resistant walls or barricades are provided around explosive storage?	NA	Provided as per QRA study recommendations.	-
323	Whether explosive substance storage areas are restricted for entry?	NA	Yes.	-
324	Whether only trained persons are handling explosive substances?	NA	Not Applicable	-

325	Whether explosive substances are stored and transported in approved containers only?	NA	Not Applicable	-
326	Whether electrical fixtures in areas handling explosives are explosion proof type?	NA	Yes, as applicable	-
327	Whether adequate measures are taken to prevent any sources of ignition where explosive substances are handled?	NA	Yes. PTW system. Vehicle movement, mobile and smoking control.	-
<b>FIRE SAFETY IN HANDLING FLAMMABLE AND EXPLOSIVE MATERIALS</b>				
328	Whether emergency procedure is available for control of leakage?	yes	Fixed and portable gas detectors. Some are interlocked with AHU, GT etc.	-
329	Whether emergency measures are displayed locally in case of accidental spillage / leakage?	yes	Yes. Appropriate instructions are available at workplaces.	-
330	Whether facility is provided for safe drainage of combustible or flammable liquids in case of leakages?	yes	An oil water separator is provided at the outlet.	-
331	Whether highly flammable liquids are stored under inert atmosphere?	no	NA	-
332	Whether flammable storage tanks are provided with flame arrestors?	Yes	For the HSD tank vent	-
333	Whether suitable PPE's are provided?	yes	Yes, as per the list.	-
<b>FIRE DETECTION AND ALARM SYSTEM</b>				
334	What type of fire detection and alarm system provided?	GSB, GSP, FSD, MCP	Flame, Smoke and gas detectors are available.	Nil
335	Whether all fire prone areas of the plant are covered with fire detection system?	yes	Yes. Covered with 132 gas detectors (Point & open path type), flame and smoke detectors.	Nil
336	Whether fire detection equipment and smoke alarms in good operating	yes	Being periodically tested / calibrated.	Nil

	condition?			
337	Whether the numbers of fire call points are adequate and free from obstruction?	yes	46 numbers of fire call points available.	Nil
338	Whether regular inspection / maintenance / testing of fire detection and alarm system carried out and records maintained	yes	Yes, records are verified.	Nil
339	Whether any atmospheric monitoring is carried out for explosive mixture of gases or vapours?	yes	Ambient Air Quality Measurement station available. Checking for flammable atmospheres is done with portable gas detectors.	Nil
340	Whether emergency power supplies are provided to fire detection and fire alarm system?	yes	Yes. UPS and EDG back up is provided.	Nil
341	Whether smoke detectors are located considering ventilation pattern?	yes	Yes	Nil
342	Whether annunciation of fire is local or in the control room or in both places?	yes	Yes. In fire station and main control room.	Nil
343	Whether fire panel is constantly attended?	Yes	Yes. Fire station and main control room are manned 24 hours.	Nil
<b>PASSIVE AND ACTIVE FIRE PROTECTION SYSTEM</b>				
344	What are the passive fire protection measures available? (Barriers, Doors, Dampers etc.)	yes	Fire Proofing for LNG Storage by reinforced concrete. Fire protection philosophy document exists.	-
345	Are the areas requiring fire barriers identified?	yes	Gas zones have restricted entry. All buildings in classified areas have fire-rated construction	-
346	Whether the fire barrier provided is of adequate ratings?	yes	Yes, generally.	-
347	Whether ventilation ducts in flammable areas have been provided with isolation dampers of suitable fire rating?	yes	Buildings have these.	-

