



# **SAFETY AUDIT REPORT**

Of

## **COROMANDEL INTERNATIONAL LIMITED**

**POST BOX NO.1116**

**SRIHARIPURAM, MALKAPURAM (POST)**

**VISAKHAPATNAM – 530 011**

**ANDHRA PRADESH**

**DECEMBERS, 2019**

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G&G CONSULTANCY  
HYDERABAD**

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## FORWARD

M/s. Coromandel International Limited, a unit of the renowned Murugappa group company situated at Visakhapatnam, engaged for the past six decades, in the manufacture of chemical fertilizers, namely complex fertilizers of various grades.

M/s. Coromandel International Limited is an existing plant, located at Sriharipuram, Malkapuram (Post), Visakhapatnam-530011.

The Company manufactures a wide range of fertilizers and markets around 4.5 million tons making it a leader in its addressable markets. Coromandel has been in business for more than 5 decades.

This safety audit was planned to self assess the implementation part of Safety and Occupational Health Management Systems to identify site specific improvements plans and to meet regulatory requirements. The audit is conducted by referencing to IS 14489:1998 (Various elements of safety management documented in IS: 14489 “Code of conducting Safety Audit”) and taking into consideration the ground realities and implementation status of various safe working methods, practices and management systems.

External Safety Audit was based on random sampling only. This report consists of various chapters starting from a brief introduction followed by methodology, observations & recommendations on Safety Management Systems and site specific observations and ending with conclusion.

Audit not only looks into the deviations or lacunae but also focuses on the best practices implemented by the organization. The recommendations given in the report are to be viewed as an aid to Management, for continual improvement and not as any faultfinding exercise.

M/s G&G Consultancy, Hyderabad thankfully acknowledge the dedication and co-operation rendered by the management and making the assignment easy sailing. We place on our records the proactive approach of all Head of Departments & Plant Personnel for their support and assistance extended to us in the process of personal visits, technical discussions and information sharing for carrying the audit successfully.

G&G Consultancy

Authorized Signatory

**Dt.27.01.2020**

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### **1.0 INTRODUCTION**

M/s Coromandel International Limited is an existing Plant located at Sriharipuram, Malkapuram (Post), Visakhapatnam-530011 **isan ISO 45001:2018 , ISO 9001:2015 and ISO 14001:2015 certified company.**

The Plant is implementing and confirming with the rules and regulations stipulated in various Indian Statutory Acts and Rules in general and specific to the activity undertaken in design, installation of the plant facility and its operations.

As regards to Safety of employees, the company, firmly believing that safety is not by chance but by choice and has taken many measures in improving the plant safety. It has incorporated all the safety features in the design stage itself to assure maximum safety to the equipments and personnel.

The organization is well established in the field of fertilizer production and the management believes in the systematic approach in the effective controlling of their activities as well their responsibility for the protection of environment, health and safety of its work force and to the local community. This is evinced by the fact that the management has implemented and practicing various systems such as integrated management system comprising QMS, EMS & OHSMS in accordance with the international standards ISO 9001, ISO 14001, ISO 45001 and also Process Safety Management System (PSMS), etc.

As the organization is importing, storing and processing large quantities of Ammonia, Sulfuric acid, Phosphoric acid and other chemicals. Hence it is the requirement of the organization, to arrange and to conduct safety audit of its safety systems by an external agency and report to be submitted to concerned authorities, as per the requirement under rule 10 (4 & 5) of Manufacture, Storage, Import of hazardous chemicals 1989 and amendments there on.

The plant operates in three shifts in addition to General shift.

## 2.0 SAFETY AUDIT METHODOLOGY

The Methodology used for carrying out the safety audit is mentioned below:

2.1 An Opening Meeting was chaired by the Unit Head with all Head of Departments & AGM-EHS along with Plant Managers to discuss the scope of the external safety audit. The presentation about the plant facilities and Safety & Environment systems was made to the Auditors by AGM-EHS.

The scope of the safety audit was agreed upon by the site Management. The Schedule of external safety audit for three days.

It was decided to make tour of the following hazardous areas/ facilities:

**Day-1: 19.12.2019**

2.1.1 AAST-Handling & Storage facilities of Ammonia

2.1.2 Sulphuric Acid Plant, Raw Materials handling facilities

2.1.3 Phosphoric Acid Plant

2.1.4 Wharf-Handling of Raw Materials, unloading and storage facilities

**Day-2: 20.12.2019**

2.1.5 Complex Plant (ABC)

2.1.6 Handling and Storage of Bulk materials, product bagging facilities

2.1.7 Legal and Statutory Compliances (Safety, Occupational Health, Environment & HR)

2.1.8 Training, Canteen, OHC

2.1.9 Fire and Security, Emergency Preparedness and Fire Fighting Facilities, Traffic Safety

**Day-3: 21.12.2019**

2.1.10 Electrical, Instrumentation & Mechanical

2.1.11 Post Audit Summary Report Preparation

2.1.12 Audit Closure Meeting

**2.2** During walk round, interaction with shop floor staff/ engineers/casual workmen about understanding of safety procedures being used at shop floor by them was also done.

**2.3** Identification of Safety & Occupational Health Hazards during walk round of plant facilities



**2.4** Observations were made with respect to Machine guarding hazards, Material Handling practices & hazards, transportation hazards, existing fire protection measures, existing fire prevention methods/ measures, Safety Permit system, Scaffolding system, Emergency Preparedness, safety awareness level of workmen & staff and prevailing unsafe conditions & unsafe acts at site

**2.5** Review of the existing Safety Management System pertaining to various elements of safety audit system as per IS 14489 to the extent which were made available to the auditors by the Management/ Organisation during audit period was carried out as mentioned below:

2.5.1 Safety Organisation

2.5.2 EHS Policy

2.5.3 Safety Committee Meeting

2.5.4 Minutes of safety committee meetings

2.5.5 Safety Promotional activities

2.5.6 SOPs- Safe operating procedures for various operations

2.5.7 Onsite Emergency Plan

2.5.8 Mock Drill Reports & Records

2.5.9 Accident/Incident Investigation System

2.5.10 Training records on Safety, Fire and First aid

2.5.11 Work Permit System

2.5.12 Safety Inspection systems & Record of Plant Safety Inspections

2.5.13 HIRA, HAZOPS & Risk Assessment Procedures

2.5.14 Records of tests and examinations of equipment and structures as per statutes (such as pressure vessels, lifting tackles, SRV's, etc.)

2.5.15 Maintenance and testing records of fire detection and firefighting equipment

2.5.16 Fire Protection measures & maintenance

2.5.17 Record of safe work permits

2.5.18 Records of monitoring of flammable and explosive substances at workplace

2.5.19 Maintenance and testing records of fire detection and firefighting equipment

2.5.20 Records of Industrial hygiene survey (Noise, ventilation and levels, illumination levels, airborne and toxic substances, explosive gases)

2.5.21 Records of Waste disposal

2.5.22 Housekeeping inspection

2.5.23 Maintenance procedure records

2.5.24 Calibration and testing records

2.5.25 Training documents etc

2.5.26 Medical Examination reports of employees

**2.6** Recommendations were made (engineering & administrative) to mitigate identified Safety & Occupational Hazards/Risks for enhancing the integrity and reliability of operations & site.

While every minute point cannot be observed by the Auditors, every effort is made to identify safety related deficiencies with reference to the system approach as per IS 14489. It is a sample Safety Audit. It was also agreed upon that the observations made in one area shall be viewed globally for other areas also.

Safety Audit is limited to geographical areas of plant facilities only. The Scope of the Safety Audit is limited to facility, hence the safety audit is facility oriented and not subjected to specific product/ process.

The elements of safety audit included the identification of possible loss-producing situations, unsafe conditions and recommendations to minimize the occurrence of such loss producing events.

The audit report is to be read in conjunction with the existing Hazard Analysis and Risk Assessment studies, Quantitative Risk Assessment studies, HIRA and Safety Audit conducted earlier by the Organization, if any.

### **3.0 AUDITING AGENCY & SCHEDULE OF AUDIT**

Apart from implementing good safety practices, periodical checking of the performance of the practices or the systems is also required. Conducting safety audit is one such requirement. Safety audits are intended to promote, improve and then maintain good safety performance. Audits review safety programs, policies, and procedures to check that they cover employee job tasks and hazards. They are a structured and effective way of preventing incidents and controlling safety hazards.

Though several audits are being conducted by the organization, including internal audits of the systems being implemented, one of the requirements is conducting of the safety audit as per the statutory requirement.

So as to comply with the statutory requirement, CIL-Visakhapatnam management is engaging outside agency, for evaluating its occupational health and safety management system performance, followed by compliance of the observations. M/s G&G consultancy, Hyderabad was assigned the work of carrying out Safety Audit as per IS 14489 for the year 2019.

The auditors visited all Areas as mentioned above & discussed with concerned In-Charge along with the Site Safety In Charge and prepared this report based on the information provided by the company regarding the existing storage practices, manufacturing process, existing safety practices & Safety Management System, Fire safety measures etc.

During the Plant Visit and studies, Top Management, respective Functional Heads, Employees and Safety in Charge/ Coordinators have evinced good interest and cooperated in the effort. The Auditors place on record their sincere thanks for the cooperation rendered by all.

The two auditors of the consultancy organisation visited the site from 19.12.2019 to 21.12.2019 for conducting the statutory External Safety Audit.

#### **4.0 EXECUTIVE SUMMARY**

4.1 During the audit, as reasonably as practical and possible , regarding the existence and implementation of elements of occupational Safety and Health Systems and system ability to achieve desired safety objectives of the organization in general and site demands in particular were examined.

4.2 The details of safety assessment carried out, recommendations for improvement are enumerated in this audit report with an objective of highlighting

the best practices on-going and those aspects where further steps if taken would benefit strengthening the already well managed safety systems in the premises.

4.3 Apart from general observations at each work and storage areas , major emphasis was given on scrutiny bulk materials handling , Process safety elements, working at heights, working at moving machinery ,waste management , internal transportation etc., regarding the administrative controls like welfare amenities, standard operating procedures & work instructions ,existing training and implementation pattern of safety precautions , incident investigations , management controls in force ,emergency mitigation plan on board ,firefighting capability etc.; how these are institutionalized in the factory to achieve sustainable performance.

4.4 Recommendations are made as may be useful for further improvement. The audit organization sincerely thanks for the co-operation received from one and all contacted during the factory visit and evaluation of systems.

## **5.0 IDENTIFICATION OF SAFETY & OCCUPATIONAL HEALTH HAZARDS DURING WALK ROUND**

The Safety Audit Report consists of field observations during walk –round in details and recommendation for each identified hazard. Walk -round observation would cover general safety, material handling& storage safety, PPE compliance by workmen, machine guarding safety, transportation safety and fire safety aspects.

The Tour of the areas as decided in the opening meeting was made along with Manager-Safety, respective Plant Manager & area In-charges. During site tour, the interaction with the shop floor workmen & Technicians were also done.

The Elements of Safety Management System as per IS 14489 were assessed for activities being carried out in the above mentioned areas during walk round of site.

Safety Documents pertaining to various elements of the safety audit as envisaged in IS 14489 were reviewed to the extent made available by the Organisation.

<b>WALK-ROUND OBSERVATIONS</b>			
<b>Sr. No.</b>	<b>Observations</b>	<b>Hazards/ Gaps Identified</b>	<b>Rn: Recommendation where “n” denotes Serial Number</b>
<b>1.0</b>	<b>AAST (Atmospheric Ammonia Storage Tank)</b>		
1.1	Two Numbers AAST tanks of 5000 MT & 7500 MT are provided for Ammonia Storage		_____
1.2	Ammonia Leak sensors are provided at 10 locations with alarm set at 25 ppm as “High” and at 300 ppm as “High High” for alerting personnel for taking the necessary “Emergency Actions”.  Ammonia Leak sensor for Ammonia Receiver 25FA01 was tested on 23.11.2109 with due date of 24.12.2019.		_____

	<p>The Ammonia receiver was found Hydro pressure tested on 28.03.2019 with due date of 27.03.2023.</p> <p>Once in 10 years, all primary valves etc., are replaced.</p>	
1.3	<p>“High level “&amp; “High High Level” alarm is provided for AAST tanks with interlocks for stopping all in puts as point of actions if any liquid Ammonia enters into Annual free space.</p> <p>Moreover, auto operated DCS controlled flare system for emission of Ammonia from AAST tanks is provided.</p>	_____
1.4	<p>Auto operated shut off valves are provided at five different locations with interlock with Ammonia Pumps once out let valve of Ammonia Storage tank is closed upon major leakage of Ammonia</p>	_____
1.5	<p>Dyke of suitable capacity is provided for holding liquid Ammonia if leakage from the tank takes place. However, cup &amp; cone type tank is provided, thereby eliminating probability of leakage of ammonia from the Storage tank</p>	_____
1.6	<p>Wind sock &amp; lightening arrester is provided for Ammonia storage tanks</p>	_____
1.7	<p>Water sprinkler system for Ammonia Pumps area &amp; Dyke area for ASST Tanks is provided. The sprinkler system operates on auto mode from DCS.</p> <p>Sprinkler system is being checked once in week</p>	_____

	for ensuring readiness of sprinkler system.		
1.8	Smoke/fire detectors are not available in the control room.	Early detection of fire in the Control room is not possible since smoke/fire detectors are not available in the control room. Moreover, all emergency operations are being carried out from DCS in control room and emergency equipment are also provided in Control room which cannot be used due to fire emergency in control room.	<b>R1:</b> Provide Smoke/fire detectors in the control room
1.9	Identification labeling & colour code for Liquid & Vapour Ammonia lines is missing at numbers of places	Hazard communication issue due to no Identification labeling & colour code for Liquid & Vapour Ammonia lines in AAST plant areas	<b>R2:</b> Provide Identification labeling & colour code for Liquid & Vapour Ammonia lines in AAST plant areas
1.10	PAS system is not provided for AAST plant area	Communication of an emergency to persons working in AAST plant areas is difficult due to want of PAS	<b>R3:</b> Provide PAS system is for AAST plant area also



