

SAFETY AUDIT REPORT

Year - 2025

For



M/s. TGV SRAAC LIMITED.

Gondiparla Village,
Kurnool District-518004,
Andhra Pradesh,
India.

Prepared By



LUMEN
Engineering Associates
ISO 9001 : 2015 CERTIFIED

LUMEN ENGINEERING ASSOCIATES

49-53-9/5, Flat No. 11, Bhavani Apartments-3, Balayyasastri Layout, Visakhapatnam-530013, Andhra Pradesh.

E-mail: lumensafety@gmail.com, web: www.lumengroup.in, Mob: 9704718934.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



PREAMBLE

PETER F DRUCKER, the Austrian writer, management consultant, and self-described “social ecologist, says, that, **“The first duty of Business is to survive, and the guiding principle of Business economics is not the maximization of profit - it is the avoidance of loss”**. Loss can be avoided by practicing systematic control of activities.

When systematic approach is practiced, it needs to be checked periodically for its effective functioning.

The above quotation speaks about the importance of safety. Whatever the job a person or an organization takes up, the focus should be about safety of self or of the organization.

Safety means not getting exposed to harm, safety is controlling of high risk in activities, so also safety is loss control. In totality, safety is a systematic approach in the control of activities, so as to avoid unwanted incidents and achieving good work environment. When systematic approach is practiced, it needs to be checked periodically for its effective functioning

TGV SRAAC Limited is located at Gondiparla Village, Kurnool District-518004, Andhra Pradesh, INDIA.

The operations involve handling and processing of hazardous (toxic / flammable) chemicals and requires effective controls in carrying out a safe operation. Apart from automated operations, the processes also involve human interface, hence, require control of human factors also. Any deviation in these activities may cause an unwanted incident and consequential human / asset loss. To avoid such situations, activities are to be controlled and control of activities requires systematic approach.

Good safety practices are a very visible way of showing that the organization does value the people working with them; so also, it will be rewarded by a workplace that's not only safer but more productive as well.

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 AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



Audits review safety programs, policies, and procedures to check that they cover employee job tasks and hazards. They are structured and effective and helps in preventing incidents by proactively identifying hazards and suggesting control measures.

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 **under rule 10 (4 & 5) of Manufacture, Storage, Import of hazardous chemicals 1989** and amendments there on.

TGV SRAAC Ltd believes in the systematic approach in the effective controlling of their activities as well as 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 management systems. Implementation of good safety practices is a very visible way of showing that the organization does value the people working with them; so also, it will be rewarded by a workplace that's not only safer but more productive as well.

Safety audit is an instrument for proactively identifying the lapses in the systems and thereby helps the organization in the prevention of incidents and for achieving continual improvement in the work environment.

Audits review the commitment of management in effective implementation of occupational health and safety across the organization, participation and involvement of its work force in the implementation and also review whether or not the organization is deriving the results of its implementation.

Safety audits are intended to promote, improve and maintain good safety performance. In order to meet not only the statutory regulations under Factories Act., and as per MSIHC rules but also to self-assess the performance of safety management systems and site-specific safety improvement,

In order to meet not only the statutory regulations under Factories Act., and as per MSIHC rules but also to self-assess the performance of safety management systems and site-specific safety improvement, **TGV SRAAC Limited** conducts external Safety Audits once every year by a reputed external agency, followed by compliance of recommendations.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



Accordingly, the task of conducting the audit for the year 2025, has been given to **Lumen Engineering Associates (LEA)**.

Lumen Engineering Associates feels it as an honor for obtaining the above assignment and expresses thanks to the Management for giving the opportunity.

The objective of audit is to look into the various activities and system's performance of the organization and to focus on any deviations from compliance of legal requirements, follow up of good work practices, for assisting the organization in the continual improvement of its EHS performance. Audit also focuses on the best practices implemented by the organization.

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

Once again **Lumen Engineering Associates** expresses its sincere thanks to the Unit Head of **TGV SRAAC Limited** and the associate plant personnel for the support and assistance extended during the conduct of this external safety auditing.

26th December 2025,
Gondiparla Village, Kurnool.

for **Lumen Engineering Associates**

V.V. Seshagiri Rao,
Chemical Engineer.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



CONTENTS

ITEM NO.	ITEM NAME	PAGE NO.
1.0	INTRODUCTION	06
	1.1 About the Plant	06
	1.2 Process Description	08
	1.3 Process Flow Charts	17
	1.4 List of Critical Equipments	25
	1.5 List of Hazardous Chemicals	25
	1.6 Details of Audit team	26
	1.7 Objective of Safety Audit.	27
2.0	METHODOLOGY	28
3.0	SITE SPECIFIC OBSERVATIONS & RECOMMENDATIONS	30
4.0	CONCLUSION	58
5.0	DISCLAIMER	59
6.0	ANNEXURE List of Hazardous Chemicals:	60



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



1.0 INTRODUCTION

1.1 ABOUT THE PLANT:

LOCATION:

TGV SRAAC Limited is located at Gondiparla Village, Kurnool District-518004, Andhra Pradesh, INDIA.

The TGV Group, a modern industrial conglomerate is renowned for setting high quality standards and rendering committed services. The activities of the group span a range of industries and services, with the commitment to produce quality products and vendor services through pioneering innovations, imbued with a singular vision and purpose to grow and reach the pinnacle of success.

TGV SRAAC Limited (formerly Sree Rayalaseema Alkalies and Allied Chemicals Ltd.) is the flagship company of the TGV Group. It is the leading producer of Chloro-Alkali products and also manufactures Castor Derivatives and Fatty Acids. SRAAC has the unique distinction of being the pioneer of the Bipolar Membrane Cell Technology from Uttdenonaspa, Italy, in India.

The company uses only state-of-the-art equipment and up-to the minute technologies including the Cost ruzioni Meccaniche Bernardini (CMB) technology from Italy for its fatty acids division. The captive power plant used, assures uninterrupted and cost-effective power supply to the manufacturing plant. The ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 certifications talk for the company's obsession with Quality, Environment and Occupational health. & Safety Management systems The international class quality of the company's produce and the intricate marketing network spanning all continents have found for it an assured place in the export markets ever since its inception. A Consistent overseas demand for its products has made the company a recognized export house today.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



The production of Chloro Alkali products has gone up significantly due to periodic expansion of installed capacity. The philosophy of utilization of chlorine and hydrogen led to diversification of product lines. Oils and Fats division was started as a downstream unit in effectively utilizing Hydrogen and caustic produced in caustic soda division. Further, to minimize the transportation risks of chlorine produced in caustic within the complex, chloromethane division has been started with Methylene Chloride, Chloroform, Carbon tetra chloride and Hydrochloric acid as product.

SITE BOUNDARIES:

The Caustic Soda Division is located with reference to surrounding boundaries as under:

S. No	Direction	Boundaries
1	East	Gondiparla village
2	West	E-Tandrapadu village
3	North	CMS Plant
4	South	Power Plant

The CMS Plant is located with reference to surrounding boundaries as under:

S. No	Direction	Boundaries
1	East	Solar Plant
2	West	E-Tandrapadu village
3	North	Sree Rayalaseema Hi-Strength Hypo Limited
4	South	Caustic Soda Division

The Power Plant is located with reference to surrounding boundaries as under:

S. No	Direction	Boundaries
1	East	Gondiparla village
2	West	E-Tandrapadu village



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



3	North	Caustic Soda Division
4	South	Tungabhadra River

WORK PLACE CATALOGUE:

Number of persons working in the site as category wise:

Permanent employees	Contract employees	Total Employees (Permanent +Contract)
900	350	1250

Plant working Hours / Shifts:

S. No	Shift	Working Hours
1	A-Shift	06.00Hrsto 14.00Hrs
2	B-Shift	14.00Hrsto 22.00Hrs
3	C-Shift	22.00Hrsto 06.00Hrs
4	General-Shift	09.00Hrsto 18.00Hrs

1.2. PROCESS DESCRIPTION:

Brief Process Description of Caustic Soda:

The purified brine having a concentration of 300 gpl is sent to the anode chambers of Ion-Exchange Membrane electrolysis.

The Ion-Exchange Membrane electrolysis consist of intermediate Bi-polar elements, one anodic end element and one cathodic end element. The Bi-polar elements and the end elements are made of solid rigid structure providing strength and electrical current distribution. The electrolyze is held together by two end grids made of carbon steel and tie rods and rests on a C.S. support resembling a filter press. The assembly is properly provided with insulator bushes. The anodic compartments are lined with titanium and



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



provided with titanium nozzles and the cathodic compartments are lined with nickel and nickel nozzles.

Teflon tube connections are provided for each cell for both inlets, recycle lines. High voltage D.C current is applied and the electrolysis of brine takes place in the cells liberating chlorine and sodium ions. The cell voltage is maintained around 3.0 to 3.5 V. The chlorine gas moves with the depleted brine having a concentration of around 220 gpl to the anolyte separator vessel where the chlorine gas is separated and gets collected in the chlorine header.

The Sodium ions pass through the selective membranes to the cathode zones and reacts with the water and forms sodium hydroxide and liberating hydrogen gas. The hydrogen is collected in a hydrogen header maintained under slight positive pressure of 100 mm of water column and sent to a gas holder, from where it is sent through a blower to various user points like:

1. Boiler/Fusion Plants-Where it is used as fuel.
2. HCl synthesis unit - Where it is burnt with chlorine gas in a furnace to form HCl gas which is absorbed in DM water to form 32-33% commercial grade hydrochloric acid.
3. Castor oil plant - Where it is used in hydrogenation of castor oil to obtain hydrogenated castor oil.
4. Hydrogen bottling unit - Where it is compressed and filled in cylinders and sold.