348	Whether sprinklers / deluge are installed wherever necessary?	yes	Yes, generally in place	-
349	Whether regular inspection / maintenance / testing of fire protection system carried out and records maintained?	yes	As per ITM of fire systems e.g. PLK/Fire/SOP/03 SOP for operation and Inspection of Fire Hydrant. PLK/Fire/SOP/08 SOP for Deluge Fire protection system. Etc	-
<b>FIXED FIRE EXTINGUISHING SYSTEM</b>				
350	What are the sources of firewater and whether they are dedicated to the fire extinguishing system?	Fire water reservoir	Water is brought from outside, rain water harvesting and condensate from air heater.	-
351	Whether the capacity of dedicated water reservoir is adequate to supply to hydrants for minimum 2 h?	yes	Adequate for 4 hours, Reservoirs of capacities 8171 M3 and 8047 M3 in two lined ponds. Requirement as per OISD standard is 13680 M <sup>3</sup> for 4 hours firefighting. Storage is 16218 M <sup>3</sup> .	-
352	Whether un-interrupted power supply is provided to the firewater pumps?	Yes, EDG	EDG of 1.6 MW available for 3 Nos electrical pumps of 335 kW each. Five diesel fire water pumps are also there.	-
353	Whether the extinguishing medium selected is appropriate to the class of fire (water, gaseous, foam, and dry powder)?	yes	Water, foam, DCP and CO <sub>2</sub> , Clean agent flooding are provided.	-
354	Whether fire hydrants layout is available?	yes	Layout drawing is available	-
355	Whether additional (over minimum requirement) fire hoses, nozzles are available?	yes	Yes. As per list.	-
356	Whether the hydrants lines are kept pressurized?	yes	Yes, at 10.5kg/cm <sup>2</sup>	-
357	Whether regular inspection / maintenance / testing of fixed fire extinguishing systems carried out and records maintained?	yes	As per schedule. (Monthly for portable extinguishers.) DVs - once in 6 months Total flooding functional test once in 5 years (ie during of testing of argon / CO <sub>2</sub> cylinders). Testing of solenoids once in a year planned.	-
<b>PORTABLE FIRE EXTINGUISHING SYSTEM</b>				

358	Whether suitable type and numbers of fire extinguishers provided?	yes	ABC type, CO2 extinguishers in adequate numbers as per statutes and OISD standards.	-
359	Whether the fire extinguishers are located at conspicuous position and easily accessible? Are they fully charged and tagged?	yes	Yes. Inspected every month.	-
360	Whether fire extinguishers periodically inspected, tested, refilled and records maintained?	yes	Monthly inspection is done.	-
361	Whether defective / unchecked fire extinguishers present at site?	No	No. Spare extinguishers are available to replace discharged or defective ones.	-
362	Whether additional fire extinguishers are available?	yes	Spare numbers are kept	-
<b>FIRE FIGHTING EQUIPMENT AND FACILITIES</b>				
363	Whether fire tenders (water / foam) are available?	yes	Water, foam, DCP Multipurpose Fire Tenders - 2Nos ERV - 500kg DCP	-
364	Whether the fire-fighting system and equipment approved, tested and maintained as per relevant standard?	yes	Yes. As per OISD standard	-
365	Whether the SCBA / fire suit provided to firefighting team for immediate action?	yes	Fire entry -1 Fire proximity -about 10 SCBA -27 full set, and spare cylinders	-
366	What is system for maintenance / recharge of SCBA?	Yes	Out sourced	-
367	Is proper access available for firefighting equipment?	yes	Yes. Access to firefighting facilities is kept clear.	-
368	Whether fire hose cabinets are in good condition, easily visible, and accessible?	yes	Yes	-
369	Whether drill tower is available? Are fire personnel carrying out regular fire drill?	yes	Fire crew conducts various types of drills every day.	-
370	What is the communication facility	PA, Telephone, Walkie	PA, Telephone, Walkie-talkie	-