1.11	One set of Oxygen & Acetylene gas cylinder was found lying in vertical position in water pool without firmly secured by chain arrangement.	This may because a major accident due to falling of un chained Acetylene& Oxygen gas cylinder.	<b>R4:</b> Provide chain arrangement for Oxygen & Acetylene gas cylinder
1.12	<p>Safety Relief Valves –Two numbers with different pressure setting are provided on each AAST Storage tanks.</p> <p>The emergency vents of SRV are connected to a vent header and back to Storage tanks.</p> <p>Smell checking from SRV is being done in every shift for checking conditions of SRV and gland leakages, if any.</p>		_____
1.13	<p>About 5 KM Pipe line for Ammonia which is laid above the ground is provided in the Dock Road. The pipe line is not having any vent or drain. Weld joints are 100% radio graphed.</p> <p>Hard Physical barricade is provided for Ammonia Pipe line to prevent any damage to pipe line due to potential accident caused by vehicles movement.</p>		_____
1.14	<p>5KM Pipe line for Ammonia is provided with PUF insulation of 45 mm thickness. A thorough Visual inspection of entire length of Ammonia pipe line is being done once in six months by the dedicated Inspection Department.</p> <p>Thermography of PUF insulation is being done once in a year by using Drone by the dedicated Inspection Department.</p>		_____
1.15	Inspection of Ammonia pipe line in Dock Road is		_____

	being done in every shift by the shift engineer for observation of any abnormality.		
1.16	QRA is done for Ammonia Pipe lines for scenario of pipe line failure		_____
<b>2.0</b>	<b>HT Panel Room for AAST</b>		
2.1	Electrical Shock treatment board in Three Languages- Hindi, Telugu & English is found displayed in HT panel room		_____
2.2	Licensed Electrical Supervisors (27 Numbers) names with validity of License was found displayed in HT panel room area		_____
2.3	Electrical Non conducting Rubber Mat is provided in front of HT panels.	The testing of Rubber mat for insulating property is not being done	<b>R5:</b> Carry out testing of insulating Rubber mats or electrical non conducting rubber mats at a predetermined frequency through an external agency
2.4	Smoke detectors are provided for HT control Room for early detection of fire		_____
2.5	Emergency Exit is provided to HT panel room		_____
2.6	Local hooter is provided outside the HT/LT Panel room. Identification labeling for Local Hooter is not done. Moreover, Two manual call points (new and old) are	Old & new MCP may create confusion/misguide the people during emergency	<b>R6:</b> Remove the unused old type manual call points from all over the plant locations <b>R7:</b> Provide Identification labeling for all Local Hooters across the plant areas.

	located at outside of the HT Panel room (near to emergency exit).		
<b>3.0</b>	<b>LT panel room for AAST</b>		
3.1	Smoke detectors are provided for LT panel room		_____
3.2	Identification labeling is done for each panel		_____
3.3	LOTO provision is available for each panel for LT panels		_____
3.4	Electrical None conducting Rubber Mat is provided in front of LT panels.		_____
<b>4.0</b>	<b>Sulphuric Acid Plant</b>		
4.1	Raw Sulphur is melted in Sulphur Melter by using medium pressure steam pressure of 7.0 kg/cm <sup>2</sup> . PRV is provided on steam header line of 30 kg/cm <sup>2</sup> to reduce steam pressure to 7 kg/cm <sup>2</sup> for Sulphur Melter. SRV is provided on steam lines.		_____
4.2	Molten sulphur is then transferred to Pressure Leaf Filter by applying pressure of 4 to 5 kg/cm <sup>2</sup> through pump.  The temperature of 130 Deg C is being maintained in the jacketed Line for liquid Sulphur transfer lines and also in the Pot for Clean Sulphur		_____
4.3	Raw Sulphur is unloaded by using hydraulically operated pay loader	Under certain circumstances Raw Sulphur may release toxic hydrogen sulphide	<b>R8:</b> Prepare PPE matrix for each hazardous operation & activity being carried out at

	<p>(vehicle) by contract workmen by tilting the bucket full of Raw Sulphur into Sulphur Melting pit. There is emission of Raw sulphur dust from during unloading from pay loader and also the emission of Hydrogen Sulphide during melting raw sulphur at temp of 175 Deg C. Contract workmen were found using PPEs such as Cotton Mask, Gum boot &amp; Safety goggle.</p>	<p>and/or sulphur dioxide gas. This product has the potential to pose ecological risks to organisms in both aquatic and terrestrial environments. Discharge of the product to soil and water should be prevented.</p>	<p>site.</p> <p><b>R9:</b> Display PPE matrix with PPE signages based on hazards at each work area</p> <p><b>R10:</b> Prepare PPE matrix for persons responding to an accidental release of Raw Sulphur in work place. Protective clothing, gloves, and an acid gas/particulate respirator are recommended</p> <p><b>R11:</b> Provide Close-fitting safety goggles &amp; 3 M Dust mask workmen handling pay loader to prevent eye contact with sulphur dust</p> <p><b>R12:</b> Provide insulated gloves and heat and Chemical-resistant clothing to workmen when handling molten sulphur. Safety type boots are recommended.</p> <p><b>R13:</b> Display safety instructions &amp; industrial hygiene procedure for handling of Raw Sulphur in work place</p> <p><b>R14:</b> Explore to provide fixed dust monitoring system for ambient air monitoring of PM2.5 &amp; M10 for ensuring Sulphur emission is well below the permissible limits</p>
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<p>4.4</p>	<p>Powder sulphur is being handled to the storage facility through a conveyor. Risk of fire hazard existed during the transportation. Raw Sulphur is being stored in a covered Godwon having storage capacity of about 25000 MT. Fire Hydrant system covering all sides is provided.</p>	<p>Sulphur dust clouds can be ignited by friction, static electricity, heat, sparks or flames. Avoid generating dust and the release of dust into the workplace as this creates a potential explosion hazard. Since dry sulphur may accumulate static charge build-up, which could become an ignition source, transfer using proper grounding Procedure.</p>	<p><b>R15:</b> Provide suitable double static earthing to conveyor for transferring Raw sulphur Powder from underground Hopper to Sulphur Storage shed.</p> <p><b>R16:</b> Explore to provide smoke detectors for conveyor for Raw Sulphur</p> <p><b>R17:</b> Explore to provide suitable type Auto operated Fire suppression system for Raw Sulphur Conveyor system</p>
<p>4.5</p>	<p>Two layers acid resistant brick lining is done for Absorption Towers. Inspection of brick lining is being done during yearly shutdown of Sulphuric Acid Plant</p>	<p>_____</p>	
<p>4.6</p>	<p>Splash guards are provided to all flange joints on Sulphuric Acid Transfer lines</p>	<p>_____</p>	
<p>4.7</p>	<p>Vent of FAT is connected to lye solution scrubber and the final venting is through scrubber stack where On Line SO2 sensor with indication in PLC in Control Room is provided.</p>	<p>_____</p>	
<p>4.8</p>	<p>Sulphuric Acid is transferred by MS PTFE line to Storage Tanks. Dyke with acid proof lining is provided. Radar Type level monitor &amp; manual level</p>	<p>_____</p>	

	gauging is also provided to each Sulphuric Acid Storage Tank.		
4.9	Shower & eye wash fountain is provided at nearby to Sulphuric Acid Storage Tanks		_____
4.10	PPEs such as PVC hand gloves, Face shield & Full Body Tychem suit is being used by field operators while taking round for inspection etc		_____
<b>5.0</b>	<b>Phosphoric Acid Plant</b>		
5.1	<p>Class I-Permit No. 47895 dated 19.12.2019 – permit valid for one shift for Hot Work (to remove worn out bolts by cutting) , Pipe Line Opening, Electrical Isolation was verified for ensuring Works are being done safely as per the check list.</p> <p>The Permit was found duly filled &amp; signed by permit issuer, permit executor etc.</p> <p>Lock No. 1603 was found provided to MCC Panel. Contractor Workmen &amp; Mechanical Technician was also interviewed about the LOTO procedure.</p>		_____
5.2	A crane was found being used which was labeled for Test details such as tested on 28.09.2019 with due date of 27.09.2020.		_____
5.3	<p>Fire Alarm panel is blocked UPS battery &amp; other material.</p> <p>The Fire Alarm Panel was showing “Red” indication for “Fire” in Zone-1. However, this condition was not</p>	<p>It is difficult to read the Zone Indication in fire alarm panel since the Fire Alarm Panel is blocked by UPS Battery &amp; UPS</p>	<p><b>R18:</b>Remove obstruction &amp; Blockage materials for Fire Alarm Panel and relocate the UPS battery &amp; UPS</p> <p><b>R19:</b> Develop a procedure of checking any abnormality in</p>

	investigated & corrected.		any Fire Alarm Panel for immediate investigation & correction
5.4	Batteries for UPS are kept on Metallic platform without any earthing	Electrical shock hazard from MS platform for UPS Batteries	<b>R20:</b> Provide double electrical earthing to Metallic platform for UPS Batteries
5.5	Spillage / Leakages of Phosphate Rock dust from grinding units, from screw conveyors, dust collectors, from dust Bins for dust collector etc was observed during audit.	Spillage & Emission of fine Rock Phosphate dust in working area, platform for Phosphoric acid storage tanks area, reactors area, near grinding units etc has resulted into health hazard. There is probability of slip & fall hazard caused by wet surface due to Hygroscopic nature of Rock Phosphate dust	<b>R21:</b> Explore to make the entire equipment such as grinding units, screw conveyors, dust collectors, dust Bins for dust collector etc leak proof so as to minimise emission of Rock Phosphate dust in work place
5.6	Finished Phosphoric acid product is being stored in 8 day tanks out of which 6 tanks are open tanks. The following observations were made on the structures located	The Platform area for Phosphoric Acid Storage tanks may be high hazard & high risk area.  Probability of accident caused by slips & fall hazard due to slippery	<b>R22:</b> Increase the toe guard height to the mid portion of hand railing of the working platform for Phosphoric Acid Storage tanks  <b>R23:</b> Provide Valve opener wrench for operating the service valves which are located away from the

	<p>above the open tanks:</p> <p>a. The area is slippery due to the nature of work environment</p> <p>b. Some of the valves are away or difficult to operate from the platforms</p> <p>c. Height of Toe guard from platform is about 3 inch only</p> <p>d. Level Indicators are not provided for Open Storage tanks of Phosphoric Acid</p> <p>e. Level Indicators are provided for Closed tanks of Phosphoric Acid</p>	<p>surface.</p> <p>Probability of over flow of Phosphoric Acid from open type Storage tanks.</p>	<p>platform so as to avoid fall of a person in open storage tank</p> <p><b>R24:</b> Provide safety Belt for persons walking on the working platform for Phosphoric Acid Storage tanks</p> <p><b>R25:</b> Provide anti skid safety shoes or Gum boots for persons working in Phosphoric Acid plant &amp; in platform for Phosphoric Acid Storage tanks</p> <p><b>R26:</b> Explore to provide suitable type of Level Indicators for Open Storage tanks of Phosphoric Acid</p>
<p>5.7</p>	<p>HIRA has been done for Phosphoric Acid Storage tanks &amp; for other activities</p>		<p><b>R27:</b> Review the existing HIRA for Phosphoric Acid Storage tanks &amp; for other activities in view of identified new hazards during safety audit so as to capture all other potential hazards</p>
<p>5.8</p>	<p>Hard Barricade cages have been provided around Absorption Tower Column for preventing persons going close to Absorption Tower Column since the temperature is around 80 to 90 Deg C</p>		<p>_____</p>



5.9	Spill kit containing Lime Powder is provided for spill control of Phosphoric acid	_____
5.10	Eye wash fountain & body shower is provided for Phosphoric acid plant	_____
<b>6.0</b>	<b>Wharf</b>	
<b>6.1</b>	<b>Rock Phosphate Unloading</b>	
6.1.1	Rock Phosphate is unloaded from ship by using BMH and Rock Phosphate is then unloaded on screw conveyor belt followed by pipe screw conveyor & stored in Silo-1 (3000 MT) & Silo-2(1000 MT).	_____
6.1.2	Dust emission is minimized due to pipe screw conveyor. Bag filter is provided during unloading from ship.	_____
6.1.3	End Stopper (Mechanical type) with sensor is provided for BMH.	_____
6.1.4	“Pull Cord” for Emergency Stopping of Belt conveyor is provided.	_____
6.1.5	Contract Workman Mr. V Venkat Rao was interviewed about usage of Pull Cord and the response was good	_____
<b>6.2</b>	<b>Ammonia Unloading</b>	
6.2.1	Ammonia Leak sensors (two numbers each side) on downstream & up stream of Ammonia Unloading valve is provided.  Checking of Ammonia Sensors is being done by	_____

	using known concentration of Ammonium Hydroxide solution.	
6.2.2	Two manifolds being used for unloading Ammonia	_____
6.2.3	During Ammonia unloading, the “Emergency Ammonia Escaping Bridge” is kept so as to evacuate the Wharf area which is then removed after unloading operation is complete.	_____
6.2.4	The Ammonia Unloading hose is being subjected to Hydro pressure test by an external competent agency once in a year. The details of last Hydro pressure tests were found displayed on Ammonia Unloading hose as hydro pressure tested on 04.06.2019 with due date of 03.06.2020.	_____
6.2.5	Drain point from the Ammonia unloading arm is connected to a container filled with water so as to drain out residual ammonia for minimizing emission in environment.	_____
6.2.6	Liquid Ammonia line is insulated	_____
6.2.7	Fire hydrant, Fire water tank, SCBA & ELBA sets, Air Line respirator etc are kept ready before starting Ammonia Unloading.	_____
6.2.8	Flange Joints are not provided on Ammonia line. Weld joints for Ammonia line are provided. 100 % testing of all weld joint by Radiography is being done	_____

6.2.9	Inspection of 5 KM Pipe Line for Ammonia is being done by AAST supervisor by walking the entire length of Dock road	_____
6.2.10	Wind Sock is provided	_____
6.2.11	Assembly Point is provided near Security	_____
<b>6.3</b>	<b>Sulphuric Acid Unloading</b>	
6.3.1	SS Flexible hose is being used for unloading of Sulphuric Acid. Flange guards are provided.	_____
6.3.2	Emergency Shower & eye wash fountain is provided	_____
6.3.3	Hose pipe is subjected to pressure test & leak test by using soap solution before unloading is carried out	_____
6.3.4	MOV is provided for Closing valve in an emergency. MOV can be closed from AAST DCS control panel in control room & also from field and also from Control room for Boiler.	_____
6.3.5	Two numbers Storage tank for Sulphuric Acid, each of 12500 T capacity is provided outside the Wharf Area	_____
6.3.6	Sulphuric Acid from Storage tank is pumped to Storage tank located in Sulphuric Acid Plant.	_____
<b>6.4</b>	<b>Molten Sulphur Unloading</b>	
6.4.1	Before unloading Molten Sulphur from ship, the Molten Sulphur line is flushed with air blower	_____

	from Ship to ensure line is free from and the residual Molten Sulphur is collected in carboy. After unloading Molten Sulphur, the air is used to remove Molten Sulphur from line to Storage tank.	
6.4.2	Molten Sulphur line is insulated. Steam Jacketed line is provided for Molten Sulphur. A temp of 140 Deg C is being maintained in the jacketed line.	_____
6.4.3	Flange Joints on Molten Sulphur line is available.	_____
6.4.4	Two numbers Storage tank for Molten Sulphur, each of 7500 T capacity is provided outside the Wharf Area	_____
6.4.5	Molten Sulphur from Storage tank is transported by Road tanker to Plant	_____
6.4.6	Dedicated Emergency Shower & Eye wash fountain is provided near Molten Sulphur Storage tanks area	_____
6.5	Emergency Safety Equipment Room is provided. The following equipment are provided: a. SCBA-05 Sets b. ELBA-03 Sets c. Small size ELBA- 06 Sets d. Ammonia Suits e. Fire Hoses f. Folding Stretchers  Check List is being used for inspection of safety equipment.	_____