The depleted brine containing dissolved chlorine is sent to De-chlorination section and the chlorine liberated is sent to the chlorine drying unit. The depleted brine is sent to saturator where the concentration gets adjusted and is recycled. The residual chlorine is released in stripper and sent to hypo section.

The chlorine blower takes the chlorine from the cell house header and discharges to drying towers after washing and the circulating 98% Sulphuric acid in the towers removes the moisture from chlorine. The dried chlorine is sent to centrifugal compressors for



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



compression to about 3 kg/cm². 98% Sulphuric acid is used as a sealant in the compressor and is circulated. The acid is cooled in shell and tube heat exchangers. The compressed chlorine is sent to liquefiers where compressed Freon is used to cool and the chlorine gets liquefied. The liquid chlorine is sent to the chlorine storage tank.

The lean 32% caustic from the Catholyte separator passes through a current breaker and from where it is sent to caustic evaporation plant where it is concentrated in two stages to 48% using steam and sent to the storage and sales.

Part of this 48% lye is sent to caustic flaking unit. Here the water content is evaporated in 2 stage to get analyzing caustic flakes of 98.5% of purity.

Production of Potassium Hydroxide:

The product is manufactured by electrolysis of pure potassium chloride solution. Potassium chloride solution is purified in brine plant by addition of required reagents. In our industry to carryout electrolysis membrane cells imported from M/s. Denora, Italy are used instead of conventional mercury cells. Since mercury is absent in membrane cell technology the product is pure and the co-products chlorine and hydrogen generated during electrolysis are pure and useful in food and pharmaceutical industries.

Potassium Hydroxide liquid obtained during electrolysis is enriched to 48% in evaporation unit from 30% concentration and further processed as flakes in fusion plant.

Chlorine and hydrogen are processed along with chlorine and hydrogen generated from sodium hypochlorite unit. Chlorine is converted to liquid chlorine, hydrochloric acid and sodium hypo chlorite. Hydrogen is used to manufacture hydrochloric acid, as a fuel, and in hydrogenation of oils in O&F division.

Production of Hydrogenated Castor oil and 12-Hydroxy Stearic Acid:

The raw-material for the manufacture of Hydrogenated Castor oil and 12-Hydroxy Stearic acid is commercial Castor oil. The route involved in this process is as follows:



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



Commercial Castor oil ----->B.S.S. Grade Castor oil ----> Hydrogenated Castor oil----->12-Hydroxy Stearic acid.

1) Bleaching:

Commercial castor oil normally would have a colour of 35 to 40 units on lovibond scale in 1" cell. In the bleaching operation oil would be bleached with Activated Earth and Activated carbon in the continuous bleaching plant at the temperature of about 100 to 105 deg. Celsius., under vacuum. The bleached oil would be filtered in pressure leaf filters to obtain the B.S.S. grade oil. B.S.S. grade oil will have a colour of about 3 to 6 units on lovibond scale. We have a 50 tons per day continuous bleaching plant. The B.S.S. grade oil so obtained by the above process would be taken up for hydrogenation.

2) Hydrogenation:

Hydrogenation is basically a batch process. In this process the unsaturated Recinolic acid, Glycerides will be saturated to 12-Hydroxy Stearic Acid Glycerides. This would be achieved by hydrogenation under controlled conditions in the presence of Nickel catalyst. Normally 3 to 4 kg of nickel catalyst per ton of material would be required. Hydrogenation would be continued till the iodine value (I.V) is dropped from 95 to about 2 units. When the required I.V.is achieved, the material will be dropped to the Heat Exchangers where the same would be cooled by the incoming oil to be taken up for the next batch of hydrogenation. The material cooled to 110 deg. centigrade. would be filtered in Heat able filter presses, from where it would be taken to the holding tanks. The material from the holding tank would be flaked and packed.

3) Saponification and Acidulation:

If 12-Hydroxy Stearic acid has to be procured, Hydrogenated Castor oil from the heat able filter presses would be directly taken to saponification vessels, where it would be saponified with 30% caustic soda so as to convert



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



Hydrogenated Castor Oil to Hydrogenated Castor Oil soap. After completing the saponification, the soap would be dropped to acidulation vessels where it would be acidulated with 30% Sulphuric acid. The soap would be split in to 12-Hydroxy stearic acid and Glycerin. Glycerin will go to the aqueous layer. The Glycerin water would be pumped to Glycerin section for further process. The 12-Hydroxy stearic acid so obtained would be given water washes to remove the mineral acidity. Then the material would be taken to the De-moisturizing vessel to remove the residual moisture. The dried 12-Hydrogenated castor oil would be flaked in the flaker, weighed and packed.

4) Glycerin Section:

The Glycerin water obtained from 12_hydroxy stearic acid section would be subjected to treatment with lime. Caustic soda and Alum to remove the mineral acidity and dissolved fatty acids. After the first treatment the Glycerin water will be filtered to the second treatment vessel where it would be subjected to soda ash treatment to remove excess lime after which it would be filtered again. The treated water would be concentrated in double effect evaporation plant to obtain crude Glycerin having 85% Glycerin concentration. During evaporation sodium sulphate would be crystalized and settled in the salt boxes. Periodically, the dry sodium sulphate would have to be removed. Crude Glycerin obtained would be filled in barrels weighed and dispatched.

Production of Fatty Acids & Derivatives:

Oil is hydrolyzed with water at high pressure and temperature and the splitting is done when crude fatty acid is produced along with Glycerin and water. The crude fatty acid is distilled under vacuum to remove the un split oil and un saponified water thereby the dark colour will be reduced to light colour.

Then the soft fatty acid is hydrogenated to hard fatty acids of desired Iodine value

In a converter where Hydrogen is admitted in presence of Ni Catalyst.

The exothermic reaction is controlled. The material is filtered in filter press and the filtrate which is Stearic acid is flaked in flaker.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



The sweet water obtained from splitting is treated with Sulphuric acid to remove traces of fatty acids. Lime is added to precipitate as Soap and Alum is added for coagulation. Then it is filtered and the filtrate is concentrated to obtain crude Glycerin. The crude glycerin is then distilled, bleached with activated carbon to obtain C.P grade Glycerin.

Brief Process Description of Chloro methane's Plant:

Process Description:

The Chloro methane plant consists of the following process utility and units.

(1) Process units:

- Hydro Chlorination section
- Chlorination section
- Rectification section
- HCl absorption section
- Effluent treatment section
- Refrigeration section

(2) Utility Facilities:

- Steam distribution system and steam condensate recovery system
- Recycling cooling water distribution system
- Nitrogen distribution system
- Instrument air distribution system
- Plant air distribution system
- DCS Control room
- Low voltage switch gear and motor control centre (MCC)
- Firefighting system
- Fire alarm system



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



1. Hydro Chlorination section:

Methanol, vaporized by methanol evaporator is fed to the hydro chlorination autoclave at an optimum ration with hydrogen chloride. The reaction is carried out in vapor phase in the presence of catalyst to produce methyl chloride.

ethyl chloride thus obtained is washed with quench liquid itself from condenser in quench tower to remove a small amount of un reacted methanol and hydrogen chloride.

It is further washed with concentrated sulfuric acid in dehydrator to remove by product dimethyl ether and water. After this treatment purified methyl chloride is compressed through methyl chloride compressor and then it is condensed and collected in a receiver from than it is sent to the chlorination section.

21% HCl form quench vessel is sent to HCl absorption system to form 31%HCl. The spent sulfuric acid from the bottom of the dehydrator has a concentration of 85 to 90%

2. Chlorination section:

Methyl chloride reacts with chlorine in vapor phase in a vessel autoclave to form higher chlorinated chloromethane.

The reactions are carried out at high temperatures and middle pressures. By control of reaction conditions and ratio of feed stock and recycling chloromethane, Methylene chloride, Chloroform and CTC are formed at desired production ratios.

Firstly, methyl chloride vaporized by evaporator is sent to the autoclave by means of flow control. Meanwhile the vapor chlorine from gas pipe line is also sent to chlorination autoclave by means of flow control.

Recycle organics (mainly methyl chloride, methylene chloride and hydrogen chloride), part is through evaporator and other through pre heater only. This mixture of vapor methyl chloride and the vapor organic are sent to autoclave by means of flow control.

The vapor reactant, with high temperatures, is cooled in quench tower, and then hydrogen chloride is separated from chloromethane compounds through condensers. Large amounts of hydrogen chloride are recycled to hydro chlorination section to produce methyl chloride, a few of them are sent to HCl absorption section to produce 31%HCl.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



The vapor organics (mainly methyl chloride, methylene chloride and hydrogen chloride) from the top of recycling tower, a part is recycled to auto clave in order to control the temperature of autoclave and the ratio of production, the other is sent to recycling tower as reflux liquid, the bottom of recycling tower is a compound of Methylene chloride, Chloroform and CTC, and sent to rectification section.

3. Rectification section:

In rectification section the product mixture is separated and purified respectively. Then it is fed to caustic washing drum to remove small amounts of acidity and fed to a zeo tower where water is removed from the product, in the end each product is stored in a separate check tank. The spent caustic is sent to effluent treatment section.