	at fire station? Is it adequate?			
<b>FIRE DRILL</b>				
371	Whether mock fire drills are conducted? What is the frequency of drills?	Yes, Quarterly	Last done in 29/11/2022 along with OISD audit	Nil
372	Whether fire drills are also performed in night shift?	yes	Last done on 17-12-2021	Nil
373	Whether feedback of fire drill is documented?	Nil	Reports prepared	Nil
374	What is the system of mutual-aid scheme?	Mutual aid agreement with neighbor industries	Mutual aid with neighboring industries is available.	Nil
<b>FIRE FIGHTING TRAINING</b>				
375	Whether there is a system of providing fire-fighting training to plant personnel?	yes	Every Friday. Mandatory once in a year for all employees	-
376	What is the frequency and duration of such training? Whether training records are maintained?	Weekly	1 hour mandatory Training records are maintained by HR department	-
377	Whether fire squads are identified for different areas for first-aid firefighting and rescue, and suitably trained?	Yes	All personnel are trained in the first aid, firefighting including hose handling. Auxiliary personnel are identified for rescue operations	-
378	Are all personnel conversant with the fire prevention and protection measures?	Yes	Yes. Verified	-
379	Whether the fire staff are sent for refresher/ advanced training courses?	Yes	Fire staff are trained at AAI or Gas De France, Training is planned/ongoing at IPSHEM, Goa .	-
<b>STATIC ELECTRICITY AND LIGHTNING</b>				
380	Whether all vessels and pipes are provided with suitable bonding and grounding?	yes	All vessels and pipes are provided with suitable bonding and grounding.	Refer point 192. Also Flanges in STV area to be checked for bonding.
381	Whether arrangement has been made for grounding the tanker containing flammable liquid during loading / unloading?	yes	Arrangement has been made for grounding the tanker containing flammable liquid during loading / unloading.	Nil

382	Whether spark resistant tools are provided?	yes	Spark resistant tools are provided wherever required.	Nil
383	Whether lightning protection is provided and is adequate?	yes	Lightning protection is provided and is adequate as per design.	Nil
384	Whether antistatic clothing, hand gloves and footwear are provided?	yes	Antistatic clothing, hand gloves and footwear are provided wherever required.	Nil
<b>PRESSURE RELIEF SYSTEM</b>				
385	Whether the listing of all 'pressure plants' [as defined under Factories Act] has been done?	yes	29 pressure vessels identified and list is available.	-
<b>INDUSTRIAL HYGIENE / OCCUPATIONAL HEALTH</b>				
<b>VENTILATION</b>				
386	Whether any ventilation study has been carried out?	Yes	Ventilation study has been carried out in the year 2017.	Nil
387	Whether natural ventilation is adequate or not?	Yes	Natural ventilation is adequate.	Nil
388	Whether dust / fumes / hot air is generated in the process?	no	No dust / fumes / hot air is generated in the process.	Nil
389	Is there any exhaust ventilation system in any section of the plant?	yes	Exhaust ventilation system is provided in any battery rooms, kitchen.	Nil
390	Is periodic / preventive maintenance of ventilation system carried out and record is maintained?	yes	Periodic / preventive maintenance of ventilation system is being carried out and the record is maintained.	Nil
391	Does any ventilation system re-circulate the exhausted air in work areas?	no	Ventilation system do not re-circulate the exhausted air in work areas.	Nil
392	Is the work environment assessed and monitored for chemical and physical hazards?	yes	The work environment is assessed and monitored for chemical and physical hazards.	Nil
393	Whether PPE are provided to workers exposed to dust / fumes and gases?	yes	PPE are provided to workers exposed to dust / fumes and gases.	Nil
<b>ILLUMINATION</b>				
394	Whether illumination study has been carried	yes	Illumination study is being carried out every six months for the assessment of	Nil

	out for the assessment of illumination level?		illumination level.	
395	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	Periodical cleaning and replacing the light fittings / lamps is done as per requirement in order to ensure that they give the intended illumination levels.	Nil
396	Are the workers subject to periodic optometry tests and records maintained?	yes	Optometry test is being done half yearly during Periodical Medical Examination Workers. Records are maintained.	Nil
397	Are emergency lighting available at first aid center?	yes	Emergency lighting is available at first aid center.	Nil
<b>NOISE</b>				
398	Whether any noise study conducted?	yes	Noise study is being conducted quarterly. Last time carried in Oct-2022.	Nil
399	Are there any machines / processes generating high noise?	yes	Machines like Air compressor, Gas Turbine are generating high noise.	Nil
400	Whether engineering and administrative controls been implemented to reduce noise exposure below the permissible limits?	yes	Engineering and administrative controls been implemented to reduce noise exposure below the permissible limits.	Nil
401	Is there a system of subjecting all those employees to periodic audiometric test who work in high-level noise areas?	yes	PME is done every six months for all employees. Audiometric test is part of PME.	Nil
402	Whether the workers are made aware of the ill effects of high noise?	yes	Workers are made aware of the ill effects of high noise through safety trainings.	Nil
403	Whether ear muffs / plugs are provided and used?	yes	Ear muffs / plugs are provided and used wherever required.	Nil
<b>VIBRATION</b>				
404	Are there equipment which contributes excess level of vibrations and whether they are identified?	yes	No such equipment.	-
405	Whether any vibration study has been carried out?	yes	Periodic vibration monitoring is being carried out	-