6.6	A Board indicating Types of Incident-location wise & emergency actions to be taken is found displayed in English		<b>R28:</b> Display Emergency Actions in Hindi & Telugu for “Types of Incident-location wise”
6.7	PEP talk training is being conducted to all workmen on every Monday.		_____
6.8	Fire Protection facilities such as Fire Hydrant, Fire Tender, Fire Hydrant Points & Pumps of HPCI, Pump for sea water etc are provided		_____
<b>7.0</b>	<b>ABC Complex</b>		
7.1	Products such as Mono Ammonium Phosphate & Di-ammonium Phosphate with composition of two grades namely 20:20 (Nitrogen 20 & Phosphate 20 as P2O5) & 28:28 (Nitrogen 28 & Phosphate 28 as P2O5) are produced		_____
7.2	Rotating parts are exposed at Trunion and Girth gear areas of granulation equipments Where people are cleaning the spillages continuously	Probability of accident of major consequences due to exposure to unguarded rotating parts of machine	<b>R29:</b> Provide suitable type of Machine guard for all the rotating parts or moving parts of all granulation equipment. Provide Zero Access Guard to each rotating equipment
7.3	Motor guard is missed for the A train east feeder (2 <sup>nd</sup> floor)	Probability of accident due to unguarded rotating part of machine	<b>R30:</b> Provide suitable type guard to motor for the A train east feeder (2 <sup>nd</sup> floor)
7.4	Hopper area for Bagging recycled	Probability of accident due to no hand railing	<b>R31:</b> Provide hand railing with toe guard forHopper

	material is not guarded to avoid fall of a person. There is a big gap on floor near Hopper.	near Hopper area for Bagging recycled material	area for Bagging recycled material to avoid fall of a person caused by a big gap on floor near Hopper
7.5	The dryer area is provided with hand railing. However, the toe guard is of 3 inch height from floor level and there is a big gap between two pipes being used for hand railing. Worker is exposed to an open area from first floor to ground floor	Probability of accident of major consequences caused by slipping of a person due to slippery floor due to nature of the product and falling of a person through big gaps between two pipes being used for hand railing for Dryers	<b>R32:</b> Modify the existing hand railing by welding grated plated till mid portion of hand railing in place of 3 inch Toe guard for all dryers area.
7.6	There is an opening at floor level around cooler drum duct	Possibility of accident due to slip & trip hazard caused by unguarded opening at floor level around cooler drum duct	<b>R33:</b> Close the opening at floor level around cooler drum duct by providing chequered plate or by any other suitable means
7.7	Unguarded pulley ends of bucket conveyors for Product	Possibility of accident due to Unguarded pulley ends of bucket conveyors	<b>R34:</b> Explore to provide proxy switch for Unguarded pulley ends of bucket conveyors
7.8	Magnet is not provided for Milling machine for separating metallic particles from oversize product	Probability of fire & explosion caused by metallic particles in oversize product in Milling Machine	<b>R35:</b> Provide magnet of suitable size & magnetic capacity for Milling machine so as to remove metallic particles in oversize product before entering to Milling

			Machine
7.9	Static earthing is not provided to Granulator, Conveyors & dryers	Probability of Fire hazard due to static charges & combustible dust	<b>R36:</b> Provide double static earthing to Granulator, Conveyors & dryers and associated equipment
7.10	Identification labeling with colour code and direction for Flow is not done for Liquid & vapour Ammonia Line		<b>R37:</b> Provide permanent Identification labeling with colour code and direction for Flow for Liquid & vapour Ammonia Line
7.11	<p>HAZOPS was for Phosphoric Acid Process has been done by internal team. While reviewing the HAZOPS work sheet, it was observed that the existing control measures for very high risk are very minimal. Moreover, the recommendations for very high risk are also minimal &amp; of trivial nature.</p> <p>The recommendations included: Training, Inspection etc</p> <p>Moreover, risk assessment for each identified hazard was not carried out.</p>		<b>R38:</b> Review the existing HAZOPS procedure by including Risk Assessment procedure so as to ensure that all hazards are identified and risk assessment for each identified hazard is done by considering the existing safety measures & controls based on Hierarchy of Controls such as elimination, Isolation, Substitution, Engineering controls, SOP, Work Instructions & training and PPE usages
7.12	Over flow line from reactor is connected to effluent canal or	Probability of severe hot burn injury due to exposure to hot mass	<b>R39:</b> Explore to provide closed type effluent canal at ground floor of Complex

	drain which is open type. Temperature of mass is about 124 Deg C	caused by splashing from open type effluent canal at ground floor of Complex Plant	Plant for over flow mass from reactor at 124 Deg C
7.13	The passage in front of ABC Complex transformer area is slippery which is caused by product dust emission. Moreover, the path way for crossing the storm water trench is also slippery and not provided with the hand railing. Hand railing with toe guard is not provided on approach path to transformer and the area between trench and transformer.	Probability of accident caused by slip & fall into storm water drains since the area is not provided with hard barricade such as hand railing with toe guard	<b>R40:</b> Provide hand railing with toe guard toon approach path to transformer and the area between storm water trench and transformer.
7.14	Contractor workers are cleaning the earth pit inside the transformer with work permit No. 74001. Location stated in the work permit was "All over the plant". Moreover, there was no supervision either by the electrical contractor or from	Working in Transformer area without supervision may cause an accident.	<b>R41:</b> Permit for working in an electrical area must specify that area only & not all electrical areas in-order to have a control on the contractor activities



	electrical department		
<b>8.0</b>	<b>Bagging Plant</b>		
<b>8.1</b>	<b>Product Silos</b>		
8.1.1	Around 350 contract workmen are working in bagging plant. PEP talk training is given in each shift for 10 to 15 minutes. Training topics in PEP talk include : Conveyors safety, usage of Pull Cord in emergency		_____
8.1.2	Product from ABC Complex plant is transferred to Bins or Silos. Dust Control system is not provided	Probability of dust emission during collection of product in Bins or Silos	<b>R42:</b> Provide dust collection system for Product Bins or Silos
<b>8.2</b>	<b>Truck Loader</b>		
8.2.1	The product from Silo is transferred to Bagging machine by closed Pipe type belt conveyor. Static earthing is not provided to Silos & Belt conveyor	Probability of fire hazard due to static charges & combustible dust	<b>R43:</b> Provide double static earthing to Silos & Belt conveyor
8.2.2	Truck Loader is being used for loading product bags from Belt conveyor to Trucks. Truck Loader is operated by using Pendant type on off push switch by a contract workman from inside the truck only	Probability of hit injury to person by oscillating luffing which can be moved up & down and sideways. The accident may be due to wrong operation of Pendant type on off push switch	<b>R44:</b> Carry out “JSA-Job Safety Analysis” for the operation of Truck Loader and loading activity of product bags inside the trucks

8.2.3	Forward movement sensor is provided to Truck Loader for auto stoppage.12 bags per minute can be loaded into truck by using Truck Loader.	
<b>8.3</b>	<b>Bags Filling &amp; Sealing Machines Area</b>	
8.3.1	Product bags falling from Draw Chute on to Belt conveyor are sometimes struck on Belt conveyor. The stuck bag is removed manually from the belt conveyor. Speed of belt conveyor is 0.9 meter per second	Probability of accident caused during removing stuck product bag from the moving belt conveyor by the contract workman <b>R45:</b> Explore to provide proxy sensor for Product Belt conveyor for Truck Loading and also for belt conveyor for manual stacking
8.3.2	Belt for conveyor is replaced whenever damaged completely. There is no criteria for replacement of Belt before it is worn out completely	Probability of accident due to damaged belt <b>R46:</b> Prepare guidelines or criteria for replacement of Belt before it is worn out completely
8.3.3	The area closer to hopper for draw chute for Filled product bags is open, without hard barricade protection	Probability of slip & fall of a person while removing stuck product bag from the belt conveyor- this may cause accident of severe consequences <b>R47:</b> Provide suitable type of hard barricade around the area closer to hopper for draw chute for Filled product bags
8.3.4	04 Numbers fully Automatic Filling & Sealing machines and 02 Numbers Semi	There is a hazard of "Caught In" injury during filling & stitching <b>R48:</b> Explore to replace Semi Automatic bagging machines by fully automatic

	Automatic Filling & Sealing machines are being used.	operation for Semi Automatic bagging machines	bagging machines so as to minimise the “Caught In” injury
<b>8.4</b>	<b>MCC room</b>		
8.4.1	MCC room in first floor found to be slippery due to product nature. Exhaust fan is also not provided. No ventilation in MCC Panel room.	Probability of accident due to slippery floor & rubber mat. Moreover, the rubber mat is wet with moisture-may pose electrical shock while carrying out maintenance works.	<b>R49:</b> Provide forced ventilation by providing exhaust fan in MCC room at first floor of Bagging Plant
8.4.2	Smoke detectors are provided in MCC room with Fire Alarm panel outside the room		_____
8.4.3	UPS Battery stand for batteries is provided with electrical earthing		_____
<b>8.5</b>	<b>Bales Godown</b>		
8.5.1	Smoke detectors are provided in Bales Godown. Fire Hose reel is provided from two sides of very big size and length of Bales Godown. The length of hose reel is 15 meter which may not cover the entire length & breadth of the Godown.	Probability of escalation of emergency due to manual operation of Fire Hose Reel. Moreover, The length of hose reel is 7.5 meter which may not cover the entire length & breadth of the	<b>R50:</b> Explore to provide auto operated fire suppression system such as water sprinkler system form Bales Godown  <b>R51:</b> Replace hose reel of 15 meter length by 30 meter length so as to cover the entire length & breadth of

		Godown.	the Bales Godown.
8.5.2	Ventilation in Bales Godown is found to be poor		<b>R52:</b> Improve ventilation either by providing roof ridged turbo ventilators or by providing supply of fresh air from one end & exhaust provision from other end for Bales Godown.
8.5.3	Emergency Exit is provided from Bales Godown		_____
8.5.4	Asbestos sheet for roof is provided.	Hazard of breathing asbestos.  Moreover, storage & disposal of damaged asbestos sheets may cause health hazard.	<b>R53:</b> Prepare a program for phase out of Asbestos across the plant
<b>8.6</b>	<b>Instrument Air Compressor Room (First Floor)</b>		
8.6.1	Details of Hydro pressure test (such as Hydro Test done on 23.04.16 & Due date on 22.04.2020) are found displayed on Air Receiver FA1407.  However, Six monthly UT test details are not found displayed on Air Receiver FA1407.		<b>R54:</b> Display Six monthly UT test details on Air Receiver FA1407.
<b>8.7</b>	<b>Tarpaulin Tying Area for Loaded Trucks</b>		
8.7.1	No standard procedure is adopted for the tarpaulin tying for finished goods vehicles	Probability of fall hazard from top of trucks to ground level due to no safety arrangement for	<b>R55:</b> Provide a working platform with toe guard and fall arrestor system for the tarpaulin tying activityfor

	working at height	finished goods vehicles
<b>9.0</b>	<b>Occupational Health Centre</b>	
9.1	<p>Ambulance AP31TB4023 is provided with drivers' availability for 24 Hours.</p> <p>Following facilities are available in the ambulance van:</p> <ul style="list-style-type: none"> <li>i. Oxygen Apparatus</li> <li>ii. First Aid Kit</li> <li>iii. IV fluid giving provision</li> <li>iv. Stretcher</li> </ul>	_____
9.2	<p>Pre employment Medical examination of all employees is being done for the following parameters:</p> <ul style="list-style-type: none"> <li>a. Vision Test</li> <li>b. Colour Vision test</li> <li>c.PFT</li> <li>d. Audiometry test</li> <li>e. Chest X ray</li> <li>f. Viral Profile</li> <li>g. Blood &amp; Urine examination</li> </ul> <p>All records are being marinated by Factory Medical Officer only.</p>	_____
9.2	<p>Periodical annual Medical examination of all employees is being done for the following parameters:</p> <ul style="list-style-type: none"> <li>a. Vision Test</li> <li>b. Colour Vision test</li> <li>c.PFT</li> <li>d. Audiometry test</li> </ul>	_____

	<p>e. Chest X ray g. Blood &amp; Urine examination</p> <p>All records are being maintained by Factory Medical Officer only.</p>	
9.3	<p>Medical examination of contract workmen is being done once in six months. However, PFT &amp; Audiometry test is not being done</p>	<p><b>R56:</b> Carry out PFT &amp; Audiometry test for contract workmen who are potentially exposed to dust/vapour and high noise in work place.</p>
9.4	<p>Medical examination of canteen workers &amp; staff is being done once in a year. Stool test for Amebiasis is being conducted. Vidal test is also being conducted apart from Biochemistry related tests.</p>	_____
9.5	<p>FMO also visits the work place for identifying Occupational Health related issues. FMO is asking question to workmen about occupational health related issues.</p>	_____
9.6	<p>Following antidotes are available in addition to routine medicines.</p> <ul style="list-style-type: none"> <li>i. Atropine ampoules for ammonia exposure.</li> <li>ii. Adrenaline ampoules for shock.</li> <li>iii. Safety gel-S for Sulphuric Acid burns.</li> <li>iv. Antidote for snake venom</li> <li>v. Rabipur for dog bite</li> </ul>	_____
9.7	<p>FMO is appointed &amp; available all working days. He is also available "On Call" since he is staying in residential colony for company employees.</p>	_____

9.8	Inspection of medicines for “Expiry date” is being done by OHC male nurse & “Expiry Date” medicines are disposed off to waste management approved agency		_____
9.9	The OHC is equipped with various equipment for medical emergency treatment such as suction machine, Pulse Oxy meter, Life saving medicines, stretches, Medical Oxygen cylinders Beds etc		_____
<b>10.0</b>	<b>Canteen</b>		
10.1	There are 03 Single Burner & 04 double burner gas Stoves in canteen. Each stove has one isolation valve inside the cooking area o canteen. Portable CO2 Type fire extinguishers are provided		_____
10.2	One fire blanket is available in the canteen area for extinguishing the fire purpose specially for oil fire	Fire Blankets are needed for rescue operation if a person is trapped in fire	<b>R57:</b> Maintain the two number of fire blankets in the canteen for rescue purpose
10.3	Cooked food utensils are covered by lids		_____
10.4	Provisions are stored inside a separate room on Pallets. Ventilation is provided.		_____
10.5	Rat Trap is not provided for “Provisions Store Room”		<b>R58:</b> Provide Rat Trap for “Provisions Store Room”
10.6	Dust Bin without cleaning is kept inside	The unhygienic condition of “Provision	<b>R59:</b> Remove the un cleaned waste bin and relocate