PRODUCTION

S.No	Product	Capacity (TPD)
1	Methyl Chloride	1.68
2	Methylene Chloride	221.2
3	Chloroform	110.6
4	Carbon tetra chloride	16.8

Raw Materials and Utilities

S.No	Raw Material	Consumption (TPD)
1	Chlorine	420
2	Methanol	150
3	Steam	750
4	Power	150000 KWH
5	No of days on stream	365 days (Including annual maintenance)
6	Rated capacity of plant	375 TPD (130000 TPA)



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



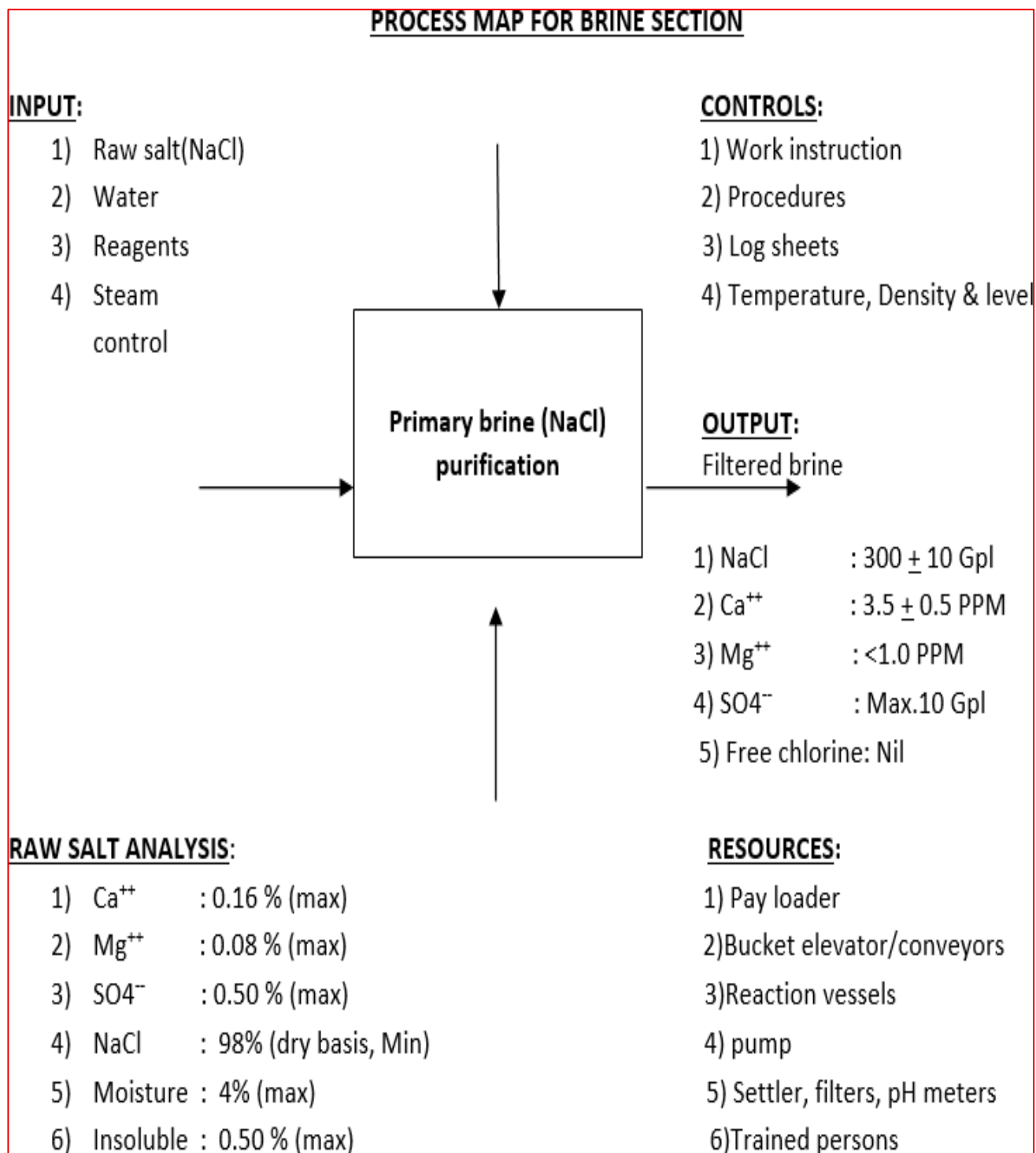
4. Description of Different Manufacturing Activities:

The plant consists of the following distinct activities:

- a. Primary and Secondary brine treatment and purification.
- b. Electrolysis.
- c. Chlorine system comprising of Drying, Compression, Liquefaction, Storage and Bottling.
- d. Hydrogen system involving usage in HCl synthesis, Boiler, Castor Oil Plant and Sales for bottling.
- e. Caustic system including Collection, Old Evaporation, 500TPD New Evaporation, Old Fusion, New Fusion and Dispatch.
- f. Hydrochloric acid synthesis consisting of HCl Manufacture, Absorption and Dispatch.
- g. Sodium Hypo system where all possible emissions from various sections of plant are absorbed and neutralized.
- h. Manufacture of fatty acids and derivatives, Hydrogenation of Castor oil in presence of Catalyst, Bleaching, Filtration, Flaking and Dispatch.
- i. Manufacturing of Potassium Carbonate and Sodium Sulphate Plant.
- j. Operation of Captive Power Generation Plant



1.3 Process Flow Charts





SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



PROCESS MAP FOR DE-CHLORINATION

INPUT:

- 1) Depleted brine
- 2) HCl
- 3) Sodium sulphite solution
- 4) Caustic lye
- 5) Steam

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Level control, Flow control, pH control

Depleted brine (NaCl)
De-chlorination
Process

RESOURCES:

- 1) Trained persons
- 2) Pumps
- 3) Vessels
PPM(max)
- 4) Degassifier
- 5) pH meter

OUTPUT:

- 1) Depleted brine concentration: 200 ± 10 gpl
- 2) Free chlorine : 20 PPM(max)
- 3) Excess Alkalinity : 80
- 4) Chlorate : 10 gpl (max)

PROCESS MAP FOR BRINE SECTION

INPUT:

- 1) Raw salt(KCl)
- 2) Water
- 3) Reagents
- 4) Steam
control

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Temperature, Density & level

Primary brine (KCl)
purification

OUTPUT:

Filtered brine

- 1) KCl : 300 ± 10 Gpl
- 2) Ca^{++} : 3.5 ± 0.5 PPM
- 3) Mg^{++} : <1.0 PPM
- 4) SO_4^{--} : Max.10 Gpl
- 5) Free chlorine : Nil

RAW SALT ANALYSIS:

- 1) Ca^{++} : 0.20 % (max)
- 2) Mg^{++} : 0.20 % (max)
- 3) SO_4^{--} : 0.4 % (max)
- 4) KCl : 98% (dry basis, Min)
- 5) Moisture : 0.50 % (max)
- 6) Insoluble : 0.5 % (max)

RESOURCES:

- 1) Pay loader
- 2) Bucket elevator/conveyors
- 3) Reaction vessels
- 4) pump
- 5) Settler, filters, pH meters
- 6) Trained persons



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



PROCESS MAP FOR BRINE SECTION

INPUT:

- 1) Filtered brine
- 2) HCl
- 3) Caustic soda
- 4) Wash water

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Temperature, Concentration & Hardness

RESOURCES:

- 1) Trained persons
- 2) Ion exchange column
- 3) Storage tanks
- 4) Pumps
- 5) Control valves

OUTPUT:

- Pure brine
- 1) KCl : 300±10 Gpl
 - 2) Total hardness : <20ppb
 - 3) Excess Alkalinity : 150 PPM
 - 4) Excess Carbonate: 300 PPM
 - 5) SO₄⁻ : 10 Gpl (max)
 - 6) Free chlorine : Nil

PROCESS MAP FOR CELL HOUSE

INPUT:

- 1) Filtered brine
- 2) DM water
- 3) DC current
- 4) Feed caustic

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Temperature, Concentration, Flow Voltage, Pressure, Purity of gas

RESOURCES:

- 1) Trained persons
- 2) Electrolysis
- 3) pH meter
- 4) Multimeter
- 5) Hydrometer
- 6) Orset apparatus

OUTPUT:

- 1) Caustic lye concentration : 28±1.0 %
- 2) Wet chlorine gas
- 3) Wet Hydrogen gas
- 4) Depleted brine concentration: 200±10 gpl



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



PROCESS MAP FOR DE-CHLORINATION PLANT

INPUT:

- 1) Depleted brine
- 2) HCl
- 3) Sodium sulphite solution
- 4) Caustic lye
- 5) Steam

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Level control, Flow control, pH control

RESOURCES:

- 1) Trained persons
- 2) Pumps
- 3) Vessels
- 4) Degassifier

OUTPUT:

- 1) Depleted brine concentration : 200 ± 10 gpl
- 2) Free chlorine : 20 PPM(max)
- 3) Excess Alkalinity : 80
- 4) Chlorate : 10 gpl (max)

PROCESS MAP FOR CHLORINE PLANT

INPUT:

- 1) Wet Chlorine gas purity : 96 % (min)
- 2) H₂SO₄ concentration : 98 % (min)
- 3) Cooling Water
- 4) Chilled water
- 5) Freon

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Temperature, Pressure, Density Concentration

RESOURCES:

- 1) Trained persons (min)
- 2) Drying towers
- 3) Chlorine compressor
- 4) Freon compressor
- 5) Liquefier
- 6) Cooling tower and pumps

OUTPUT:

- 1) Liquid chlorine purity : 99.9 %
- 2) Spent H₂SO₄ acid concentration : 75 % (min)



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



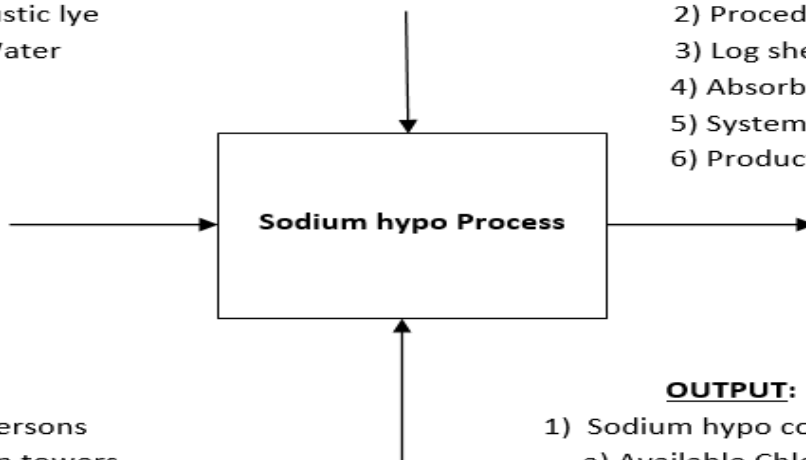
PROCESS MAP FOR SODIUM HYPO PLANT

INPUT:

- 1) Chlorine gas
- 2) Dilute caustic lye
- 3) Chilled Water

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Absorbent concentration
- 5) System suction Pressure
- 6) Product Concentration



RESOURCES:

- 1) Trained persons
- 2) Circulation towers
- 3) Blowers, Heat exchangers
- 4) Pump & Storage tank

OUTPUT:

- 1) Sodium hypo concentration:
 - a) Available Chlorine: 130 ± 10 gpl
 - b) Excess Alkalinity : 15 ± 5 gpl
- 2) Vent line chlorine gas : Free

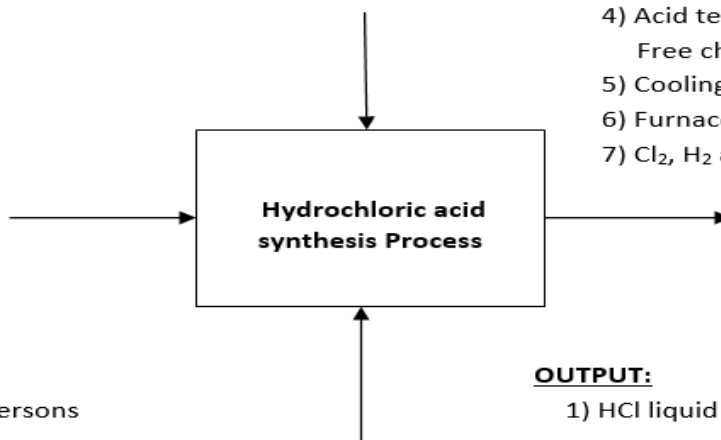
PROCESS MAP FOR HCl PLANT

INPUT:

- 1) Chlorine gas
- 2) Hydrogen gas
- 3) DM/ Raw Water

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Acid temperature, Concentration, Free chlorine
- 5) Cooling water temp/ Pressure
- 6) Furnace chamber pressure
- 7) Cl_2 , H_2 and water flow



RESOURCES:

- 1) Trained persons gpl
- 2) HCl furnace
- 3) Blowers, Heat exchangers
- 4) Pump & Storage tank
- 5) Nitrogen purging system

OUTPUT:

- 1) HCl liquid concentration : (30 – 36) %
- 2) Free chlorine : 5 PPM (max)



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



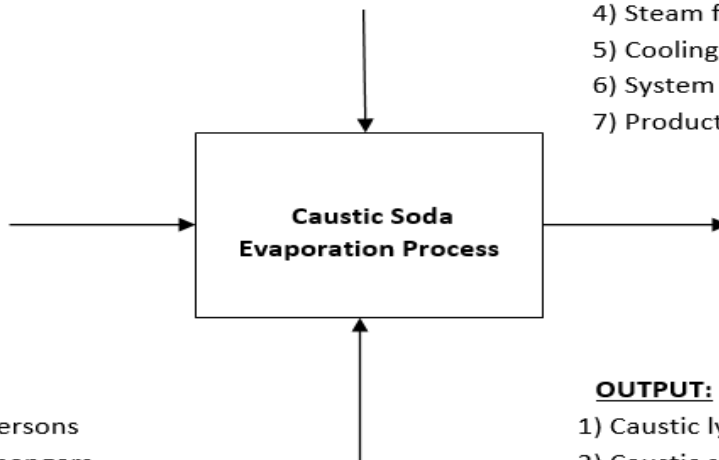
PROCESS MAP FOR EVAPORATION PLANT

INPUT:

- 1) Dilute Caustic lye
- 2) Steam

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Steam flow & pressure
- 5) Cooling water temp/ Pressure
- 6) System pressure/ Vacuum
- 7) Product quality Ni/ Fe



RESOURCES:

- 1) Trained persons
- 2) Heat exchangers
- 3) Pump & Storage tank

OUTPUT:

- 1) Caustic lye concentration : 47% (min)
- 2) Caustic soda flakes

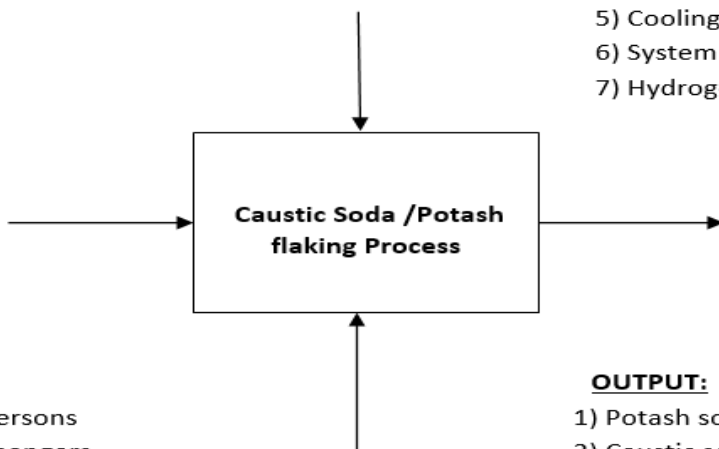
PROCESS MAP FOR CAUSTIC SODA/POTASH PLANT

INPUT:

- 1) Dilute Caustic lye/ Potash lye
- 2) Steam
- 3) Furnace oil
- 4) Hydrogen

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Steam flow & pressure
- 5) Cooling water temp/ Pressure
- 6) System pressure/ Vacuum
- 7) Hydrogen and furnace flow



RESOURCES:

- 1) Trained persons
- 2) Heat exchangers
- 3) Pump & Storage tank
- 4) Flaking machine

OUTPUT:

- 1) Potash soda flakes purity : 87 to 91 %
- 2) Caustic soda flakes purity: 97 to 98 %



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



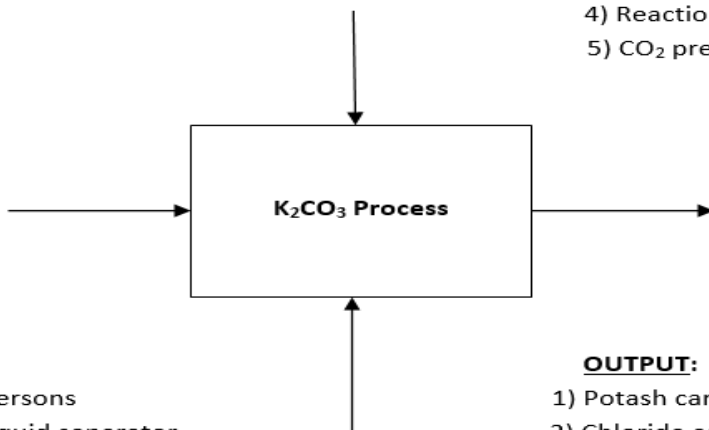
PROCESS MAP FOR K_2CO_3 PLANT

INPUT:

- 1) Dilute Potash lye
- 2) Liquid CO_2
- 3) Furnace oil
- 4) Hydrogen

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Reaction temperature control
- 5) CO_2 pressure



RESOURCES:

- 1) Trained persons
- 2) Vapour liquid separator
- 3) Crystallizer
- 4) Rotary dryer

OUTPUT:

- 1) Potash carbonate purity : 99 % (min)
- 2) Chloride as KCl : 0.1 % (max. 0)

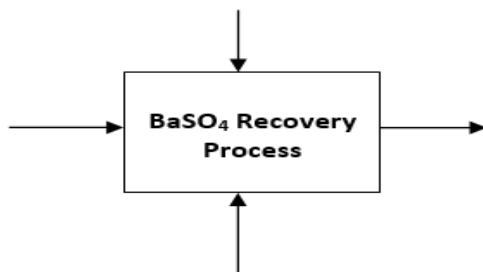
PROCESS MAP FOR $BaSO_4$ PLANT

INPUT:

- 1) Depleted brine – 9 to 12 gpl
- 2) Steam
- 3) $BaCl_2$ solution
- 4) Hydrogen peroxide
- 5) Dry water
- 6) Raw water

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) $BaCl_2$ flow control
- 5) Sulphate concentration



RESOURCES:

- Trained persons
- Laminar thickener
- Reaction vessel(Agitated)
- Slurry storage tank
- Agitated Nutche filter
- Spin flash dryer

OUTPUT:

- 1) $BaSO_4$ powder purity : 98 % (min)
- 2) Barium density : 1.0 G/CM³
- 3) Chloride : 0.2 % (max)



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



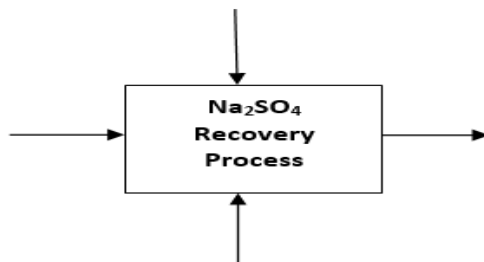
PROCESS MAP FOR Na₂SO₄ PLANT

INPUT:

- 1) Depleted brine – 9 to 12 gpl (Na₂SO₄)
- 2) Steam
- 3) Sodium sulphite (5%) solution
- 4) HCl (15%)
- 5) Cold water (from chiller)

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Sodium Sulphate conc.