406	Are the measures taken to combat vibration to acceptable levels?	yes	Periodic condition monitoring for predictive maintenance is done. Vibration that can cause health issues are not found.	-
407	What is the frequency for measurements of vibration?	Periodically	As per criticality of equipment for predictive maintenance purpose.	-
408	Are the records of measurements and maintenance of equipment / system maintained?	yes	Yes. By Technical services.	-
<b>HEAT STRESS / COLD STRESS</b>				
409	Are there sources from equipment increasing the heat load in work places?	no	GTs, EDGs are some of local heat-producing equipment where maintenance persons are controlled under PTW system.	-
410	Whether evaluation of heat stress is carried out?	yes	As part of the PTW system. Governmental directives are followed during peak summer time. Enough drinking water is available and the resting places/shelters.	-
411	Whether natural ventilation is adequate to minimize the heat stress in work environment?	yes	It is a combination of natural and forced ventilation where necessary	-
412	Are resources available to deal with very hot or very cold conditions (drinking water, lined gloves, insulated boots)?	yes	These are available . Kerala govt has promulgated no work during the mid-day of extremely hot months like May	-
413	Do workers know the symptoms of heat cramps / heatstroke or frost bite/ hypothermia?	no	These training sessions are far in between. Not witnessed in 2022 so far.	Increase the frequency of heat stroke before summer and make frostbite training more frequent.
414	Are the personal protective equipment suitable for reducing the effects of heat stress available?	yes	Generally, yes.	
<b>NON-IONIZING RADIATION</b>				
415	Does the work involve likely exposure to non-ionizing radiations (ultraviolet, infrared, radiofrequency, microwaves, lasers, etc)?	na	Some of these are part of routine tolerable exposure to the personnel. Those exposed to exclusive hazards are instructed to risk-manage them through PTW/JSA	-

416	Whether risk assessment has been done for all work areas involving presence of non- ionising radiations?	na	As applicable. Refer to 415	-
417	Are the work areas displayed with relevant safety signs?	na	As applicable. Refer to 415	-
418	Are the employees aware about the hazards of non-ionising radiations?	na	As applicable. Refer to 415	-
419	Does a written procedure exist for working in non-ionising radiations?	na	Not required	-
420	Is the work environment monitored periodically for physical hazards and control measures initiated whenever deviation from permissible values is observed?	na	As applicable. Refer to 415	-
421	Whether suitable personal protective equipment are provided to workers exposed to non-ionising radiations?	na	As applicable. Refer to 415	-
<b>WORK PLACE MONITORING FOR HAZARDOUS CHEMICALS</b>				
422	Whether the dust, fumes, smoke aerosols and mist are monitored as per statute and records maintained?	na	1 No. AAQMS and portable equipment are available. No significant issues found.	-
423	What are the types of detectors used for monitoring concentration of hazardous chemicals?	GSP, GSB, FSD	Gas detectors.	-
424	Is any alarm system installed for any leakage of hazardous chemicals?	yes	Yes, in MCR and fire station	-
425	Are antidotes available for toxic chemicals?	No toxic chemicals are handled	NA	-
426	Are control measures initiated whenever deviation from permissible values is observed?	NA	Yes. For gas detectors checking with portable gas detectors.	-