	Provision Store room where vegetables etc are also kept in open. Vegetable wastes also found lying on floor. The floor is found wet.	Store Room” may cause health hazard due to food contamination	outside the canteen area <b>R60:</b> Keep the floor of Provision Store Room dry all the time to avoid slip & fall hazard
10.7	A portion of Steam line is not found insulated in tea making area	Probability of hot burn injury due to exposure to un insulated hit surface of steam line	<b>R61:</b> Provide thermal insulation to a portion of un insulated steam line in tea making area
10.8	An damaged electrical cable for Potato Peeler also tied to the un-insulated hot water/steam pipe in tea making area	Probability of electrical shock due to joints in cable having insulation tape and the joint portion is lying on wt floor	<b>R62:</b> Replace the damaged cables to be replaced and proper dressing of electrical cable to be done <b>R63:</b> Relocate the electrically driven Potato peeler machine to “Provision Store Room”
10.9	Very dirty dust bins are found kept near Tea making, Milk boiling area	The unhygienic condition of area may cause health hazard due to food contamination	<b>R64:</b> Remove the un cleaned waste bin and relocate outside the canteen area and provide dust bins with lid only
10.10	LPG Full Gas Cylinders storage area is provided under weather shed. The shed height is below head level.	The protruded portion of shed may cause injury to head.	<b>R65:</b> Either cut the protruded portion of shed or raise the height of roof
10.11	LPG Leak sensor is not provided near LPG Full		<b>R66:</b> ProvideLPG Leak sensor



	Gas Cylinders storage area. Do's & Don'ts of LPG Gas Cylinders not found displayed	near LPG Full Gas Cylinders storage area  <b>R67:</b> Display Do's & Don'ts of LPG Gas Cylinders handling
10.12	Isolation valve of LPG manifold is not reachable	In case of fire emergency inside gas stove in cooking area, it is difficult to close the isolation valve  <b>R68:</b> Proper access to be provided for the isolation valve
10.13	Hand cleaning liquid soap , hand dryer , two towels etc are provided near hand wash area	_____
10.14	Two numbers drinking water coolers are provided. The Aqua guard was cleaned on 15.12.2019 with due date of 14.01.2020	_____
10.15	About 180 persons (employees) are dining per shift. The PAS system for communication of an emergency is not provided in canteen. It may happen that most of the ERT members are in canteen for dining purpose.	<b>R69:</b> Provide PAS system to canteen for employees so as to communicate a major emergency for immediate actions either from ERT team in canteen or otherwise
10.16	Separate canteen facility is provided for contract workmen for dining purpose where about 200 contract workers can take food at a time.	<b>R70:</b> Provide PAS system to canteen for contract workmen so as to communicate a major emergency for immediate actions to be taken by contract workmen

10.17	The persons serving food in canteen were found wearing head caps, Hand gloves and nails were cut		_____
<b>11.0</b>	<b>Transformers</b>		
11.1	There are 54 Transformers ( of varying capacities from 30 MVA to 250 MVA) across the site including new PAP-2 Plant		_____
11.2	Protection Relays, Winding Temperature & oil temperature alarm in control room etc is provided for Transformers.		_____
11.3	Cleaning of insulators is being done on monthly basis after taking the shutdown		_____
11.4	Silica gel breather valves are in healthy condition		_____
11.5	Transformer Oil level is being maintained at conservative level only. Testing of Transformer Oil is being done through an external agency once in a year		_____
11.6	Line Clearance (LC) permit is being taken before starting any electrical maintenance works under the supervision of Trained shift electrical engineer of power plant only		_____
11.7	40 mm metal of adequate thickness is spread in the Transformer yard		_____
11.8	Fire wall is constructed between 30 MVA transformers	The risk of fire hazard is high for higher capacity	<b>R71:</b> Explore to provide a suitable type auto operated fire suppression system for

		Transformer	30 MVA capacities transformers
11.9	Earthing is not provided to fencing & door for Transformer yard	Probability of electrical shock	<b>R72:</b> Provide Earthing to fencing & door for Transformer yard
<b>12.0</b>	<b>HT Yard</b>		
12.1	Earthing is not provided to fencing & door for HT yard	Probability of electrical shock	<b>R73:</b> Provide Earthing to fencing & door for HT yard
12.2	"Danger Board" is found displayed. CO2 Fire extinguishers are provided		_____
12.3	Vegetation growth outside the fencing area of HT Yard & Transformer Yard	Probability of bush fire-may cause a major fire if not controlled	<b>R74:</b> Explore to provide "Fire Barrier" of at least 4 to 5 feet width outside the fencing of HT Yard & Transformer Yard so as to prevent spread of bush fire to HT yard & transformer yard area
<b>13.0</b>	<b>11 KVA Receiving Sub Station Room</b>		
13.1	Smoke detectors are provided		_____
13.2	Thermography imaging is being done once in a month by electrical department for identification of Hot Spots for taking corrective & preventive actions		_____
13.3	04 numbers Arch Flash Suits are provided & being used while carrying out maintenance		_____

	works	
13.4	Identification Labeling is provided for each panel	_____
13.5	Mechanical & electrical Interlock systems are provided for each panel	_____
13.7	LOTO Interlock system is provided for each panel	_____
13.8	Emergency Exit is provided	_____
13.9	Emergency Lighting is provided with DG back up	_____
13.10	HT trench is filled with sand	_____
13.11	LOTO with lock & tag was found for B train Dryer Fan with permit dated 21.12.2019 was found provided	
<b>14.0</b>	<b>Electrical safety</b>	
14.1	HT Voltage detector is provided & being used	_____
14.2	Single Line Diagram for 11 KVA & 33 KVA Distribution is found displayed	_____
14.3	Rubber mat is provided in front of panels.	<p>The testing of rubber mat for its insulating property is not being done</p> <p><b>R75:</b> Explore to provide “Insulating flooring” to all HT Panel Rooms &amp; LT panel rooms</p> <p><b>R76:</b> Get the insulating rubber mat tested for its insulating property</p>
14.4	Two DG of 750 KVA & 500 KVA are provided for	_____

	lighting load, UPS & welding points	
14.5	“Cherry picker Make” Aluminum ladder with insulating rubber bushes being used	_____
14.6	FRP ladders are also being used	_____
14.7	One pair 33 KVA electrical resistance hand glove is kept in electrical shop & also in sub station	_____
14.8	Various equipments for electrical integrity testing are provided as mentioned below: a. Underground Line Detector b. HT Detector c. Cable fault detector	_____
14.9	Two Nos. Arch Flash Suit ( 40 CAL/cm <sup>2</sup> ) in substation & two nos. in electrical shop are provided	_____
14.10	List of Authorized Persons as per CEA for 28 persons is found displayed in electrical shop	_____
14.11	“Electrical safety” posters & signages are found displayed inside Electrical shop	_____
14.12	Electrical shock treatment boards are displayed in all LT & HT panel rooms	_____
14.13	First Aid Training for all 28 Authorized persons ( Licensed supervisors) is not given	<b>R77:</b> Arrange First Aid Training for all 28 Authorized persons (Licensed supervisors) for giving artificial respiration during an electrical shock treatment.(Sec 45 and rule 63(c) of the F.Act)through St. John Ambulance

14.14	SLD for Plant Electricals in details is found displayed in electrical Shop	_____
14.15	Electrical Safety Week is celebrated every year in the month of May by involving external agency	_____
14.16	Maintenance of Fire alarm & MCP is being done once in a month by electrical department (checked by electrical supervisor) by using a check list. For Example: Inspection dated 04.11.2019 was reviewed.	_____
14.17	Cable dressing in ABC complex plant & other plant is not done	<b>R78:</b> Plan for proper Cable dressing in ABC complex plant & other plant to avoid electrical incident
14.18	Smoke/fire detectors are not available in the control rooms of all plants though DCS operated Control Panels & Fire Alarm panels are located	<b>R79:</b> Provide Smoke/fire detectors are not available in the control rooms of all plants for early detection of fire
14.19	All electricians are found wearing Safety shoes with steel toe caps only. Electrical safety shoes are not provided to all electricians.	<b>R80:</b> Provide Electrical safety shoes to all electricians being engage at site and obtain the Certificate for Electrical safety shoes
14.20	Auto operated suitable type fire suppression system is not provided to HT Load centers	<b>R81:</b> Explore to provide Auto operated suitable type fire suppression system such as CO2 flooding system

		or Clean agent flooding system to HT Panel Room (Sec 38 and rule 61 of Factories Act)
14.21	ELCB &RCB is provided to DB & panels	_____
14.22	ELCB is provided to panel boards for all portable tools such as cutting machine, drill machines, grinding machines etc	_____
<b>15.0</b>	<b>Safety Management system across the Plant</b>	
15.1	Cautionary notice for chemical hazards are not prominently displayed in the workplace as per the Schedule XX (Handling and manipulation of corrosive chemicals) for Sulphuric Acid Plant, Phosphoric Acid Plant, AAST etc	<p>Hazard communication is not being done through Cautionary Notices &amp; safety Signages etc</p> <p><b>R82:</b> Display Cautionary notice boards for chemical hazards &amp; safety measures &amp; precautions as per the Schedule XX at various locations in the plant</p>
15.2	Visual inspections being carried out once in 6 months for the lines, fittings and valves are carrying out the Ammonia and Sulphuric acid. However, this inspection schedule was not covered the Phosphoric acid lines in the plant	<p><b>R83:</b> It is recommended to add the phosphoric acid lines, fittings and valves in the inspection schedule, and to carry out inspections as per the Schedule XX.</p> <p>A separate registers are to be maintained for the Ammonia, Sulphuric acid and Phosphoric acid</p>

<b>16.0</b>	<b>Mechanical workshop</b>		
16.1	SWL of pillar jib crane was certified to be 1 Ton capacity. But it was installed in 1967 with the same capacity. It may reduce the rated capacity due to the ageing and wear-tear	Probability of accident which may be caused by in correct SWL for the lifting equipment since it was installed in 1967with the same capacity.	<b>R84:</b> Carry out a comprehensive internal inspection for structures being used for the material handling
16.2	Lifting beams in the process area is not included in the competent person inspection list	Probability of accident which may be caused by no regular inspection & testing by an approved competent person	<b>R85:</b> Lifting beams in the process areas are to be inspected with competent person annually& records for statutory testing in Form 38 are to be maintained
16.3	Safety latches were not available for the hooks in mechanical and electrical workshops. For Example: PJC-02 (2T), PJC-08 (1T) etc	Probability of accident which may be caused during lifting & lowering the load which may come out from the hook due to jerks	<b>R86:</b> Provide Safety latches for all the hooks for lifting tackles & tools across the plant
16.4	Pedestal and bench grinding machines were not having the guards. However, face shield is being used during grinding operation	Probability of accident which may be caused due to breaking of grinding wheel	<b>R87:</b> Provide Machine guards to Grinding Wheel for the Pedestal and bench grinding machines
16.5	Mechanical workshop having the old lathe and drilling machines which are not having the machine guards		<b>R88:</b> Provide Transparent strong guard for the lathe machine and drilling



			machines
16.6	Operational instructions for various machines in the mechanical work shop was not displayed	Probability of accident due to following of in correct operations by the operators & contract workmen	<b>R89:</b> Display Do's and Don'ts for various operations (lathe, drilling, shaping, boring, rolling etc) in multi-language (Telugu, Hindi & Tamil)
16.7	Single certificate from the competent person was obtained for 258 wire rope slings. Same was observed in other tools as well	The Capacity of each equipment may be different and year of manufacturing may be different. Therefore, SWL may not be same for all rope slings	<b>R90:</b> Obtain Inspection and test certificate for each rope sling & other lifting tools & tackles and as batch wise
16.8	Welding station is provided in the Work shop	Persons may be exposed to hazardous fumes during welding in work shop	<b>R91:</b> Explore to provide suitable type "Welding Fume extractors" for all welding machines
16.9	Secondary containment is provided for Lube Oil barrels		_____
16.10	Turbo-ventilators are provided in work shop. Natural Ventilation is good		_____
16.11	Natural illumination is provided by installing transparent sheets on roof in addition to lighting		_____
16.12	Safety procedure for Gas Cutting is found displayed in work shop		_____
16.13	Flash back arrester is provided for cutting torch.		<b>R92:</b> Provide Mechanical

		<p>Guards to valves of Gas Cylinders being used for cutting</p> <p><b>R93:</b> Make fixed arrangement for CO2 Fire Extinguisher for each Gas cutting set</p>
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**6.0 REVIEW OF SAFETY MANAGEMENT SYSTEMS AS PER IS14489**

Sr. No.	Observations & Gaps	Recommendations
<b>6.1</b>	<b>EQHS Policy</b>	
a.	<p>EQHS Policy is prepared and signed by the Managing Director dated 01.10.2015.</p> <p>It covers the management intentions &amp; support for compliance. The EQHS Policy is based on corporate EQHS Policy.</p>	_____
b.	<p>EQHS Policy is displayed at strategic locations such as main gate and near canteen of the site.</p>	_____
c.	<p>EQHS Policy is also displayed in Telugu &amp; English in all Control Rooms</p>	_____

d.	EQHS Policy is prepared as per guidelines of ISO 14001: 2015 & OHSAS 45001: 2018 & ISO9001:2015 Standards	_____
e.	EQHS Policy is being communicated to employees & contract workmen during PEP talk at security gate	_____
f.	Pocket card of QHSE S Policy is distributed to all employees including contract workmen at site.	_____
<b>6.2</b>	<b>Safety &amp;Health Organisation</b>	
<b>6.2.1</b>	<b>Safety Department</b>	
a.	The Organisation has a well established EHS Department.	_____
b.	The EHS department is headed by Mr. K. Raja Sekhar- AGM-EHS who reports to the Unit Head(VP & Head manufacturing).	_____
c.	AGM-EHS has total 16years experience. He holds B. Tech (Chemical) degree &M Tech (Environment). He has also done Post Graduate Diploma in Industrial Safety (One year Course) as per the requirements of Factory Acts.	_____

<p>d.</p>	<p>AGM-EHS is supported by 05 safety officers, having Degree &amp; Diploma in Mechanical or Chemical engineering, in addition to Diploma in Industrial safety.</p> <p>Safety officers are deputed in shifts and are carrying out safety inspection, issuing work permit, Plant round, preparation of JHA for High Risk Permit works, participation in HAZOPS, RCA and documentation &amp; training etc</p>	<p>_____</p>
<p>e.</p>	<p>Site EHS-Head is retrained in safety training in 2019 from external agencies such as CLI. They are also retrained by their Group consulting organisation such as M/s Chola Risk Management.</p> <p>Training by Prism Consultant was also arranged on Topics such as Root Cause Analysis, HAZOPS etc.</p>	<p>_____</p>
<p>f.</p>	<p>The Site EHS- Head has power to stop any work based on severe unsafe conditions till the corrections happen.</p>	<p>_____</p>