RESOURCES:

- Trained persons
- High pressure pump
- Membrane Skid (Nano filtration)
- Chiller
- Crystallization tank
- Sedimentation Tank
- Centrifuge
- PLC- DCS system
- CIP Tank, Vessels and pumps

OUTPUT:

- 1) Na₂SO₄.10H₂O : 96.0% (min)
 - 2) Chloride : <2.0 %
- Permeation(Low sulphate brine)
- 1) Na₂SO₄ : ≤1.5 gpl (SO₄ ≤ 1.0 gpl)

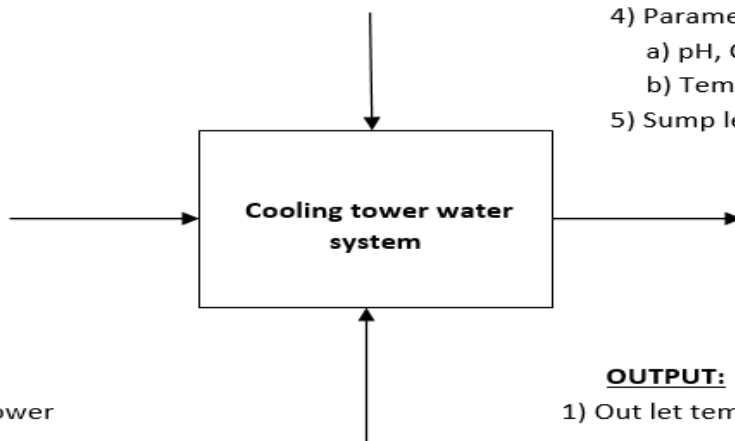
PROCESS MAP FOR COOLING WATER SYSTEM

INPUT:

- 1) Circulation hot water
- 2) Chemical dosing
- 3) Makeup Water

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Parameters
 - a) pH, Chlorides, Alkalinity
 - b) Temperature, Hardness
- 5) Sump level



RESOURCES:

- 1) Cooling tower
- 2) Circulation pump
- 3) Cooling tower fan
- 4) Trained persons

OUTPUT:

- 1) Out let temperature is less than 30°C



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



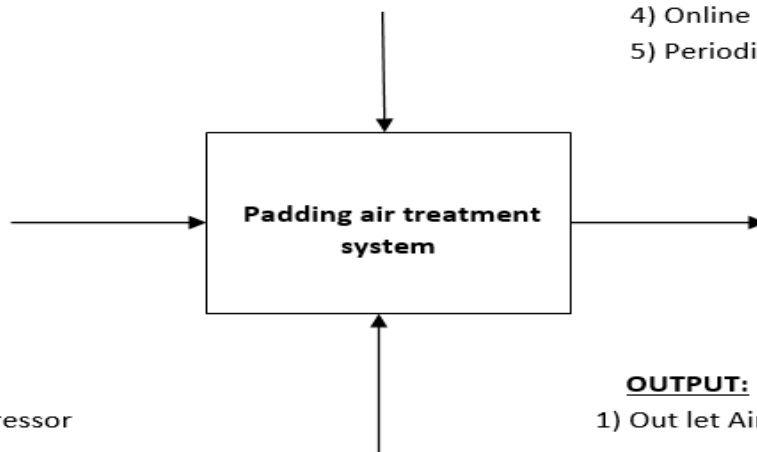
PROCESS MAP FOR PADDING AIR SYSTEM

INPUT:

- 1) Atmospheric Air
- 2) AC power
- 3) Absorbed

CONTROLS:

- 1) Work instruction
- 2) Procedures
- 3) Log sheets
- 4) Online dew point
- 5) Periodical regeneration



RESOURCES:

- 1) Air compressor
- 2) Heat exchanger
- 3) Dryers
- 4) Trained persons

OUTPUT:

- 1) Out let Air dew point : - 55 to -50°C

1.4. List of Critical Equipments:

The list of equipment being used in the site for the manufacturing process:

- Chillers
- Separators
- Dryers
- Autoclaves
- Filters
- Deodorizers
- Pressure leaf filters
- DG sets
- Air Compressors
- Bleachers
- Pumps
- Boilers

1.5. List of Hazardous Chemicals: ENCLOSED IN THE ANNEXURE



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



1.6. Details of Audit team:

The following are the team of auditors from **LEA** involved in conducting Safety Audit and preparation of audit report during 23rd, 24th & 25th December-2025 for **TGV SRAAC Limited** located at Gondiparla Village, Kurnool District-518004, Andhra Pradesh, INDIA

1. Mr. V.V.Seshagiri Rao.

AMIE – Chemical Engineering

Dip. In Mechanical Engineering

Dip. In Safety in Chemical industries.

28 years in operations department and 9 years in Safety,Health & Environment.

2. Mr. M.Prasad Reddy

B.Sc. (Chemistry)

PG Diploma in Industrial Safety

Experience:20 years in operations, 10years in Safety

3. Mr. P.A.Patruadu

B.E, MIE, FIV

Diploma in Industrial Safety

Competent Engineer under Factories Rules

20 years of experience in Operations,Maintenance & Safety

Dates Audited: 23rd , 24th & 25th December 2025.

Sections Audited:

- 1. Caustic Soda Division. (Brine plant, 20 tph boiler, 5 tph Thermal boiler, Nitrogen Compressor area, Brine classifier, Salt yard)**
- 2. Potassium Hydroxide plant**
- 3. Cell House, Hydrogenation plant, De Chlorination.**
- 4. Chlorine plant (compressor house, drying tower, Chlorine storage, Scrubber system, bottling plant)**
- 5. Hydro Chloric acid (old & new)**
- 6. Evaporation**
- 7. Hypo plant**
- 8. Potassium Carbonate plant**
- 9. Fusion plant**
- 10.Castor Oil hydrogenation**
- 11.Power generation plant**



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- 12. DM plant
- 13. ETP
- 14. Chlorine cylinders handling.
- 15. CMS plant units
- 16. Fire water pump house
- 17. Firefighting department
- 18. Security
- 19. Training
- 20. Stores
- 21. OHC
- 22. Canteen
- 23. Switch yard
- 24. Rectifier transformers

1.7. Objective Of Safety Audit:

The objective of the safety audit is to evaluate the effectiveness of the company's safety effort and make recommendations, which lead to a reduction in accidents and minimization of loss potential.

Safety audits are an important part of a company's control system and these checks ensure that deteriorating standards are detected in time. Examination of the defects exposed in this review results in hazardous conditions and potential incidents being avoided.

Regular audits should be based on the premise, that resources should be made available to identify and eliminate hazards before incidents occur, rather than use the resource of manpower and materials only after injuries and damage to equipment have resulted in human suffering, significant monetary loss which, in certain circumstances, affect the profitability severely.

Safety audit is also to be conducted, so as to comply with the mandatory requirement under sub rules 4,5,& 6 of rule 10 of MSIHC rules 1989 (amended in 2000).



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



2.0 METHODOLOGY

The Occupational health and safety management audit is a structured process of collecting independent information on the efficiency, effectiveness and reliability of the total OH&S management system and drawing up plans for corrective action.

Auditing examines each stage in the OH&S management system by measuring compliance with the controls the organization has developed, with the ultimate aim of assessing their effectiveness and their validity, for the future.

This site safety audit was conducted referencing to BIS: 14489:2018 and discussions with plant officials, perusal of documents and records submitted by the company. Walk thro' field inspection, information data, clarifications & inputs provided by the company officials, etc.

Audits include observations of employee working habits doing a variety of job tasks. Auditors walk through the workplace focusing on given job tasks and observe employee behaviors, regarding safe work practices, such as follow up of safety regulations, usage of PPE and following of good ergonomics.

Audit also focuses on safe work behaviors and good work practices.

The following elements of safety management system are reviewed:

- ◆ Occupational Safety & Health Policy
- ◆ OS & H Organizational setup
- ◆ Education & training
- ◆ Employees participation in OS & H management
- ◆ Motivational and promotional measures
- ◆ Safety manual and rules
- ◆ Compliance with statutory requirements
- ◆ Hazardous area classification
- ◆ Accident reporting, analysis, investigation & implementation of recommendations



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- ◆ Risk Assessment including hazard identification
- ◆ Safety Inspections
- ◆ Health and Safety improvement plans / targets
- ◆ First aid facilities – Occupational health Center
- ◆ Personal Protective equipment
- ◆ Housekeeping
- ◆ Material handling equipment
- ◆ Electrical and Personal safeguarding
- ◆ Ventilation, Illumination and Noise
- ◆ Work environment monitoring system
- ◆ Fire prevention, protection and fighting systems
- ◆ Emergency Preparedness Plans
- ◆ Process / Plant modification procedure
- ◆ Transportation of Hazardous Substances
- ◆ Contractor Safety System



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



3.0 SITE SPECIFIC OBSERVATIONS & RECOMMENDATIONS

3.1. CMS PLANT:

1. Observed Chloroform 200 ltr drums stored over the road in the open atmosphere. If chloroform is released to the atmosphere due to the failure of the carboy could result in a serious health hazard. It is advised to store it in a dedicated storage only
2. Access to the Fire Monitor is blocked with Chloroform 200ltr carboys and could result in a delay in fire response time. Hence, it is advised that clear access shall be maintained by marking no storage zone near the fire monitor area.
3. AFFF carboys stored in open atmospheric conditions. Atmospheric conditions could result in poor performance of AFFF, which is not desirable in a firefighting situation. Hence shall be stored in controlled weather conditions.
4. Label regarding Manufacturing date and expiry dates are missing on the AFFF solution carboy. Manufacturing and expiry dates at AFFF carboys shall be ensured.