<b>FIRST AID FACILITIES AND OCCUPATIONAL HEALTH CENTRE (OHC)</b>				
427	Are adequate numbers of first aid boxes provided? Give location details?	yes	First aids are provided in substation, MCR, LAB, OHC, etc.	Nil
428	Are qualified / trained first aiders available in each shift?	yes	Qualified / trained first aiders are available in each shift.	Nil
429	How many qualified / trained first-aiders are available at each plant / department?	40	40 qualified / trained first-aiders are available at each plant / department.	Nil
430	How many persons are trained / given refreshers training in first aid in a year?	40	40 qualified / trained first-aiders are available at each plant / department.	Nil
431	Whether occupational health centre is provided?	yes	OHC is provided.	Nil
432	Does OHC conform to the provisions of the existing statutes?	yes	OHC is conforming to existing statutes.	Nil
433	Are the Medical Attendants / Doctors available in each shift?	yes	Doctor is available in general shift. Medical Attendants (BSC-Nursing) in all shifts.	Nil
434	What facilities are available for transportation of the injured to hospital?	Ambulance	Ambulance is available for transportation of the injured to hospital.	Nil
435	Are the names of the trained first aiders displayed?	yes	Names of the trained first aiders are displayed near the First Aid Boxes.	Nil
436	Are the name of nearest hospitals and its telephone number available in OHC?	yes	The name of nearest hospitals and its telephone number are available in OHC.	Nil
437	Does the plant have any special preventive medicine program?	no	It is not called for.	Nil
438	Is ambulance posted in proper place and is it available whenever required?	yes	Ambulance is available 24X7.	Nil
439	Are sufficient numbers of anti-dotes available in case of any emergency?	na	Not called for.	Nil
440	Are fire safety measures provided in first aid centre?	yes	Fire safety measures are provided in first aid center.	Nil

441	Are emergency lighting arrangements available at first aid centre?	yes	Emergency lighting arrangements are available at first aid center.	Nil
<b>PERIODIC MEDICAL EXAMINATION</b>				
442	Whether the periodical medical examination of employees, required under relevant statute is carried out?	yes	PME is being done every six months.	Nil
443	Whether it is ensured that contractors employee are medically examined during pre-employment as well as during the course of employment?	yes	It is ensured that contractors' employee are medically examined during pre-employment as well as during the course of employment.	Nil
444	During the periodical medical examination of the workers, are they examined as per the hazardous process in which they work? (First schedule of The Factories Act, 1948)	yes	During the periodical medical examination of the workers, they examined for color blindness, stereo-depth, BMI, ECG as per the hazardous process in which they work.	Nil
445	Are the records of all such examination maintained?	yes	Records of all such PME are in place.	Nil
<b>PERSONAL PROTECTIVE EQUIPMENT AND EMERGENCY EQUIPMENT</b>				
446	Whether list of required PPE for each hazardous activity is available?	yes	SOP No. PLK/SOP/11 Hardhat with inbuilt safety goggles is a good introduction	-
447	Whether feedback from workers obtained during selection of PPE?	yes	Yes. Samples approved with feedback from workers.	-
448	Have the workers been trained in proper use of PPE including BA sets?	yes	Yes. Part of fire training	-
449	What is the system of procurement, inspection, issue, maintenance and replacement of PPE?	PPE stocked at warehouse. PPE cupboards are kept at each building. PPE cupboards are inspected every month.	Safety Department procures PPE.	-
450	Whether qualitative and quantitative fit- check for respirators is ensured prior to use?	yes	Yes	-