<b>6.2.2</b>	<b>Safety Committee</b>	
a.	<p>General Safety Committee (comprising 14 management representatives &amp; 14 Non management representatives) has been constituted.</p> <p>Management representatives are selected by the Unit Head.</p> <p>Non management representatives are selected by General Secretary of Union in consultation with HR Head.</p>	_____
b.	<p>The List of Members of GSC is circulated to all members through a letter signed by VP &amp; Manufacturing Head.</p>	_____
c.	<p>The GSC is held once in three months. The tenure of the GSC is for two years.</p>	_____
d.	<p>VP &amp; Manufacturing Head is the Chairman &amp; Dy. Manager-EHS is the Secretary of General Safety Committee (GSC).</p> <p>The last GSC Meeting was conducted on 20.11.2019.</p>	_____
e.	<p>Minutes of Meeting is prepared as per the Agenda mentioned in the Circular dated 11.11.2019 for the GSC for date 21.11.2019 only as mentioned below:</p> <ul style="list-style-type: none"> <li>i. Accident/ Incident status from last meeting to this meeting</li> <li>ii. Safety record achievement for Coromandel Employees &amp; for Contract Employees</li> <li>iii. Near Miss status</li> <li>iv. Safety Training Details</li> <li>v. Pending Jobs of Previous GSC Meeting</li> <li>vi. New Points for Discussion</li> </ul>	_____
f.	<p>The MOM for new points included: Action Plan, Responsibility &amp; Target date for completion</p>	_____

g.	GSC Meeting is conducted in Telugu. MOM is recorded in English for each GSC Meeting. New points are discussed and review of previous meeting points was done.	_____
h.	MOM of Safety Committee Meeting is sent through e mail to respective HODs etc for compliance.	_____
i.	MOM copy is also sent to Union General Secretary for communication purpose.	_____
j.	Tracking for compliance of recommendations is being done by the Dy. Manager-EHS through e mail & compliance status given by HODs. Also, field observations are made after compliance status received from HODs.	_____
<b>6.2.3</b>	<b>Safety Budget</b>	
a.	Safety Budget for Operating Expenses was found prepared. The Budget for Operating expenses for FY2019-20 is Rs.1.5 Crores. The Budget for Capital Expenses for FY2019-20 is Rs.6.0 Crores for works such as HDPE lining, SCBA, ELB , Confined space-Fume extractor etc However, there is no constraint for safety budget for CAPEX safety items	_____
b.	The safety budget is arrived using the following criteria: i. Previous Year Budget expenditure ii. Number of employees & contract workmen iii. ATA (Annual Turn Around) iv. Maintenance Jobs v. Statutory Licenses & requirements vi. Safety & statutory celebrations vii. Consumables viii. ISO/OSHASA Audit ix. RCA Recommendations x. Scaffolding	_____

	The Budget is based on Risk Based Process safety approach.	
c.	In addition the approved Budget, there is a separate Budget provision of Rs.25.0 Lakhs for High Risk Emergency for Unit Head.	_____
<b>6.3</b>	<b>Accident Reporting, Investigation &amp; Analysis</b>	
a.	Accident Management Procedure as per SOP no. IMS-CPM-09 dated 15.03.2018 as per IMS Manual is in place	_____
b.	All incidents are classified as below: i. First Aid Cases (FAC) ii. Medical Treatment Cases(MTC) iii. Restricted Work Cases (RWC) iv. Lost Time Incident (LTI) v. Near Misses	_____
c.	The summary of incident for till November, 2019 for FY2019-20 is given below: i. First Aid Cases (FAC)-04 ii. Medical Treatment Cases(MTC)-01 iii. Restricted Work Cases (RWC)-NIL iv. Lost Time Incident (LTI)-03 v. Near Misses-1200 with 14 High Risk Near Miss with 100 % Closure status. Near Misses are further classified into: Low Risk, Medium Risk & High Near Misses. 100 % compliance for High Near Misses is ensured by the Management.	_____
d.	Investigation is carried out for High Near miss incident, FAC, MTC, RWC &LTI	_____
e.	For carrying out Investigation of Incidents across the plant, Final Incident Investigation Team (FIIT) team (Total 10 Teams) comprising members from each department has been formed in order to strengthen the Incident Investigation Process, Quality of Incident	_____

	Investigation Reports by using RCA procedure of PSMS as guideline. Team leader may involve Non management staff & contract workmen for carrying out the Incident Investigation as & when needed.	
f.	Accident Reporting & Investigation Format is available.	_____
g.	The accident data are available with the Safety Department.	_____
h.	The retention period for Investigation Reports with reference to Incident related to Factory Act is lifelong whereas for Low Critical Legal cases, the retention period is 08 years	_____
i.	The Top Management is apprised of incident/accident data by preparing a detailed monthlyreport which is sent to MD through Corporate EHS Head.	_____
j.	All recommendation in Investigation reports are tracked by preparing tracking sheet. Till date, about 95% of compliance of all recommendations has been achieved.	_____
k.	Software Tool such as “Coral” is being used for ensuring Legal compliance. “Alert” is received one month before the compliance date with escalation to the Unit Head, if not complied.	_____
<b>6.4</b>	<b>Safety Inspection &amp; Audits</b>	
a.	Safety inspection of various safety related equipment is being carried out by EHS department & Fire Department and records are being maintained by these departments only	_____
b.	Safety inspections of various safety equipment are being carried out at a pre-determined frequency by using a structured safety inspection check-list as mentioned below:	_____



i.	Inspection & maintenance of fire pumps is being done by the Utility(mechanical department) as per the Preventive Maintenance Schedule	_____
ii.	Inspection of fire hydrant valves, Fire Hose Boxes, Water Monitor, Foam Monitor, Hose Reel etc is being done on fortnightly basis by the Fire department	_____
iii.	Inspection of Fire Tender is being done on daily basis by the Fire department	_____
iv.	Inspection of Fire Extinguisher is being done on fortnightly basis by the Fire department	_____
v.	Inspection of Water Sprinkler is being done on weekly basis by the Fire department & mechanical department	_____
vi.	Inspection of First Aid Boxes is being done by OHC team on monthly basis	_____
vii.	Inspection of Ambulance is being done on weekly basis by OHC Team	_____
viii.	Inspection of Air Line is being done on monthly basis by safety department	_____
ix.	Inspection of SCBA is being done on monthly basis by safety department	_____
x.	Inspection of PAS is being done on daily basis by safety department & electrical department	_____
xi.	Inspection of MCP & Fire Alarm Panel is being done on yearly basis by safety department & electrical department	_____
xii.	Inspection of safety shower & eye wash fountain is being done on monthly basis by safety department &	_____
c.	Safety inspections of various safety critical equipment are being carried out at a pre-determined frequency by using a structured safety inspection check-list by other department as mentioned below:	_____

i.	Inspection of Gas Cutting set & Welding machine set is being done on monthly basis by using a check list by the mechanical & safety department	_____
ii.	Inspection & Testing of Lifting Tools & Tackles is being done on six monthly basis by a competent external agency/person under mechanical department	_____
iii.	Inspection & UT Testing for gauge thickness of Pressure Vessels is being done on six monthly basis by a competent external agency/person under Inspection department	_____
iv.	Visual Inspection of Pipe Lines for Ammonia & Sulphuric Acid by using drone is being done on six monthly basis by Inspection team of Inspection Department	_____
v.	Thermography Inspection of Pipe Lines for Ammonia is being done on yearly basis by Inspection team of Inspection Department	_____
vi.	Inspection of safety belts/ fall arrester is being done on six monthly basis by competent external agency under mechanical department	_____
vii.	Inspection of D Shackles, Chain Pulley Blocks, Lifting Tools & Tackles is being done on six monthly basis by competent external agency under mechanical department	_____
viii.	Inspection of conveyors is being done on quarterly basis by mechanical department	_____
ix.	Inspection of guards is being done on quarterly basis by mechanical department	_____
xi.	Inspection of cranes is being done as per the due date by the mechanical department & Inspection team	_____
xii.	Inspection of earth pits is being done once in two years by electrical department	_____

d.	Chemical safety inspection- on six monthly basis is being done by the inspection team & safety department	_____
e.	External Safety Audit is being done by an external agency once in a year.	_____
f.	Internal Audit as per OHSAS is being done once in six months	_____
g.	Statutory inspection of Boiler, HT yard, Transformer is being done once in a year by statutory bodies	_____
h.	A dedicated Inspection Department headed by Asst Manager& supported by three technicians is carrying out inspection of critical safety related equipment & Pipe lines.	_____
i.	Asset Management team has been established for carrying out safety inspection of safety critical equipment	_____
j.	A team of “Safety Stewards” for each department is formed for the better implementation of Safety Management system in day to day operations in their respective work area. There are 40 “Safety Stewards” across the entire plant. The major roles of “Safety Stewards” is given below: i. Effective implementation of Work Permit system ii. Ensuring 100 % Compliance to job specific PPEs while on Job iii. Effective implementation of LOTOTO iv. Ensuring to follow SOP & JHA while on Job	_____
<b>6.5</b>	<b>Safety Training</b>	
a.	A dedicated Training Centre with Training Department is in place	
b.	Training Needs Identification is carried out for each employee at functional level. Training	_____

	Identification needs is done based on the gaps between RPL (Required Proficiency Level) and CPL (Current Proficiency Level) after due discussion with HR, Safety & HOD.	
c.	Department wise safety training needs is prepared by HOD & HR based on RPL & CPL as per the discussion held between Immediate Officer (IO) and Reporting Officer (RO).	_____
d.	Yearly training Calendar for contractor's supervisors & workers is prepared.	_____
e.	Yearly training Calendar for employees is prepared.	_____
f.	Yearly training Calendar does not include training program for senior management team	<b>R94:</b> Prepare Yearly training Calendar by including training program for senior management team
g.	Training on Statutory subjects such as Electrical & Boiler etc is being conducted by Electrical Supervisor & Boiler Supervisor.	_____
h.	Safety man days for each person per annum are 3.0-man days for Employees & Contract Workmen. 3.01-man days for Employees & 3.02-man days for Contract Work men were recorded In 2018-19. 1.70-man days for Employees as against target of 1.95-man days & 2.29-man days for Contract Work men as against target of 1.95-man days were recorded In 2019-20 till November 2019.	<b>R95:</b> Arrange more training programs for Employees so as to level the gap of man days between target & actual till march 2020.
i.	There are three Training Modules: Safety Module-1: The following topics are included and training conducted from May, 2019 to August, 2019. a. Electrical safety b. Material Handling c. Fire	_____

	<p>Fighting Awareness d. First Aid &amp; Power safety                      e. Emergency Response Plan (ERP)                      Safety Module-2: The following topics are included and training was conducted from September, 20109 to December, 2019.</p> <ul style="list-style-type: none"> <li>a. PSM elements (14 Elements)</li> <li>b. Safety , health &amp; environment</li> </ul> <p>Safety Module-3: The following topics are included and training is planned from January 2020 to April 2020.</p> <ul style="list-style-type: none"> <li>a. Process safety Incidents</li> <li>b. Process competency &amp; PSM Elements (additional 5 elements)</li> <li>c. Changes /Amendments in Procedure</li> <li>d. One Point Lessons</li> </ul>	
j.	<p>In the month of December (as on 19.12.2019)-                      Participants: 877 &amp; man days: 220 for Contract Workmen was recorded</p>	<p style="text-align: center;">_____</p>
k.	<p>In the month of December (as on 19.12.2019):                      Participants: 34 &amp; man days: 34 for Employees was recorded.</p>	<p style="text-align: center;">_____</p>
l.	<p>Training calendar for the month of December, 2019 was reviewed. It was noticed that training was conducted on the following topics for Contract Workmen:</p> <ul style="list-style-type: none"> <li>a. Fire &amp; safety b. Construction safety</li> <li>c. Conveyors safety d. Safety Module-2</li> <li>d. BBS e. Confined space entry, Work Permit Systems &amp; Work at Heights, Scaffolding standards.</li> </ul> <p>It was noticed that training was conducted on the following topics for Employees (Management &amp; Non Management staff) in the month of December, 2019:</p> <ul style="list-style-type: none"> <li>a. Safety Module-2</li> </ul>	<p style="text-align: center;">_____</p>

m.	<p>Induction training is being conducted for all new employees &amp; the duration is three days for Technical persons &amp; One day for Non Technical persons.</p> <p>Training on SOP is being given during three days induction training programs for employees.</p> <p>Refresher training on SOP is also given.</p>	_____
n.	<p>Induction Training program for contract workmen is conducted in local language, Hindi &amp; Tamil. Video screening and oral assessment is being done.</p> <p>Videos on following topics are available: Emergency Response Plan, MSDS, Hazards, Scaffolding safety etc</p>	_____
o.	<p>“Job specific safety training” is given by respective department to contract workmen but record is not maintained.</p>	<p><b>R96:</b> Maintain the “Job specific safety training” record of contract workmen given by respective department</p>
p.	<p>Visitors are given 10 minutes Induction training by video playing in English at main security gate</p>	_____
q.	<p>Refresher is being conducted for contractor’s supervisors &amp; workers. The Training assessment of participants for Refresher training is being done through questionnaire in Telugu.</p>	_____
r.	<p>Refresher Training is being conducted to employees as per the training schedule. This is covered under monthly “Class Room Training”. Training assessment of employees (management &amp; Non management staff) for refresher training is being done through questionnaire in English.</p>	_____

s.	<p>The qualifying marks are 75% for both management &amp; Non management staff and Contract Workmen. However, Training SOP does not capture this requirement.</p>	<p><b>R97:</b> Revise the Training SOP by capturing the requirements of qualifying marks of 75% for both management &amp; Non management staff and Contract Workmen.</p>
t.	<p>“One Point Lesson” is not displayed across the plant for creating awareness about the hazards &amp; safety precautions though safety training is being given under Safety Training Module-3.</p>	<p><b>R98:</b> Display “One Point Lesson” is not displayed across the plant for creating awareness about the hazards &amp; safety precautions so as to reduce incident &amp; injury in plant</p>
u.	<p>The following infrastructures &amp; facilities are available for conducting training in Training Center: 1.Training hall with TV and video player (40 persons) 2.Audio-Video facility 3.Overhead projector 4.White Board etc</p>	<p style="text-align: center;">_____</p>
v.	<p>A dedicated training hall for contract workmen is provided. PEP Talk is also being conducted in Control room in second &amp; night shift by the shift safety officer.</p>	<p style="text-align: center;">_____</p>
w.	<p>External Training programmes are also being conducted. For example: Training on “Root Cause Analysis” and “Process safety Incident Investigation” was conducted on 10<sup>th</sup> &amp; 11<sup>th</sup> July, 2019 for Managers (22 participants) by an external agency namely Prism Consultant.</p>	<p style="text-align: center;">_____</p>