CMS Compressor house:

5. 4 No of compressors are located in the building, ID No and test dates are not available at the safety relief valve (SRV) of all 4 compressors. SRV ID No and test dates shall be made available
6. One cable hanging with exposed conductor (insulation removed) at the motor side of Compressor ID No: C2101C. cable insulation shall be ensured.
7. The electrical switch cover is missing at the compressor C2101A. Cover needs to be provided.
8. EOT crane at CMS1, Capacity 10 tons SWL and Test dates are not available. Test dates shall be made available near to the crane.
9. Canteen, MCB switch distribution box near wet grinder area kept open condition all electrical conductors are exposed. The MCB distribution box cover shall always be kept closed. Hazard communication, like DANGER, not to open, shall be displayed at door.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



10. Two LPG gas cylinders are attached to the gas manifold, and the entire system is located inside the building. In case of gas cylinder failure inside the building could result in a serious explosion. Hence, it is advised to relocate gas cylinders and the manifold outside the building in well-ventilated area under the shade to prevent explosions.
11. Gas cylinders connected to the manifold directly without any isolation valve; if the regulator fails, there is a probability of gas leakage during cylinder changing time. Hence, shut off valve shall be provided for each cylinder at the gas manifold.
12. Quick shut-off valve not provided at Manifold out let to the kitchen. LP gas handling system shall be provided with at Manifold out let and at the usage end also to shut off the gas immediately during an emergency. (refer OISD regulation)

3.2. BRINE PLANT:

Salt Yard:

1. Raw material being unloaded with power shovels, Standard wheel blocks are to be provided to the truck wheels to prevent accidental rolling of truck due to power shovel operations in line up with CMV rules 1989 (R138).
2. Brine solution pumps motor earthing strips are getting corroded at weld joints and earthing continuity fails, need to be checked and rectified.
3. Brine solution pumps base is getting corroded, needs painting or to be replaced.
4. The pumps are found to be running with continuous seal water causing water wastage, seals to be repaired.
5. One of the Bucket Elevator (stand by elevator) has casing its damaged and has holes. Needs to be repaired to prevent leaks.
6. At the Elevators pit approach area side railing to prevent fall in to pit found damaged to be rectified to prevent the incident of fall hazard in to pit..
7. Salt hopper bottom pit approach stair case is not proper, it is neither a cat / monkey ladder nor a stair case. It is to be properly laid.
8. Maintenance persons are using electrical plug socket without proper plug. Found bare wires are inserted in the plug sockets at salt area MCC room. Also supply to two



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



equipments is taken from single socket in the same way. This practice should be avoided by having strict vigilance and control of activity.

9. Sulfate removal system (SRS) one pump located in a pit of 2500mm depth, above the pit work platform is located and no guard rail is provided to prevent the risk of accidental fall into the pit. Guard railing shall be provided with reference to IS 4912 – 1938

3.3. K₂CO₃ PLANT:

1. Liquid Carbon dioxide CO₂ Storage tank area: There is no proper access for the local electrical control panel. The control panel is to be relocated to a safer location.
2. All the process equipment is provided with guards, and no guard conforms to standards and running parts are accessible. Hence, it is advised to redesign all the guards suitably with reference to IS: 9474-1980.
3. Lot of frost deposition was noticed over the CO₂ supply line at the storage tank area. Some part of the CO₂ supply line that passes close to the floor level is accessible with probable risk of frostbite injuries. Hence, it's required to provide insulation over the line where people move, and HAZCHEM information shall be displayed in a standard size of 600 mm x 450 mm (recommended for 10-15m viewing), refer IS 9457: 2005 - Safety colors and safety signs - Code of practice.
4. Chiller unit at CO₂ storage tank. Local electrical panel body earthing is missing. Same is to be rectified

3.4. CHLORINE PLANT:

1. Observed drain loops of 7th, 8th, 9th, 10th and 11th cell hose found terminated at about two meters height, approximately above the floor level. Whenever the seal overflows and there is a possibility of overflowing liquid splashing over the floor and the persons who are working nearby. Hence, it is required to extend the drain loop up to the floor routed suitably to the nearby effluent drain.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



2. Permit to work NO 1375 issued for civil work for working on scaffolding, and persons are allowed to move under the scaffolding. No barricading was provided to prevent persons' movement. Advised to strengthen the mill work at Policy and needs to train all affected employees
3. ID Nos not provided to the eye and body wash showers, eye& body wash drench located at the chlorine compressor area, not firmly fixed to the bottom
4. No insulated rubber mat available to the electrical local panel at the compressor K-701-F. advice to provide an insulated rubber mat confirming to the a IS 15652 (2006) in line up with regulation 21 of CEA rules 2023
5. Flange guard found missing at sulfuric acid storage tank manhole dummy D 602 and D602A. Suitable flange guard required to prevent unexpected emergencies.
6. Sulfuric acid Pumps ID number 607 A & 608 C Pump Motors Drive coupling. Guards not fastened firmly. The guard needs to be fixed to the base frame at both sides, suitable to prevent the guard from flying out in case of pump drive coupling failure (refer IS:9474-1980 for guarding requirement).
7. Sulfuric acid dyke entry found not secured. It is required to provide a gate with suitable access control to prevent unauthorized entry (preferably LOTO). A suitable HAZARD communication board needs to be displayed at the entry point.
8. The sulfuric acid filling point is found available near the sulfuric acid pumps area, and the filling area is not secured; filling receptacles are not labelled. In safety point of view filling area needs to be secured suitably by providing suitable, substantial barricading with access control. Filling receptacles shall be labelled in line with requirements as said in Sec 87AP Factory rules 95 under Schedule XX (handling and manipulation of corrosive substances). Only trained persons shall be allowed to fill the activity under strict supervision.
9. Rotating parts and running "V" nip points are found unprotected and exposed at chlorine compressors and air compressors. It is required to modify the guards in line up with IS:9474-1980.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



10. Painting workers found using an “A” type self-supported ladder for painting works, but the employee positioned himself at the topmost rung and was doing a painting job in this process, there is a probability of a person falling from the ladder due to imbalance. Hence, it is required to identify all affected employees and train them in safe working procedures of working at height and safe usage of ladders.
11. Safety relief valve of air compressor ID numbers, capacity and test dates are not displayed at the location. As part of the best safety practices, ID numbers, capacity and test dates shall be displayed at the location

Chlorine Gas Filling Area:

1. Chlorine leak detector sensors are mounted at a height of more than 5 feet in the Filling cubicle cabin. As chlorine is approximately 2.5 times heavier than air, it takes a lot of time to reach the chlorine leak detector. From a safety point of view and effective control of leak detection and control, the chlorine leak detector sensors are to be mounted close to the floor (approximately 300 mm above the floor).
2. Chlorine filling cubicles are provided with automated closing doors to contain chlorine inside the hood during accidental failure of the filling procedure. some doors are wedged to prevent them from closing. During an emergency, this type of process failure could result in serious consequences. Hence it is advised to discourage unsafe workplace attitudes, making arrangements to prevent functional process automatic closing of cubicle cabin doors.
3. Inside the Chlorine filling cubicle, a suction hood (scrubber ID fan inlet duct) is provided to suck and deliver the chlorine gas to the scrubbing system for neutralizing. But the suction hood is terminated at about 900 mm from the floor level, and its damper is kept in closed condition. Since chlorine gas is heavier than air scrubber sucks air instead of chlorine, which is accumulated at floor level, and it is very difficult to open the suction hood damper during a raised emergency condition. Hence, it is advised to review the scrubber hood position and the damper operating process. In safety point it is better to bring down the hood opening as close to floor level and keep the damper always in open condition.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



4. Adequate number SCBA sets. Airline masks are provided to meet the emergency during chlorine leak. It is observed that a lot of dust got accumulated inside the Face hood of SCBA set and air line masks. If anyone inhaled the dust that accumulated inside the hoods may cause serious respiratory illness. Hence, it is advised to maintain the hoods free from dust accumulation.
5. Airline respirator supply line found heavily corroded outside. It is needed to check the corrosion condition inside the pipeline. It is also advised to provide corrosion-resistant metal tubing for breathing airline respirators.
6. It is learnt that moisture, oil and chemical filters are not made available on the breathing air supply line. Inhaling raw air may cause for respiratory hazard. From a safety point of view, moisture, oil and chemical filters shall be made available to filter all contaminants, and breathable air quality shall be ensured to prevent respiratory risks.

3.5. HCL PLANT:

1. All air blowers running shafts and "V" running nip points found unprotected and accessible with a potential hazard of body part entanglement in running nips. Guards needs to be modified Suitably with reference to IS: 9474-1980.
2. SCBA, along with storing cabinet positioned outside the room, is exposed to the open atmosphere and a lot of dust accumulation is noticed inside the SCBA face mask. Dust may create respiratory health problems. Advise to relocate SCBA to near by location where it is not exposed to open atmospheric condition.
3. HCl furnace 2nd floor and operating floor, parapet wall found removed and unprotected due to building maintenance activity. The same shall be protected by providing a wall, if opening is required, same can be protected by providing a suitable removable guard railing and display hazard communication on the hazard of falling from height.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



3.6. OLD EVAPORATION PLANT:

1. Flange guards were found missing at some areas.
2. Observed flame / Gas cutting equipment being used without flashback arrestors at the regulator. Flame / Gas Cutting set is to be provided with flash back arresters at the regulator (as per S I 1323 – 1982) and a non-return valve at the cutting torch and pressure gauges and regulator to ensure safe cutting operations. Gas cutting requires inspecting with check list every time before using.
3. Fork Lift ID No: E2 was found without SWL marking and test date, and the reverse horn is also not working. Advised forklifts required to inspect with check list for its functional condition every time before using.
4. New pipeline rack. Civil construction work is in progress at new store building area using a non-standard wooden scaffolding. Using nonstandard scaffolding for height works could result in serious emergencies. Advised to use standard scaffolding (refer IS 3696 (Parts 1 & 2)) of working at heights.
5. 9th dichlorination plant area, local electrical switch station converted into lab, working close to the electrical installation is not advisable due to electrical hazards, which is against to the CEA 2010 rules. Advice to relocate the lab to a safer area .