451	What are the arrangements for safe custody and storage of PPE?	Individual lockers for all employees provided	Lockers provided for staff. PPE cup boards available.	-
452	Are the contractor's workers provided with the required PPE?	yes	Contractors' responsibility for mandatory PPE, safety belts. Other PPE are issued by PLL on need basis.	-
453	Do the PPE conform to any standard?	yes	IS standards and EN standards.	-
454	Are sufficient eye wash fountains and safety showers available?	yes	Yes. Provided in all plant areas / jetty.	-
455	Whether appropriate respiratory protective devices are available in accordance to the hazard potential?	yes	SCBA, FFP2 dust respirators are provided	-
456	Are the staff members trained in the right uses of respiratory protective devices?	yes	Yes. Training once in a year during fire training.	-
<b>OCCUPATIONAL DISEASES</b>				
457	Whether pre-employment medical checkup data available?	yes	Pre-employment medical checkup data is available with OHC.	Nil
458	During the medical checkup, is any person found having occupational diseases mentioned in 3rd schedule of The Factories Act, 1948?	no	No. As per records, Not found any person with such diseases.	Nil
459	Whether the medical practitioner informed the Chief Inspector of Factories about the occurrence of the occupational disease?	na	Not applicable.	Nil
<b>ACCIDENT / INCIDENT REPORTING, INVESTIGATION AND ANALYSIS</b>				
<b>ACCIDENT REPORTING AND DATABASE MANAGEMENT</b>				
460	What is the procedure for accident/ incident / dangerous occurrence reporting?	Incident reporting tool (IRIS) available.	SOP for incident reporting and investigation exists PLK/HSE/SOP/03 Rev02 ed 1-Mar-22	-
461	Whether the accident data for the last five years for reportable and non-reportable accidents are available?	yes	It is available in the Suraksha-setu portal	-

<b>ACCIDENT INVESTIGATION</b>				
462	Are all the accidents investigated?	yes	All are investigated. NM as per defined risk matrix	-
463	Whether accident investigation procedure is documented?	yes	PLK/HSE/SOP/03 Rev02 ed 1-Mar-22	-
464	Whether accident investigation reports are submitted to top management?	yes	Yes, quarterly and as applicable	-
465	How are the findings from accident investigation reports communicate to workers?	Incident learning shared by mail. Safety committee meetings etc.	Generated from Suraksha-setu	-
<b>ANALYSIS OF ACCIDENTS</b>				
466	Whether accident analysis is done as per IS 3786?	yes	Yes. Investigation Reports seen. IRIS# In/Kochi/2021/81 Incident Date 11-Mar-2022 (HiPo NMs wherein a bag with scaffolding couplings opened loose and items fell down) . and IRIS# In/Kochi/2022/4 Incident Date 14-Apr-2022 9Wastyer Converter caught fire)	-
467	Whether root causes of accidents are analysed?	yes	Yes. Verified in the above Investigation report	-
468	Is the accident statistics effectively utilized? If yes, how?	yes	Training decisions are generally made on the basis of this.	-
469	What nature of injuries occurred during the last five years?	Human injuries	Discussed and witnessed the staistics	-
<b>IMPLEMENTATION OF RECOMMENDATIONS</b>				
470	How does the management ensure implementation of the recommendations to avoid recurrence of accidents and incidents?	Accident investigation & analysis is done through an online portal, named "suraksha Setu Portal"; this portal monitor the entire stages of accident investigation including the implementation of recommendations.	They review the status at various meetings. Director Technical HSE Review MOM # MOM/Q3/QRM-HSE/2022-23 dt 29 Nov 2022. Plant Head Monthly HSE Review Meeting # MOM Dt 10-Dec-2022. MRM MOM # 14 <sup>th</sup> IMS-MRM meeting dt 30-Sep-22 (6-monthly as part of IMS). Safety Committee Employee Qtly # 36 <sup>th</sup> meeting Dt 1-Nov-22. Contractor Safety Committee 21-Oct-22 meeting # 26	
<b>REPORTING AND INVESTIGATION OF NEAR-MISS INCIDENTS</b>				

471	Are all near-miss incidents reported and investigated?	yes	Yes, but Near-Miss reporting can improve in the number	Launch a campaign on the advantages of reporting NMs, UAs & UCs.
472	Is there any system of classifying and analyzing the near-miss incidents?	yes	Yes but the number of Near Misses are not encouraging	-
<b>EMERGENCY PREPAREDNESS</b>				
<b>SITE SPECIFIC DETAILS</b>				
473	Are the site area maps (including layout, access roads and assembly points) available in control room / emergency control centre?	Yes	Yes, verified in ECC. Emergency contact numbers are displayed at various locations	-
<b>DUTIES AND RESPONSIBILITIES OF KEY PERSONNEL</b>				
474	Is the hierarchy of emergency response personnel right from site emergency controller downward?	Yes	Yes, verified	-
475	Are the duties and responsibilities assigned to the designated officials during emergency?	Yes	Yes. In ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass	-
<b>IDENTIFICATION OF EMERGENCIES AND ACCIDENT SCENARIO</b>				
476	Are the possible accident scenarios leading to emergency identified and known to the operating personnel?	Yes	Yes. In ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass	-
477	Are approved emergency preparedness plans (on-site and off-site) in place?	Yes	Yes. ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass	-
<b>DECLARATION AND TERMINATION OF EMERGENCY</b>				
478	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?	Yes	Yes. Recorded emergency messages are relayed to the assigned personnel on their mobile. Weekly drills on messaging is done.	-