x.	Training on “Consequences Management System” was conducted in November, 2019 by the Corporate EHS Head to Senior Management team	_____
y.	Training on “Occupational Health & Industrial Hygiene practices” not given in view of handling of Raw Sulphur, ABC Complex Products, Rock Phosphate etc.	<b>R99:</b> Arrange training on “Occupational Health & Industrial Hygiene practices” in view of handling of Raw Sulphur, ABC Complex Products, Rock Phosphate etc.
<b>6.6</b>	<b>Safety Communication/ Motivation/ Promotion Programmes</b>	
a.	Safety Promotional activities like Safety Day Celebration are being organized on National Safety Day. Various competitions are organized such as Assay Writing, Poster competition, safety Slogan quiz, etc	_____
b.	The Organisation has been awarded various awards during the last five years	_____
c.	Adequate numbers of Safety Signages, Safety Posters, Safety Slogans and Safety Instructions Boards etc are found displayed.	_____
<b>6.7</b>	<b>First Aid &amp; Occupational Health Centre</b>	
a.	First Aid Boxes are provided to all department, security gate, OHC, Ambulance etc for emergency usages	_____
b.	Trained First- aiders (50 Numbers) from various departments are available covering each shift.	_____



c.	Training in First aid is given by St. John's Ambulance Services	_____
d.	Resuscitators are not provided at all HT& LTPanel rooms	<b>R100:ProvideResuscitators at all HT&amp; LTPanel rooms</b>
e.	OHC is provided for giving First Aid. Following Equipment are kept in OHC i. Emergency Oxygen Apparatus ii. Automated portable Suction Apparatus iii. Surgical Instruments for minor surgery iv. ECG machine v. Multi Parameter Monitor-ECG,NIBP,SP02 vi. Defibrillator vii. Spirometer viii. Audiometer ix. Pulse Oxymeter xi. Multi Parameter Patient Monitor xii. Electronic digital BP monitor xiii. Multi Parameter Monitor-ECG,NIBP,SP02	_____
f.	Anti venom for snake bite is also kept in OHC	_____
g.	Ambulance is provided. One set of Oxygen cylinder is kept in ambulance. One number folding stretcher is kept in Ambulance.	_____
h.	Trained Male nurses are available in each shift for the site. FMO is available 24x7 hours for attending to any medical emergency	_____
<b>6.8</b>	<b>General Working Conditions</b>	
<b>6.8.1</b>	<b>Housekeeping</b>	
a.	Waste Bins (MS) are provided for collection of wastes as mentioned below: i. Blue coloured Bin- for Non Metallic wastes ii. Red coloured Bin- for Metallic wastes	_____

	iii. Green coloured Bin- for Trash	
b.	Dust extraction system for PAP,SAP, Wharf Rock Phosphate during ship unloading, etc are provided to minimise dust in the work place	_____
<b>6.8.2</b>	<b>Noise</b>	
a.	Area for equipment such as DG set room, air compressors, rock grinding unit-ball mill area,SAP-Blower area, Complex Plant-dryer area, granulator area, etc have been identified as “High Noise” producing equipment & Work areas.	_____
b.	Signages with “Caution Notice for High Noise areas” where the Noise level is above 90dBA have been displayed.	_____
c.	Noise monitoring is being done in the plant once in a month by internal team. All values are within Permissible limits, except for few working areas such as ball mill for rock grinding, Melter area, Dryer area (A & B train) is very closer to 90 dB(A). The last Noise Monitoring as per the Factory Rules in working areas was carried out on 27.11.2029	_____
d.	Employees & contract workers having potential exposure to High Noise in work places are subjected to “Audio Metric Examination” during Periodical Medical examinations	_____
e.	Acoustic enclosures are provided to DG sets	_____
f.	Ear Plug/ear Muff is provided to persons exposed to High Noise area	_____
<b>6.8.3</b>	<b>Ventilation</b>	
a.	Natural ventilation is provided to all areas.	_____

b.	Turbo-ventilators are provided for Mechanical Work shop area	_____
c.	Room A/C are provided in offices & Admin Block etc	_____
d.	<p>The record for Personal Dust Monitoring was available.</p> <p>Record for Ambient Air quality was available.</p> <p>The details of Limits for Ambient Air Quality was found displayed as below:</p> <p>i. PM 2.5 : 60 micro gram/ m3</p> <p>ii. PM 20 : 100 micro gram/ m3</p> <p>iii. Ammonia : 0.4 micro gram/ m3</p> <p>iv. Sox : 80 micro gram/ m3</p> <p>v. Nox : 80 micro gram/ m3</p>	<p><b>R101:</b> Carry out personal dust monitoring for work areas where workers are potentially exposed to dust such as Grinding Unit in PAP, Sulphur Melter area, Belt conveyor area of Complex plant etc</p>
<b>6.8.4</b>	<b>Illumination</b>	
a.	<p>Illumination monitoring of work places is being done once in a month as per OCP-OHS/SHE/SF/WI/006.</p> <p>The Illumination Monitoring report for the month of November, 2019 was reviewed and the values are within limits for all areas except for few areas where Illumination level in Lux is closer to Limit of 65 Lux.</p>	_____
<b>6.9</b>	<b>Hazard Identification &amp; Control</b>	
a.	<p>Job Hazard Analysis (JHA) has been carried out for all activities &amp; operations at site.</p> <p>HAZOPS have been carried out for all Processes at site.</p> <p>There are 05 HAZOPS Team with a leader for each team for carrying out HAZOPS.</p> <p>Moreover, one team for 05 Year HAZOP Study</p>	_____

	is also formed.	
b.	<p>5 Years HAZOP report for “Node: (1) Liquid Ammonia transfer from 25GA01A/B &amp; 25GA05A/B to B/L consumers “was reviewed. The “Risk Assessment” of identified “Potential Consequences” was not done as per the “Risk Matrix”</p> <p>In practice, as per OSHA Standard, Hazards are Identified &amp; the risk assessment is carried by considering the existing controls and if the risk is not acceptable than additional controls are recommended based on the type of risk (Low, Moderate, high, Extreme High) and risk assessment is again carried out with additional controls to know whether risk is acceptable or un acceptable.</p>	<b>R102:</b> Review the existing HAZOPS report and modify it accordingly after carrying out Risk Assessment.
c.	<p>Different types of hazards have been identified. Identified major hazards are:</p> <p>i. Electrical Hazards ii. Mechanical hazards iii. Fire hazard iv. Chemical spillage hazards v. Emission of Ammonia etc</p>	_____
d.	<p>Emergency Actions plans have been prepared &amp; relevant control measures have been taken to minimise consequences of identified hazards as mentioned in HAZOPS, JHA &amp;also in Onsite Emergency Plan</p>	_____
e.	<p>The organisation is certified for ISO14001:2015 &amp;ISO 45001 Standards</p>	_____
<b>6.10</b>	<b>Technical Aspect</b>	
<b>6.10.1</b>	<b>Safe Operating Procedures (SOP)</b>	
a.	SOP for each department is available at site	_____
b.	OCP & Work Instructions have been prepared for various activities & operations based on the	_____

	results of JHA or HAZOPS etc	
c.	IMS Manual dated 15.03.2018 has been prepared with procedures for carrying out JHA, Risk Register, for preparing Occupational Safety & Health program etc	_____
d.	Refresher Training on SOPs, OCP & Work Instructions is being given as per the Monthly Training Schedule.	_____
e.	The existing Safe Operating Procedures are being updated or reviewed as per the Procedure for Control of Documented Information (IMS-CPM-01) and also as per the Document Amendment Request {(DAR) IMS-F-10}	_____
g.	IMS Manual is prepared by IMS Co-ordinator or MR, Reviewed by Head-Operations & Approved by Unit Head	_____
h.	Contractor's safety is paramount to the organisation since a large work force of contract worker is engaged for various works. However, a system for selection of contractors is not in place before placing Work Order. However, it is ensured by respective HODs that contractors follow the site safety rules & practices once Work Order is issued to contractors.	<p><b>R103:</b> Prepare a system for selection of contractors based on safety evaluation for the following criteria/ parameters (to name few) before issuing Work Order as mentioned below:</p> <p>Done</p> <ul style="list-style-type: none"> <li>i. Quality of workman ship</li> <li>ii. Quality of Supervision</li> <li>iii. Tools &amp; equipment</li> <li>iv. Adherence to safety &amp; health rules</li> <li>v. Injury/ Illness performance</li> <li>vi. Housekeeping etc</li> </ul> <p>Rating should be given for each parameter. The</p>

		<p>acceptance criteria may be decided upon by the site safety head</p>
<p><b>6.10.2</b></p>	<p><b>Work Permit System</b></p>	
<p>a.</p>	<p>Following Work Permit System is in place for the site:</p> <ul style="list-style-type: none"> <li>i. Class 1A Permit for HotWork , Pipe Line Opening, Electrical &amp; mechanical isolation, Height.</li> <li>ii. Class 1B Permit for Confined Space.</li> <li>iii. Class 1B Permit for Cold Works, Excavation, Electrical &amp; mechanical isolation.</li> <li>iv. Safety Permit for Radiography</li> <li>v. Safety Permit for Crane Lifting</li> <li>vi. Safety Permit for Road Blocking</li> </ul> <p>A structuredCheck list is being used for each type of Permit.</p> <p>If required, JHA is also being carried for High Risk Areas Works.</p>	<p>_____</p>

<p>b.</p>	<p>Medical examination such as Blood Pressure (BP) of person allocated for working at height is being done.</p> <p>However, these medically fit persons for working at heights are given ID card indicating that “Medically Fit for Work at Height”</p>	<p>_____</p>
<p>c.</p>	<p>LOTOTO (Lock Out Tag Out &amp; Try Out) system is also available.</p> <p>LOTO station is provided in all departments &amp; also in Utility.</p> <p>Locks are available for locking valves on all types of energy such as Air energy.</p>	<p>_____</p>
<p>d.</p>	<p>PEP Talk or Tool box training is being given to employees &amp; contract workmen on Work Permit System before starting the work</p>	<p>_____</p>
<p><b>6.10</b></p>	<p><b>Waste Disposal system</b></p>	
<p>a.</p>	<p>Different types of wastes are collected in Waste Bins with colour code:</p> <p>i. Red Coloured Bin : Metallic Wastes</p> <p>ii. Blue Coloured Bin: Non Metallic Wastes</p>	<p>_____</p>

	<p>iii. Green Coloured Bin: Trash</p> <p>Disposal from wastes bins is being done on shift basis.</p>	
<b>6.11</b>	<b>Personal Protective Equipment</b>	
a.	<p>Mandatory PPEs such as Safety shoes, Helmet, uniform are provided to all working at site. PPEs such as Helmets are replaced by safety department whenever found damaged. Safety shoes are replaced once in a year.</p>	_____
b.	<p>Job specific PPEs such as Safety harness , safety goggle, welder’s goggle or face shield, Dust Mask, Full Body PCV suit, PVC hand gloves, Ammonia Gas canister Mask, Air Line respirator etc are provided &amp; being used</p>	_____
c.	<p>Apart from the above PPEs, the following PPE are also available:</p> <p>i. At ware house 10 nos. of filled cylinders &amp; 20 nos. of 3M filter cartridge are available at emergency safety cabin.</p> <p>ii. 10 SCBA set cylinders &amp; 20 nos. of 3M filter cartridge are available at ware house.</p> <p>iii. In safety department’s room 2 Nos. ELBA sets, 2 nos. of Airline respirators, 2 nos. air blower type respirators, 2 nos. - 3M filter cartridge gas masks are available.</p> <p>iv. At AAST control room one no. air blower type respirator is available.</p> <p>v. MSA protection suit from liquid Ammonia 2 nos. are available at Wharf safety equipment room.</p> <p>vi. The regular personal protective equipment like PVC suits, gloves, face shields, asbestos gloves, cotton face masks etc are available at</p>	_____



	<p>all the control room as per requirement.</p> <p>vii. About 12nos. of fire suits are available at the following locations.</p> <p><b><u>Location of Fire Suits:</u></b>                  Utilities Control Room: 1No.                  Central Control room: 1 No.                  WharfMolten Sulfur Storage area: 2 Nos.                  General Emergency cabin at Lab: 1 No.                  Fire tender:1 No.</p>	
d.	Ear muff or Ear Plug is being used in High Noise area.	_____
e.	Safety belts & fall arrestees are being used & being checked once in six months by safety department and also by an external agency	_____
f.	Inspection & audit of PPE quality & PPE compliance is being done by the safety department& also by "Safety Stewards"	_____
g.	<p>General PPE Matrix is prepared&amp; found displayed.</p> <p>PPE matrix based on hazardous activities&amp; operations being carried for each activityis notprepared &amp; hence, not displayed</p>	<p><b>R104:</b>Prepare job specific PPE Matrixbased on hazardous activities&amp; operations of that job or work being carried at site &amp; display the same near each hazardous activity or operation</p>
h.	BIS Standards arenot beingmentioned for each PPE in Purchase requisition during procurement of PPEs	<p><b>R105:</b>Incorporate ISI or BIS standard for each PPE being requisitioned in the Indent</p>
i.	SOP for PPE is prepared. As per SOP, various respiratory PPEs & Emergency PPEs such as Air	_____