3.7. NEW HYPO PLANT:

- 1 No insulated rubber mat provided at the instrument panel of the New hypo plant. Insulated rubber mat shall be made available at the panel.
- 2 SCBA cabin fix inside the panel room over the wall, and it is very difficult to access. needs to relocate at accessible height to access easily in case of emergency.
- 3 Observed Civil construction employees attending construction work with ordinary rubber shoe some shoes were found torn out. Using substandard shoes may cause serious injuries. Hence, it is advised to ensure foot protection conforming to IS 15298 (Parts 1-4) to prevent injuries.
- 4 Dilute caustic tank 108 dyke access provided with RCC stairs up to 2000mm height. But no fall protection was provided to the RCC staircase leading to dyke to prevent falling from height while ascending or descending the steps. Hand railings/guard rails



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



are required to be provided in lineup with is.4912.1978 to ensure falling from height and to ensure three-point contact while ascending or descending the steps.

- 5 Exhaust fan not provided to the Battery room located at panel room ID HYPOEMCC 1&2 to prevent cell gases accumulation, which may cause fire incidents. Suitable exhaust system shall be provided to prevent cell gases accumulations.
- 6 Access to the mechanical store provided through the electrical panel room ID HYPOEMCC 1&2 and passing through the electrical panel is risky and nonconforming to the CEA 2010 regulations. Advised to provide a dedicated passage to the mechanical store.
- 7 A lot of mechanical items are stored in the electrical panel room ID HYPOEMCC 1&2, which is against to the CEA2010 regulations.
- 8 750 KVA Emergency DG Set located near to the electrical panel room ID HYPOEMCC 1&2; fuel tank of capacity 950 litres is not provided with secondary containment. Suitable secondary containment shall be provided.
- 9 750 KVA Emergency DG set: Appropriate firefighting requirements are not available to meet the diesel tank fire,. Suitable capacity Mechanical Foam type Extinguisher needs to be provided.
- 10 Pumps ID No: P101 A, B, & C located inside the Tank 108 Dyke, pump coupling guards are not fastened at both sides. Pump Guards needs to be fixed to the base frame at both sides, suitable to prevent the guard from flying out in case of pump drive coupling failure (refer IS:9474-1980 for guarding requirements).
- 11 Pumps ID No: P101 A, B, & C located inside the Tank 108 Dyke; if the tank fails these pumps can submerge in the dye with tank content process will be hampered. Hence, it is required to relocate the pumps outside the dyke to safely guard the pump and drive motor.
- 12 Pump ID No P1 1205 A&B Pump coupling rotating part are accessible. guarding neds to reviewed with reference to IS:9474-1980.
- 13 Hypo storage tank D1202 H 65 KL not provided with dyke. Tank shall be provided with a dyke to contain the tank content in case of tank failure refer in Sec 87AP



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



Factory rules 95 under Schedule XX (handling and manipulation of corrosive substances)

- 14 Storage tanks D-120 E, F, G 65 KL each located in a single dyke. This dyke provided drain line without a valve. Drain valve shall be provided, and the valve shall be kept closed at all times.

3.8. CELL HOUSE:

1. Cell house No:9 electrical bus bars are accessible. Access shall be protected by providing suitable guard railing and display hazard communication on LIVE bus bar hazards.
2. The elements lifting floor opening is protected with guard railing, which is not adequate as mid rail is not provided. Guard railing shall be reviewed with reference to IS 4912 - 1938

3.9. COMPRESSOR HOUSE:

1. Compressor ID no K2777 C, & D provided with substandard guards running parts are accessible through the guard with a potential hazard of body part entanglement in running nips. Guards needs to be modified suitably with reference to IS: 9474-1980.
2. No insulated rubber mat was provided to the electrical panel near the compressor K2777 C area. Insulated mats shall be provided.
3. Nitrogen compressor drive Guards are not adequate. Guards need to be modified suitably with reference to IS: 9474-1980.
4. Temporary cables are drawn over the floor for fabrication activity at the outside building. These cables may entangle with the foot, resulting in person-trip incidents. Similar conditions were observed at other locations, construction and maintenance activities. Hence, advised to develop a temporary cable policy to ensure safety.
5. Instrument air compressor K-2777-C provided an operating platform at 400mm height from the floor level. Platform found unprotected toward the building entry point and there is a probability of falling from the platform. Hence, advised to provide guard railing to the platform's unprotected edge.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



3.10. Power Plant:

1. Power plant over all housekeeping is good.
2. It is good to note that QESH policy etc., are found displayed in the control room.
3. Lightening protection system is to be studied and to be provided accordingly to cover entire area.
4. For the air receiver tank (D – 730A) pressure gauge, SRV calibration is due as per tag it is due on 16.07.2025. Ensure the same for all the pressure vessels in the plant.
5. Scaffold found erected for maintenance activity, tagging is not evident to know the status / condition of the scaffold for using it. Ensure to put the relevant tag to certify the use of scaffold.
6. There are about three number of breaker lifting trolleys in the MCC, test certification for these is not evident as these are coming under lifting tools they are to be tested and certified by competent person and provide a tag to the trolley regarding tested and due date of testing.
7. In the MCC smoke detectors wiring found to hanging, to be fixed properly.
8. In the generator floor lot of spare material (seems to be heavy) found stored on the floor, Integrity of the floor slab to hold the weight of the material to be ensured.

3.11. HYDROGENATION (AUTO CLAVES):

The hydrogenation system totally is not working at the time of audit and no maintenance activity observed. Observations given are based on the inter action with the operator at the work place and walk through observations.

- Hydrogenation plant housekeeping is to be improved, unwanted material, dust is found at the top platform of Auto claws.
- There shall be two escapes from the installation building.
- Autoclave earthing strips continuity is to be ensured.
- Emergency Response, direction to assembly points list of first aiders, rescue team members etc., are not displayed at the section. These are to be clearly displayed for the awareness of persons working at the area.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- The inter communication / PA system phone at the operator table found to be not working.
- Hydrogen leak detectors are to be calibrated as scheduled and the updated tags are to be displayed so as to know the tested date and due date of next testing and calibration.
- Pressure indication gauge is provided between Rupture Disc (RD) and SRV, consider providing a transmitter to indicate the pressure on panel also and audio-visual display for real time indication of the failure of RD to the operator concerned.
- For the step ladder provided for going to the top platform of auto claves, only one side railing was given, provide railing on the second side also for ease of climbing up.
- Pressure gauge, SRVs are to be calibrated once in six months by competent person as per AP factories rules 1950 related to pressure plant under section 31 of factories act 1948 and rule 56 of the AP factories Rules and calibration date and due date of calibration is to be displayed on the SRV / pressure gauge, For the SRVs / pressure gauges on the auto claves the Calibration found to be due.
- Vents, including those of pressure relief devices, shall be arranged to discharge in a safe place in the open air so as to prevent impingement of escaping gas on to personnel or any structure.
- SRV and RDs are to relieve the pressure to safe location such as a dump tank of suitable capacity as designed and the dump tank also should have a vent relieving to safe location.
- Consider providing High-pressure audio-visual alarm for any increase of pressure in auto claves, so as to take immediate action by the operator concerned before the RD blows off.
- It was observed that the Rupture Disc and SRV are provided in series on the auto claves basing on process reasons, though two pressure relieving devices are there, only the SRV is actually relieving the pressure of the auto clave in case of high pressure. Hence the functioning of the SRV is to be ensured periodically as



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



there is no other redundant device to safe guard the auto valve.

- Process flow diagrams, Critical parameters of Hydrogenation process and action to be taken in case of hydrogenation process emergency are to be displayed visibly at operators panel board.
- Ensure adequacy of firefighting equipment at Hydrogenation process unit.

Castor oil filters:

- Castor oil filters are seeming to be handling oil at temperatures about 80° C to 100° C, in case of any oil spills due to leak etc., the burn injury will be severe consider barricading the area and display caution regarding hot oil and use of suitable PPE and
- Also provide flange guards for hot oil pipe flanges.
- The bottom tray provided at one of the filters for collecting any leaked oil found totally corroded and oil gets spread over the floor in case of leak in to the tray, renew the tray.
- Provide insulation for hot oil piping to avoid any accidental contact.
- Unwanted material / equipment to be identified and removed from Hydrogenation and Castor Oil filters area.

3.12 Hydrogen Compressors and Hydrogen storage bullets section:

(At the time of audit, all the three compressors are not working due to planned shutdown. Audit carried out basing on the interaction with operating persons and site observation.)

- Hydrogen storage bullets area entrance to unauthorised persons is found restricted by providing a gate and is locked too. However, there is other side entry through compressor room, where there is no gate or door and people are found entering through it. In such case the provision of locked gate at one side is getting defeated. Consider restricting personnel entry through compressor room also by providing a door,
- Provide caution display such as Hydrogen storage and compressors area, unauthorised entry restricted.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- Also provide caution such as No un authorised hot work, No smoking, No cell phone usage, No Plastic / Polythene usage, cautioning personnel not to enter wearing clothing which can generate static charges etc.,
- One plastic chair was found inside compressor room, use of plastic material inside is to be restricted.
- Compressor and bullets area is found to be of cemented and hard flooring, which when metallic materials / equipment such as N₂ cylinders are moved on it or when people are entering inside the area, their shoe soles may have stone pebbles or metal pieces stuck can cause friction and invisible sparking, which is enough to cause Hydrogen to catch fire in case of any leak there. Consider providing non sparking mastic floor or any provide with any other material which doesn't cause sparking. As to ignite a stoichiometric Hydrogen – Air mixture requires a Minimum Ignition Energy (MIE) of 0.02 milli Joules(mJ). This tiny amount of energy means nearly any spark or hot surface is an effective ignition source,
- In case of using rubber sheets for flooring ensure conductive rubber sheets are used, so as to ground the static charge of the moving personnel.
- While doing so also ensure perfect grounding of personnel moving or working at the area.
- Personnel Static charge grounding (dissipater) provided at the entry gate to bullets area, seem to be not working properly, it is to be checked periodically for its proper functioning.
- The personnel static charge dissipater is to be provided at entry through compressor's room also as the energy required to ignite Hydrogen is roughly ten times less than that for common hydrocarbon fuels. This energy level is so low that a static discharge from a human body, which is typically less than 1 mJ can easily ignite a wide range of flammable mixture (4% - 75% by volume) of Hydrogen.
- Intrinsic safe electric equipment / lighting has been provided at compressor room, ensure that the lighting and instrument equipment wires glands are not loose and gaps are there. (Ex: for PS 1761 cable gland came out.)