479	Are the methods of communication (siren, public address system etc.) for declaration and termination of an emergency known to all the workers?	Yes	Yes, verified in the MCR (Main Control Room)	-
<b>RESOURCES-EVACUATION / TRANSPORT</b>				
480	Are the following resources (equipment, personnel and procedures) required handle emergency available? 1. Communications, 2. Public announcement systems 3. Monitoring of hazardous releases into the environment, 4. Emergency shelters at the facility, 5. Emergency exits with proper illumination, with uninterrupted power supply, 6. Direction for emergency exit / escape route marked in haulage / Alleyways, 7. Transport for evacuation of plant personnel, 8. Medical care including administration of antidotes, 9. Security / maintenance of law and order.	Yes	Yes. Available.  Checked at site.	-
<b>COMMUNICATION FACILITIES</b>				
481	Does the emergency control centre have direct communication links with the fire station and the plant control room?	yes	PA, Telephone, walkie talkie	-
482	Are there adequate alarm points from which an emergency alarm can be raised?	yes	Yes. Total 46 Nos. MCPs . Also emergency telephone 100 and 111.	-



483	Is there infrastructure available for ensuring backup electric power supply for communication links where required?	yes	UPS and EDG	-
<b>MEDICAL CARE</b>				
484	Is the procedure for emergency medical care available?	yes	SOP for casualty management is available.	Nil
485	Whether the system has been tested at regular frequency through mock drill / exercises for its adequacy?	yes	The system has been tested at regular frequency through mock drill / exercises for its adequacy.	Nil
486	Does the system of periodic replacement of antidotes and medicines required in emergency exist?	NA	Not applicable	Nil
<b>UPDATION OF EMERGENCY PLAN</b>				
487	Is the emergency plan updated based on the feedback from the periodic drills / exercises?	yes	Yes. Report 28-Sep-2022 HSD tank T4012 diesel leakage. The Drill Report for Tier 1 drill done on 29 Nov 2022 for OISD auditors is not ready yet. All recommendations have already been implemented.	Expedite completing the Nov drill report
488	Are the contact details of all concerned officials kept updated in the emergency plan?	yes	Yes. ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass	-
<b>PERIODIC DRILLS / EXERCISES</b>				
489	Are mock-exercises conducted at stipulated intervals?	yes	Tier 1 or 2 drills every quarter. Tier 3 was last done in Jan 2021	
490	Are the scenarios varied in the mock- exercises to ensure that all possible factors including meteorological conditions, affected plant personnel covered?	yes	Yes. ERDMP, Kochi: PLK/HSE/DOC/02 Effective 20-Aug-2022. Reviewed by IRClass	-
491	Whether emergency preparedness Plans have been tested and reviewed at regular frequency through mock drill for its adequacy	yes	Tier 1 or 2 drills every quarter. Offsite Tier 3 crisis drill was last done in Jan 2021	-