	Line Respirators, SCBA Sets, ELBA Sets( for Emergency Escape), 3M Cartridge Respirators, Canister masks etc are provided in Sulphuric Acid Plant, Phosphoric acid Plant, Utility & AAST Plant, Complex Plant (A & BC Trains), Wharf, Fire Station, Ambulance Room, Sulphur Control Room etc	
<b>6.12</b>	<b>Fire Protection</b>	
a.	Fire Hydrant layout has been prepared in the Site Lay Out drawing No.170-VE—1921-06 & displayed at site. Fire hydrant network is provided for all the plants and facilities.	_____
b.	Fire hydrant header pressure is maintained by jockey pump and one motor driven and one diesel driven firewater pump are provided to meet the requirements of firewater in case of emergency. Motor driven pump is also connected to the power source from captive power plant. These pumps should always be on auto mode so that they start automatically in case of drop in pressure of the fire hydrant header below present valves.	_____
c.	Fire Pumps are provided for Ammonia Storage area as mentioned below: i. Jockey Pump: 12.3m <sup>3</sup> /hr ii. Electrical driven pump: 273m <sup>3</sup> /hr iii. Diesel Engine Pump: 410 m <sup>3</sup> /hr	_____
d.	Fire Pumps are provided for Other areas as mentioned below: i. Jockey Pump: 32m <sup>3</sup> /hr ii. Electrical driven pump: 273m <sup>3</sup> /hr iii. Diesel Driven Fire pump Trailer: 8000 LPM. Fire Pump Trailer is stationed at Fire Office.	_____

e.	Dedicated feeder for Fire Pumps in PCC panel is provided. Motor driven pumps are also connected to the power source from captive power plant.	_____
f.	The capacity of static water reservoir is as below: i. 20 Lakhs gallon – One Number dedicated water reservoir Source of water: Municipal Water	_____
g.	Level in reservoir for Fire Water is being checked by Utility technician	_____
h.	All essential employees (who are trained in first aid and fire fighting) are responsible for fire fighting.	_____
i.	Engineer Mechanical (Utility) will maintain the fire hydrant system	_____
<b>j.</b>	<b>Fire Tender</b>	
j-i	<p>Fire foam tender of 3000 Liter capacity of the water and 500 Liter capacity of Foam is available at site. Fire pump capacity in Foam Tender is of 108 m<sup>3</sup>/hr at 80 m head.</p> <p>2 Nos. self-breathing apparatus &amp; 2 Nos. ELBA are also kept in the Fire Foam tender and can be used by the Firemen while approaching toxic gas affected areas.</p> <p>Another Fire Tender is also available having capacity of 5000 Liters of water and 500 Liter of foam.</p> <p>The following safety equipment are also provided in Foam Tender:</p> <p>i. Cartridge Respirator face mask for Sulphur &amp; Ammonia</p> <p>ii. Spray Nozzles</p>	_____

	iii. Jet Nozzles Fire Tenders are stationed at Fire Office.	
j-ii	05 Trained Drivers & 05 Dedicated Fire Men for operation of Fire Foam Tenders are available round the clock.	_____
k.	Portable Fire Extinguishers of varying capacity & Types such as CO2, DCP, ABC and Foam etc have been deployed covering all areas/sections of the plant etc. i. CO2 type 4.5 Kg & 9 Kg -130 Numbers ii. Mech. Foam type 9 Liter & 50 Liter iii. DCP 5 Kg & 10Kg -212 Numbers iv. ABC Type 5 Kg & 2Kg	_____
l.	<b>Mobile Foam Monitor:</b> Mobile Long Range Water Foam Monitor with 1000 Liters Foam Compound Storage tank mounted on wheels is also available at site	_____
m.	Fixed & Automatic fire fighting installations such as water sprinkler systems have been provided for the following areas: i. AAST Tanks ii. Ammonia Pumps iii. LPG Cylinders Battery for Flare	_____
n.	Adequate Fire Fighting facilities have been provided as mentioned in the Emergency Response Plan	_____
o.	Monthly inspection and service for all the site fire extinguisher is being carried out by fire department once in 15 days	_____
p.	Hydro pressure testing of Fire Hoses is not being done. Physical inspection of Hoses being done during monthly inspection. There is probability that damaged hoses with pin hole may be in the hose boxes.	<b>R106:</b> Carry out Hydro pressure testing of Fire Hoses & maintain the record (Section 38 and

		Sec31 read with rule 56 of the Factories Act)
q.	<p>Training on “Basic Fire Safety” is being conducted through fire department twice in a month for all employees &amp; contract work men.For Example: Training was given on 12.11.2029 for 100 Contract Workmen for 35 minutes at gate.</p> <p>Training on basic fire fighting methods was given on 17.04.2019 to contract workmen where 80 persons where trained.</p> <p>Theory &amp; Practical with demo was explained by the Fire Officer.</p> <p>Training on fire fighting was given to employees on 04.03.2019 where 65 employees participated.</p>	_____
r.	<p>Persons responsible to carry out Fire Fighting are as mentioned below:</p> <ul style="list-style-type: none"> <li>i. Fire Men</li> <li>ii. Trained Fire Fighters ( having three Months intensive training) from plants</li> <li>iii. Security Guards</li> <li>iv. Fire Officer</li> </ul>	_____
s.	<p>Monthly calendar for training programs for employees &amp; contract workmen is available and training on fire fighting is being conducted as per the yearly calendar</p>	_____
t.	<p>Fire Alarm &amp; MCP have been provided for the entire site</p>	_____
u.	<p>Smoke detectors are provided to all HT &amp; LT Panels</p>	_____
w.	<p>Hooter, MCP &amp; Fire Alarm Panel is provided at local areas and connected to centralized Fire alarm system in Control Room where 24 hours monitoring is being done.</p>	_____

x.	Mock drill is being conducted once in six months. Table Top Mock Drill is also being conducted.	_____
y.	Mock drill is also being conducted in night time & on weekly off/Holidays	_____
z.	Fire fighting drill is not being carried out	<b>R107:</b> Carry out Fire fighting drills as often as necessary and at least once in every period of 2 months. (Ref Rules 61 of AP factories rules)
z-i.	No major fire incident occurred in 2018 & 2019 inside the plant. One small fire incident (Sulphur fire) occurred on 05,08.2019	_____
<b>6.13</b>	<b>Emergency Preparedness</b>	
a.	Onsite Emergency Plan (OSEP) was revised vide DOC NO: E / SH / SF / WI / 001. REV NO: 4 DATE OF ISSUE: OCTOBER 2009.	<b>R108:</b> Revise the existing OSEP in view of addition of PAP-02 Plant
b.	Potential hazards/Emergencies have been identified in Emergency Response Plan (ERP) or On Site Emergency Plan (OSEP) and procedure for controlling each type of emergency has been outlined in OSEP or ERP	_____
c.	04 Numbers Assembly Point have been provided covering all parts of the plant to cover the whole site area with the consideration of wind direction and more than one road approach on each point i. Employee gate No.2 ii. Contract Work men gate No.3	_____

	<p>iii. Gypsum Pond Area Gate No. 4                  iv. Dock Road Entry Gate No. 5                  In addition to above, other assembly points are:                  i. At the Silo area entrance gate at wharf.                  ii. At the OR berth entrance gate area north - East end of berth.                  The assembly points shall be selected basing on the wind direction at the time of the incident.                  These areas are covered by the PA system, for effective communication with the assembled personnel during an emergency.</p>	
<p>d.</p>	<p>Emergency Response Team (ERT) has been identified in OSEP. ERT team with flow of communication is prepared in OSEP and communicated to all ERT by training.                  ERT Members comprising Fire Fighting, First Aid Team(50 Members) Rescue team (21 Members), Safety Team &amp;Maintenance Team have been identified as part of OSEP.</p>	<p>_____</p>
<p>e.</p>	<p><b>Emergency Control Centers:</b></p> <p><b>The main control center</b> is Manger-Shift Operations’ (Shift Superintendent) room located in the Admin Building. The control room will be provided with adequate facilities for internal as well as external communication. All necessary documentation mentioned under section 4.2 will be maintained in the main control center. Personal protective equipment like SCBAs, gas masks etc are provided in room No 164 (Emergency cup- board) sufficient numbers for use during an emergency.</p> <p><b>Alternate main control center</b> is located in the garage area and all the above-mentioned</p>	<p>_____</p>

	<p>facilities and documentation are also provided in the alternate center.</p> <p><b>Forward Control Centers:</b> The plant personnel will also use the concerned unit control rooms as forward control center during the emergency</p>	
<p>f.</p>	<p>10 Numbers Wind socks covering all parts of plant &amp; all direction are provided at strategic locations as per OSEP as mentioned below:</p> <ol style="list-style-type: none"> <li>1.Admin Building – 1 No.</li> <li>2. Complex plant “C” train top – 1 No.</li> <li>3. Phosphoric acid plant top – 1 No.</li> <li>4. Atmospheric Ammonia Tank-2 – 1 No.</li> <li>5. SAP2 IAT Tower – 1 No.</li> <li>6. Wharf Area - On inclined Conveyor structure (JD 1304) – 1 No.</li> <li>7. Wharf area - Molten Sulfur storage tanks– 1 No.</li> <li>8. Rock grinding plant top – 1 No.</li> <li>9. Product handling unit top – 1 No.</li> <li>10. AAQM – 1 No.</li> <li>11. Plant Gate – 1 No.</li> </ol>	<p>_____</p>
<p>g.</p>	<p>Medical Emergency Response system comprises of the following:</p> <p>A First Aid centre operates in the factory round the clock. A full time doctor takes care of the first aid centre from 8 AM to 4:30PM and he is available to take care of any emergency during the non-working hours and holidays. Qualified Ambulance Room Assistants are posted in shifts and are available round the clock. An ambulance van is also available at the Ambulance Room round the clock with dedicated drivers for</p>	<p>_____</p>



	<p>driving the Ambulance Van.</p> <p><b>Facilities at the Ambulance Room:</b></p> <p>Following facilities and equipment are available at the First Aid centre:</p> <ul style="list-style-type: none"> <li>i. Emergency O<sub>2</sub> apparatus.</li> <li>ii. Suction Apparatus.</li> <li>iii. Surgical Instruments for minor surgery.</li> <li>iv. ECG machine.</li> <li>v. BI sugar analysis</li> <li>vi. Observation Table</li> <li>vii. Electronic digital BP monitor</li> </ul>									
h.	<p>Nominated hospitals facility is available in case of emergency and needing special attention. Nearest available facilities are as follows:</p> <p>Hospital/ Nursing Home: Distance (km) &amp; Beds</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Hymavathi Nursing Home</td> <td style="width: 10%; text-align: center;">1</td> <td style="width: 10%; text-align: center;">18</td> <td style="width: 10%; text-align: right;">St.</td> </tr> <tr> <td>Anne’s Hospital, Malkapuram</td> <td style="text-align: center;">4</td> <td style="text-align: center;">123</td> <td></td> </tr> </table>	Hymavathi Nursing Home	1	18	St.	Anne’s Hospital, Malkapuram	4	123		_____
Hymavathi Nursing Home	1	18	St.							
Anne’s Hospital, Malkapuram	4	123								
i.	<p>Safety Inspection Check List is being used for inspection of Ambulance. Inspection of ambulance is being done by the driver in shift.</p> <p>The filled check list is checked by the Security Officer &amp; OHC In-charge.</p>	_____								
j.	<p>Communication with local bodies &amp; external agencies in an emergency is done by using personal mobiles and P&amp;T Numbers only. Security is also provided with Mobile for communication.</p>	_____								

<p>k.</p>	<p>For communication of an Emergency, “111” is dialed form any Intercom <b>Emergency Alarm Telephone “111”</b> or “444” of the plant gate security office.</p> <p>The call to the telephone No. 111 would be simultaneously received by the personnel at the following locations:</p> <ul style="list-style-type: none"> <li>i. Laboratory.</li> <li>ii. AAST Control room</li> <li>iii. Plant gate security.</li> <li>iv. Telephone operator (Reception)</li> <li>v. Fire Station.</li> <li>vi. Occupational health center (Ambulance room)</li> </ul> <p>Of the above 6 locations, whoever lifts the telephone first only will receive the emergency message. They in turn would communicate the message to the other 5 places by dialing # 1 of the emergency phone and should inform by the speaker phone.</p>	<p><b>R109:</b>Display “111” or “444” on Intercom of all departments</p>
<p><b>6.14</b></p>	<p><b>Plant Lay Out &amp; Area Classification</b></p>	
<p>a.</p>	<p>Classification of Hazardous Zones in the plant for electrical installations has been done and Hazardous Zones have been marked on the Plant Lay Out Drawing No.Engg-skt-2053 Rev 0.</p> <p>However, this drawing is not found displayed in the plant.</p>	<p><b>R110:</b>Display Hazardous Area Classification Drawing in the plant at strategic locations</p>

<b>6.15</b>	<b>Pressure Vessel ( Fired&amp; Unfired)</b>	
a.	All identified Pressure vessels are tested for Thickness gauging by a competent agency. Records are also maintained in Form 8 (Rule 56 as per AP Factories Rules-Report of Examination of Pressure vessels or Plants)	_____
b.	Safety Relief Valves of suitable pressure rating is provided to Air receivers, Nitrogen surge vessel, etc	_____
<b>6.16</b>	<b>Lifting Machines ,Tackles &amp; Tools</b>	
a.	All Lifting Machines, tackles & Tools have been identified and a list is available with Mechanical section (Tool Room)	_____
b.	There are 30 Numbers Hydraulic jacks being used at site & all are found tested by a competent agency and records of examination & testing are being maintained in Form No. 38. For Example: Hydraulic Jack with Pump, cap: 20 T, located in Mechanical Work Shop was found tested on 29.12.2018 with due date of 28.12.2019- yearly testing.	_____
c.	There are 434 Numbers D-Shackles being used at site & all are found tested by a competent agency and records of examination & testing are being maintained in Form No. 38. For Example: D Shackle, cap: 1 T was found tested on 21.03.2019 with due date of 20.03.2020- yearly testing.	_____
d.	There are 328 Numbers Wire Rope Slings being used at site & all are found tested by a competent agency and records of examination	<b>R111:</b> Arrange to get Test Certificate in Form 38 for

	<p>&amp; testing are being maintained in Form No. 38. For Example: Wire Rope Slings of varying capacities with sr. no. 1 to 256 were found tested on 21.03.2019 with due date of 20.03.2020- yearly testing. One Single Test Certificate was issued by the Competent Person for Wire Slings from Sr, No.1 to 256.</p>	<p>individual Wire Rope sling since _____ year of manufacturing will be different</p>
e.	<p>There are 88 Numbers Polyester Web Slings being used at site &amp; all are found tested by a competent agency and records of examination &amp; testing are being maintained in Form No. 38. For Example: Polyester Duplex Sling, cap: 2 T, was found tested on 21.03.2019(51 Nos.), 04.06.2019 (10 nos.), 12.06.2019 (15 nos.) &amp; 20.09.2019 (12 Nos.) With due date of one year from the date of testing- yearly testing.</p>	<p>_____</p>
f.	<p>There are 116 Numbers Safety Belts being used at site &amp; all are found tested by a competent agency and records of examination &amp; testing are being maintained. The testing of safety belts (Full body harness with double lane yard- Class A Fall Arrester) is being done as per Rules prescribed under Rule 61-C Of AP Factory rules). For Example: safety belt was found tested on 23.09.2019 with due date of 22.03.2020- six monthly testing.</p>	<p>_____</p>
g.	<p>There are 47 Numbers Chain Pulley Blocks of varying capacities which are being used at site &amp; all are found tested by a competent agency and records of examination &amp; testing are being maintained in Form No. 38. For Example: Chain Pulley Block, cap: 1 MT, Location: Tool Room was found tested on 28.12.2018 with due date of 27.12.2019- yearly testing.</p>	<p><b>R112:</b> Obtain the certificate of testing for Chain Pulley Blocks being used by the contractors</p>

h.	<p>There is 01 Number Man Cum Material Lifting Basket (mancage) is being used at site &amp; is found tested by a competent agency and records of examination &amp; testing are being maintained in Form No. 38 (as per Rule 55 &amp; 55A of Factory Rules)</p> <p>For Example: Man Cage, cap: 04 Persons or 1000 Kgs, ID No. CIL/MCB/4P/01 was found tested on 21.03.2019 with due date of 20.03.2020- yearly testing.</p>	<p>_____</p>
i.	<p>There are 06 Numbers EOT Cranes of varying capacities which are being used at site &amp; all are found tested by a competent agency and records of examination &amp; testing are being maintained in Form No. 38.</p> <p>For Example: Double Girder EOT Crane, cap: 12 T, Location: Mechanical Work shop was found tested on 28.12.2018 with due date of 27.12.2019- yearly testing.</p>	<p>_____</p>
j.	<p>There is 01 Number Electrical Wire Rope Hoist being used at site &amp; all are found tested by a competent agency and records of examination &amp; testing are being maintained in Form No. 38.</p> <p>For Example: Electrical Wire Rope Hoist, Cap: 01T, ID No. EWRH-01 was found tested on 22.02.2019 with due date of 21.02.2020- yearly testing.</p>	<p>_____</p>
k.	<p>There are 13 Number Mechanical Hoist being used at site &amp; all are found tested by a competent agency and records of examination &amp; testing are being maintained in Form No. 38.</p> <p>For Example: Mechanical Hoist, Cap: 01 T, was found tested on 28.12.2018 with due date of 27.12.2019- yearly testing.</p>	<p>_____</p>
l.	<p>There are 12 Number Pillar Jib Cranes (Trolley Type) being used at site &amp; all are found tested</p>	<p>_____</p>