<b>TRAINING OF PLANT PERSONNEL</b>				
492	Are the plant personnel trained in handling emergency equipment?	yes	Yes. All employees and selected contractors are trained on firefighting mandatorily once in year.	Nil
<b>PUBLIC AWARENESS PROGRAMMES</b>				
493	Are public awareness programs conducted for the people around the site regarding the actions to be taken in case of off-site emergency?	yes	To some extent nearby communities are made aware. In 2020 tier 3 drill, they were informed/involved. Public awareness program conducted on 28-Jun-2022.	Nil
<b>MUTUAL-AID PROGRAMME</b>				
494	Are the types of accidents where external organizations would be involved in remedial actions identified? Are their responsibilities defined?	yes	Yes. Mutual Aid Agreements are with BPCL (STF), FACT, Cochin Port Trust with defined roles & responsibilities	-
495	Is the plant responsible for rendering mutual aid assistance to any other external organizations? Does this assistance affect the plant's emergency preparedness?	yes	Yes, as per Mutual Aid Agreements with BPCL (STF), FACT, Cochin Port Trust. Such involvements provide more experience to the responders rather.	-
496	Whether the communication channels for mutual assistance identified and known with and between two organizations?	yes	Yes, verified in the ECC	-
<b>EMERGENCY CONTROL CENTRE</b>				
497	Is the emergency control centre located beyond the effective distances of identified emergency scenarios?	yes	Within MCR and also at the reception as a standby location	-
498	If the emergency control centre is located within the effect distance, is it suitably protected that it will be available in case of emergency?	yes	Yes, verified	-
<b>SAFETY INSPECTION</b>				
<b>INSPECTION PROGRAMME</b>				

499	Are checklists available for inspections? For example availability of checklists like: a) Handling, Storage and Transportation of hazardous chemicals; b) Electrical hazards; c) Fire safety; d) Hand and portable power tools; e) Machine hazards; f) Lifting equipment; g) Ladders and scaffolding; h) Environmental Monitoring; j) Civil structure; k) Housekeeping; m) Emergency equipment; and n) Gas cylinder and other pressure vessels used / available in the organization.	yes	In the maintenance building, a temporary cutting and welding shop is set up with a lot of spark coming out, despite the curtains provided which are found open partially. Nearby, used oil storage cans/drums were seen.	Consider improving Risk-based inspection
<b>SAFETY RELATED DEFICIENCY (SRD) REPORT</b>				
500	Are SRDs generated based on the area wise checklists?	yes	YES.	-
501	What is the procedure for resolving the SRDs?	yes	Work notifications through SAP.	-
502	Whether the procedure exists for notification and root cause analysis of non- conformities and action taken on them?	yes	Yes. Followed.	-
<b>SAFETY INSPECTION RECORDS</b>				
503	Are the safety inspection records maintained?	yes	Yes. In 'Surakshasetu' app.	-
<b>METHODOLOGY AND INSPECTION TEAM</b>				
504	Is there written procedure for safety inspection?	yes	SOP available. No. PLK/HSE/SOP/2	-
505	Whether safety inspection is carried out by a designated team?	yes	(1) Area owner / Senior management (2) External - Monthly EIC and Safety for project site	-
506	What is the frequency of safety inspections?	yes	Monthly - 2 Nos Project site Monthly - 1	-

507	Whether an inspection report is generated?	yes	Generated	-
<b>COMPLIANCE OF RECOMMENDATIONS</b>				
508	To whom the recommendations are submitted	Head of the dept.	Recommendations and implementation status are reviewed at various meetings. Director Technical HSE Review MOM # MOM/Q3/QRM-HSE/2022-23 dt 29 Nov 2022. Plant Head Monthly HSE Review Meeting # MOM Dt 10-Dec-2022. MRM MOM # 14 <sup>th</sup> IMS-MRM meeting dt 30-Sep-22 (6-monthly as part of IMS). Safety Committee Employee Qtly # 36 <sup>th</sup> meeting Dt 1-Nov-22. Contractor Safety Committee 21-Oct-22 meeting # 26	-
509	Are recommendations of safety inspections complied in time?	yes	Yes, verified in the quarterly presentation made to the management by HSEF dept	-
510	Is compliance of recommendations sent to top management?	yes	Yes, every quarter	-
511	Is compliance of recommendations reviewed by safety committee?	yes	Yes. There are two safety committees. One for employees with management and another for contractors with management. Meetings are conducted quarterly on consecutive months. MOMs as shown under item 508	-
512	Does top management follows-up the compliance?	yes	Yes, in the MRMs. Quarterly performance reviews on HSEF.	-