	<p>by a competent agency and records of examination &amp; testing are being maintained in Form No. 38.</p> <p>For Example: Pillar Jib Crane, Cap: 01 T, was found tested on 28.12.2018 with due date of 27.12.2019- yearly testing.</p>	
m.	<p>The license for competent person for testing of lifting machines &amp; tools is also available- Competent person accepted by The Director of Factories through Certificate No. L. Dis. B2/4677/2019 dated 30.09.2019 and is valid from 25.09.2019 to 24.09.2020.</p>	_____
n.	<p>SWL is posted on each Lifting Tackles &amp; Tools</p>	_____
<b>6.17</b>	<b>Calibration &amp; Testing</b>	
a.	<p>Calibration of Weighing machine was carried out from Meteorological Department was found tested once in a year&amp; the Calibration certificate is valid till 22.03.2020</p>	_____
b.	<p>Earth Resistance testing in earth Pits (480 numbers) was done on 13.05.2019 by the contractor&amp; test was witnessed by Electrical Supervisor. The Reports are verified by the Electrical In Charge.</p> <p>The details of date of testing; due date &amp; value</p>	_____

	of earth resistance is found displayed on each earth pit.	
c.	Transformer oil testing (54 Transformers) was done on 24.01.2019 & 25.01.2019 and the test reports are valid for one year	_____
d.	Mobile Welding Rectifier was checked on 21.11.2019 and the report is valid till 20.01.2020	_____
e.	MOV valve for Ammonia in Wharf was visually inspected for valve packing & calibrated on 03.04.2019	_____
f.	Ammonia Leak Sensor was calibrated on 23.03.2019 using standard Ammonia gas with one-year validity	_____
g.	Level transmitters for Sulphuric Acid, IAT, FAT, DT etc are being checked once in a year during ATA	_____
h.	Pressure transmitters are being checked once in a year during ATA	
i.	Inspection of Lightning Arresters is being done once in a year. The inspection was done on 30.03.2019.	_____

b.	Mapping for coverage of entire areas & structures by the existing Lightening arrester with dedicated earth pits is not done on the site lay out drawing for ensuring that no structure is left out without lightening protection	<b>R113:</b> Carry out Mapping for coverage of entire areas & structures by the existing Lightening arrester on the site lay out drawing for ensuring that no structure is left out without lightening protection (Sec 7-A and Sec 41 read with 61-B of the Factory Act))
j.	Thermoplastic PTFE Flexible Hose for Sulphuric Acid unloading in Wharf was tested for Hydro pressure of 21 kg/cm <sup>2</sup> by an external agency on 01.11.2018	_____
k.	Drinking Water Analysis (18 samples) was carried out from Regional Public Health Laboratory on 30.04.2019 for Bacteriology Analysis & found to be satisfactory.	_____
l.	Breathing air quality was tested on 22.08.2019	_____
m.	Structural Stability testing is being done once in a year.	_____
n.	Storage tanks ( AAST, Sulphuric Acid, Phosphoric acid etc) is being done once in 5 years	_____



<b>6.18</b>	<b>Vehicular Traffic &amp; Transport Safety</b>	
	The following safety measures & facilities are provided at site for transport safety & vehicular traffic	_____
a.	Truck stoppers at Loading point are being used	_____
b.	Hard Barricades are provided for critical areas such as near LPG Cylinders area, AAST – from manifold area to cooling towers, Ammonia Pump area, 5 KM Dock Road for Sulphuric Acid Lines	_____
c.	Zebra Crossings are provided from Admin Building to Plant areas. Dedicated Pedestrians walk ways with signages & Zebra crossing are provided in the plant wherever necessary.	_____
d.	Convex Mirrors are provided at turning, corner, isolated area etc for avoiding accident	_____
e.	HIRA for transportation Hazards is not found done by the logistic team along with safety	<b>R114:</b> Carry out HIRA for transportation Hazards is not found done by the logistic team along with safety
f.	Training on “Defensive Driving” is being	_____

	imparted to drivers etc	
<b>6.19</b>	<b>Access &amp; Approach Platforms</b>	
a.	Adequate safe access is provided to places & areas such as working platform with hand railing & toe guard, ladders etc are provided for areas such as PAP Storage tanks, Sulphuric Acid Plant ,AST Tanks, Scrubbers stacks etc	_____
b.	Standard Aluminum ladders, FRP ladders,Standard Aluminum ladders Telescopic type & Mobile scaffold tower etc being used for carrying out works at height.	_____
<b>6.20</b>	<b>Communication System Adopted In Plant</b>	
a.	Fire Alarm, MCP & Electrical siren & Megaphone etc are provided as communication system for communicating an emergency.	_____
b.	Public Address system is provided for the site	_____
<b>6.21</b>	<b>Transportation</b>	
a.	Materials such as Sulfuric Acid, Molten sulphur, Liquid Ammonia, Rock Phosphate etc are transported to factory and Finished Goods is transported from the site to various destination	_____
b.	The following Modes of transport are being used for receiving raw materials & for sending Finished Goods in Bags to customers: i. Road	_____

	ii. Ship iii. Rail	
<b>6.21.1</b>	<b>Road Transport</b>	
a.	Molten Sulphur & Rock Phosphate from Wharf Storage tanks to Plant are being received by Tankers & Trucks through internal Dock road.	_____
b.	Hard Barricades are provided for Dock road to avoid accident	_____
c.	Unloading Procedure is displayed & PPEs is being used during unloading into Tankers & Trucks	_____
d.	Unloading Procedure (PSMS/SOP/Wharf/04/Rev03) for loading liquid sulphur to road tankers by gravity at wharf is in place. Unloading Procedure (PSMS/SOP/Wharf/08/Rev1) for loading liquid sulphur to road tankers by pit pump at wharf is in place.	_____
e.	Road safety PEP talk & Road safety awareness programs are being conducted for truck drivers	_____
f.	Each truck & tanker entering inside the factory premises is being checked by security by using a safety inspection check list. Entry Control Check list for Hazardous Substance Tankers was reviewed. The check list is exhaustive which includes check points such as Condition of Tanker, Authorization of driver for driving the hazardous substance, Registration certificate of the tanker, PVC overall suit (For Sulfuric acid, Phosphoric acid), TREM Card - Available with Driver, Flames arrestor on exhaust pipe (Muffler), First Aid Box, Wooden Stoppers etc	_____

g.	Safety induction training & defensive driving training is being given to trucks drivers at vehicle entry point only by playing DVD by security officer	_____
h.	About 20 % Finished Goods is transported by road transport in wagons.	_____
<b>6.21.2</b>	<b>Rail Transport</b>	
a.	About 80 % Finished Goods is transported by rail transport in wagons.	_____
b.	Manual Loading of wagon is being done	_____
c.	All maintenance of rail line, signal etc is being done by railways.	_____
d.	Man movement alerting hooter is provided at Wagon post side	_____
<b>6.22</b>	<b>Machine Guarding</b>	
a.	Zero Access guards & 360 Deg protection is not provided through existing guards for Rotating parts of pumps, Belt Drives etc	<p><b>R115:</b> Review the existing design for machine guarding of couplings, belt drives etc and modify the guards so as to provide Zero Access guards &amp; 360 Deg protection</p> <p><b>R116:</b> Explore to provide Proximity sensors are fixed for high speed coupling guards</p>
b.	Belt conveyors tail end pulleys are not provided with adequate machine guards	<b>R117:</b> Provide Proximity Switches with trip

		interlocks for all belt conveyors tail end pulleys & for rotary machines man entry areas
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**7.0 POSITIVE ASPECTS OF SITE & FACILITIES WITH RESPECT TO BEST SAFETY PRACTICES**

During the audit it was observed that the management has already incorporated several in built design by safety in the production lines. Based on the discussions held with Site Head& AGM-EHS and Sr. Management Team, the management is all set to further institutionalize and implement best safety arrangements and practices, in addition to time tested and ongoing ones depending upon necessity and based on the merit of each case.

The following positive aspects are worth mentioning:

**7.1 Fire Suppression Facilities & Systems**

**7.1.1** Auto operated Fire Hydrant System with Jockey Pump, Electrical driven main fire pump and one diesel driven Pump is provided.

**7.1.2** Fire Water storage reservoir of 20Lakhs Galloncapacities exclusively for firefighting is provided

**7.1.3** Auto operated Fixed installations such as Water Sprinkler System for AAST tanks, Ammonia Pump area, LPG Cylinder area etc are provided

**7.1.4** Fire Tender is provided.

## **7.2 Fire Alarm & Detection system**

7.2.1 Fire Alarm & detection system is provided for almost all areas/ blocks in the plant with local fire alarm panels

## **7.3 Emergency Exits**

7.3.1 Emergency Exits have been provided to all areas & blocks wherever applicable. Auto Glow signages have also been provided

## **7.4 Energy Isolation System**

The company has introduced & implemented the Energy Isolation system like Electrical, Pneumatic, Hydraulic, etc. & LOTOTO system (Lock out Tag out & Try Out). The field training on Energy Isolation is being arranged as per the predetermined schedule.

## **7.5 Personal Protective Equipment (PPE) Issue Booth for Transport Drivers & Helpers**

The Management has set up Personal Protective Equipment (PPE) Issuing Booth for Transport Drivers & Helpers for ensuring all Transport Drivers & Helpers are entering the plant premises with required PPEs.

## **7.6 Safe working platforms/Equipment for Height works**

Standards for working at heights are provided & being implemented by the Management.

Very good Scaffolding Erection and Dismantling systems are being followed along with inspection tag duly inspected and signed by the Scaffolding Inspector.

Fall arrester with double lanyard is provided wherever applicable. Medical examination of workmen engaged for work at height is being done by the factory medical officer.

A specialized cup & bolt type Scaffolding is being used for maintenance works and training on erection of Scaffolding is being organized by an expert agency for contract workmen.

### **7.7 Occupational Health Surveillance & Industrial Hygiene monitoring program**

Occupational Health Surveillance & Industrial Hygiene monitoring program is being carried out for various activities. This program includes Noise Monitoring, Dust Monitoring, gaseous emission monitoring, Illumination Monitoring etc

### **7.8 Contractor Safety program**

A robust system for ensuring implementation of site safety rules & safety precautions by contractors is in place. Induction training on safety & refresher training for contract workmen is being carried out as per yearly training schedule

### **7.9 Process Safety Management System**

The Management had introduced additional 05 PSMS Elements to the existing 14 PSMS elements. Implementation of additional 05 PSMS will go a long way in achieving the Safety Standards to a next higher level.

## 8.0 OVERALL OBSERVATIONS

8.1 The Management has taken a large numbers of “In Built Safety Measures”. Monitoring of already existing in built safety measures is also being done from time to time by Safety & Engineering team

8.2 The Plant is implementing and confirming with the rules and regulations stipulated in various Indian Statutory Acts and Rules in general and specific to the activity Undertaken In design, installation of the plant facility and its operations.

8.3 Suitable fire protection measures have been taken by the Management and as & when needed, expansion of the existing fire hydrant system is being undertaken under CAPEX.

8.4 The Company’s Safety Management principles and programs are based on QHSE Policy.

8.5 The factory management has displayed EQHS Policy in the factory. Under its policy implementation Risk Assessment of all the processes carried out, accordingly the infrastructure is up-graded, necessary safety trainings are carried out, personal protective equipment are issued to its employees towards achieving the goal of Zero Accident objective. This is a continuously on-going exercise.

8.6 Periodical review, compliance of legal requirements, ensuring continual improvement; imparting education and training on OHS issues are found satisfactory.



8.7 Incident (including near misses and emergency situations) reporting, investigation and analysis is being carried out thoroughly meeting the requirements of PSMS and OHSAS – 18001 standards.

8.8 It is evident that the factory management is keen in implementing relevant safety standards, has adequate internal machinery to monitor and implement various safety management practices and sustain continual improvement in the area. The corporate division continuously supports the site management in meeting the organizational objectives in this direction.

8.8 The Factory management is open and committed and striving to take the safety standards in the factory to higher levels and achieve Positive Safety indices year by year.

## 9.0 CONCLUSIONS

The various elements of Process Safety Management System (PSMS) is being reviewed and implemented as & when needed by the Management.

The existing safety measures, Practices & procedures are being periodically reviewed with reference to best available technology and safety practices. Implementation & compliance of recommendations of external safety audit would go a long way in reducing associated risks to an acceptable level.

This audit is conducted based on random sampling only and deviations observed at few areas, are given in this report. Similar deviations / lacunae may arise in other work area, in future.

The recommendations given in this report are to be viewed as an aid to Management, for continual improvement and not as any deficiency detect or fault-finding exercise.

## 10.0 DISCLAIMER

The Auditors of M/s G & G Consultancy , Hyderabad, based upon professional experience and training, will offer recommendations to abate unsafe conditions & unsafe acts and violations identified during the walk-through safety audit, but does not guarantee that all (and every), safety issues will be identified.

The Safety Audit of the Plant Premises are carried out based on generally accepted guidelines, Codes, standards and /or practices in the field of safety & health management.

The recommendations are based upon the field observations along with respective Section Head and information furnished/ provided by the Organisation wrt the existing safety measures, Practices & Safe Operating Procedures. M/s Coromandel International Limited, located at Sriharipuram, Malkapuram (Post), Visakhapatnam-530011, Andhra Pradesh in India, will hold the Auditors/Consultancy Organisation, harmless for unsafe conditions & unsafe acts violations identified but not cured; hazards/ violations not identified; or any claim, dispute or other form of controversy arising from or out of an actual or purported safety violation.

The undersigned auditor/consultant does not carry any liability of damage or risk incurred by the Organisation who sponsored this Safety Audit Study, by its own

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