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- Hydrogen leak detectors testing seems to be not done; detectors are having cobwebs.
- Except K 501 C, A & B compressors and connected piping and supports are getting corroded, needs painting.
- Compressors and connecting piping and supports are to be properly earthed, ensure continuity of earthing (for some piping flanges continuity bonding found missing)
- Hydrogen MSDS and Dos and Don'ts regarding Hydrogen handling is to be displayed visibly at work place.
- It is noted that Drawing office is located above the compressor room. Hydrogen gas if leaks go up and might enter in Drawing office and eventually cause fire incident as the lighting and other electrical equipment used in the office may not be of intrinsic safe (Ex: Air Conditioner etc.), Consider relocating the drawing office from Hydrogen handling / storage area.
- Compressor room sun shading found to be getting damaged, need repair.
- Lot of electrical cables are found laid on the sun shade haphazardly, any joints in the cables can cause hot spots, these cables are to be properly laid preferably through a conduit.
- Outside compressor room, castor oil loading platform railing is not good and once side railing is missing, it is to be rectified.
- By the side of platform drain is full with stagnated water and drain is not having any cover. Stagnated water is to be cleaned and drain to be covered.
- There is lot of vehicle / fork lift movement by the side of Hydrogen compressor room, ensure that the vehicles exhaust is provided with standard spark arrestors.
- At bullets area there are about 4 to 5 Hydrogen leak detectors are provided. However, all the detectors are fixed at one side only, in case the leak goes other sides due to wind direction or otherwise, leak may not be detected, provide leak detectors at other sides also; especially towards Fusion plant where there is furnace.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- For the SRVs on the bullets the discharge outlet height seems to be less, consider increasing the height so as to vent out any released Hydrogen due to popping / passing of SRV at a higher height for safe dispersal of gas.
- Bullet area sprinkler system checked and found to be good.
- Consider spark proof mastic or other flooring at bullet area also at the same time ensuring static charge grounding of personnel moving at the area i.e., in case of using rubber sheets use conductive rubber sheets.

Hydrogen handling system (compressors, storage bullets and hydrogenation system)

Pipelines and Vessels:

- Pipelines for hydrogen shall be clearly marked by means of colour coding and/or labels and flow direction are to be marked
- Mechanical integrity of Hydrogen piping and vessels handling Hydrogen and their support structure are to be checked periodically basing on the corrosion level and of Hydrogen embrittlement.
- Hydrogen has a very low molecular weight and high diffusivity making it prone to leaks hence mechanical integrity checks of the equipment and connected piping should be carried out more frequently.
- For Hydrogen handling System consider carrying out **HAZOP** study referencing P&ID and actual site lay out to evaluate process hazards and operability and to comply with the recommendations accordingly.
- While doing HAZOP consider hazards those are likely to impact from the other areas of operations.
- Any modifications / changes in system are to be addressed under Management of Change and HAZOP to be carried prior to modification / change.
- The hydrogen pipeline should be run at a higher elevation than other pipelines.
- Ensure bonding of the piping flanges and good earthing of the piping system.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



Identification of and Access to Hazard Zones:

- The extent of the hazard zones is to be posted by permanent notices, particularly at access points, or by distinctive lines painted on the ground. Notices shall indicate the nature of the hazard, e.g. *HYDROGEN - FLAMMABLE GAS NO SMOKING - NO OPEN FLAME*
- Only authorised personnel shall be allowed to enter these zones. These personnel shall be aware of the hazards likely to be encountered and the relevant emergency procedures. Notice to that effect is to be posted as *NO UNAUTHORISED ENTRY* Personnel shall be instructed on the dangers of using unauthorised electrical equipment
- These instructions shall include advice on hazards, which may arise.
- Such instructions should be repeated at regular intervals.
- Ensure that only Flame / spark proof electrical fittings / lighting has been provided at Hydrogen handling zone. Also ensure that cable glands for the electrical boxes / lighting etc are totally tight fitted without gaps.
- Strictly prohibit cell phone usage at Hydrogen handling area. Only use intrinsically safe phones for communication.
- Display caution regarding spark proof tools for maintenance activity. Also strict vigilance is required on maintenance activity carried out by regular maintenance personnel or contract work force regarding use of spark proof tools.

Earthing & Static Charge Prevention:

- Equipment and systems shall be earthed and bonded to give protection against the hazards of stray electrical currents and static electricity.
- All systems shall be bonded, where necessary, and effectively earthed to give protection against the hazards of stray electrical currents, static electricity and lightning protection
- Floors, floor coverings, rubber mats, chairs, steps, etc. shall be of conductive material in order to achieve the electrostatic earthing of persons.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- All persons working in hydrogen stations should wear conductive footwear.
- Care shall also be taken in the choice of material for working clothes since most
- synthetic materials readily generate static charges. Fire resistant clothing should be worn when working in classified areas.

3.13 Sodium Hydroxide flakes loading:

1. Sodium Hydroxide flakes jumbo bags loading plat form, provide a step ladder for easy accessibility, in case of any caustic spill, which is of 98% concentration, person should come down easily.
2. Provide all the necessary PPE for carrying the activity.
3. There is no shower / eye washer near to the loading point. In case of spill on body / eye one has to run a distance for washing it and by the time he goes to the shower / eye washer he gets burns because of high concentration of caustic.
4. Provide caustic MSDS and dos and don'ts display in Telugu which is to be clearly visible.
5. Ensure the exhaust system is in good working condition to suck any Caustic dust emitted during activity.

3.14. FIREFIGHTING DEPARTMENT:

1. Numbers of fire tenders are available with the department.
2. Fire NOC has been taken on dated: 21.09.2021 and is valid for five years.
3. Fire water pressure is being maintained at 7.0 kg / Cm ²
4. Diesel operated pumps are available for fire water in case of Power failure, which will be started manually when power fails.
5. No secondary containment provided for Diesel tank. Secondary containment (Bund wall or otherwise) is to be provided.
6. AFFF shelf life is not evident, ensure the shelf life. It is not good to keep AFFF exposed to sun as the properties of foam may deteriorate. (EX: Carbuoys are kept exposed to sun at 11 & 12 fire water monitors area).



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



7. At the 11 & 12 monitors and at some other areas scrap material and other waste found placed, this hampers the accessibility to monitors operation. All the firefighting equipment such as hydrants, monitors, CO2 or others shall place such that they are easily accessible.
8. Also, for some monitors the valve wheel is so fixed that for operating the wheel one has to go into a congested place. While fixing hydrants / monitors ergonomic study to be carried for ease of operation.
9. It was observed that two of the fire tenders became very old, recommended to replace with new fire tender with all facilities.
10. Recommended to provided tested tag to all fire extinguishers.
11. Fire hoses after usage shall be dried placing them on a slanted stand or ramp so as drain all the water. By the present practice of drying them keeping horizontally on floor may leave water traces inside hose and eventual pitting and causing holes in hoses.

3.15. OCCUPATIONAL HEALTH CENTRE (OHC):

1. No Full-time medical Officer available in OHC. A qualified Medical officer MBBS with AIFH (Associate Fellow in Industrial Health) required in line up with Statutory requirements as said in Factories act 1948 Sec 10, 61(SC) B, AP of factory rules.
2. OHC is equipped with 8 beds and 5 nursing staff. Also 3 ambulances are available.
3. All Occupational health hazards are to be identified and annual tests to be conducted basing on these findings.
4. Recommending arranging some of the training sessions by doctor for all the workers regarding health hazards.
5. Doctor should be a member in Safety Committee and need to attend all the Safety Committee meetings to discuss any repeated First-aid cases or injuries
6. Material Safety Data Sheets (MSDS) of all the hazardous chemicals being used in the plant are to be made available at OHC so that Doctor can Know the health hazards of the chemicals and accordingly keep medicines and treat patients and



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



even if the patient is sent to tie up hospital can provide the details to the Doctors there.

7. Annual medical checks are being carried for all the employees. Along with the existing medical checks consider adding Lever function test also.
8. First aiders list is not evident, consider providing first aid training to some of the employees taking employees from each plant / section and display the list of trained first aiders. (their names, section, employment number, contact number etc.,)
9. At Oxygen cylinders storage, (about 15 cylinders are found stored) display Oxygen cylinders handling precautions.

3.16. 132 KV SWITCH YARD:

1. List of the authorised electrical persons shall be displayed at the entrance as per IE rules.
2. Gravels are to be provided as per IE rules.
3. Caution regarding entry of un authorised persons, dos and don'ts while working inside switch yard to be displayed at the entrance and entrance to un authorised personnel is to be controlled.
4. Persons who are working at battery room are not having awareness on hazards of the battery room and panels.
5. In the Wet battery room, exhaust is not evident, provide exhaust fans so to disperse any liberated Hydrogen.

3.17 RECTIFIER TRANSFORMERS:

1. For most of the transformer's silica gel is to be replaced it is getting exhausted and colour turning to pink.
2. Transformer below pit is having stagnated water, needs to be cleaned and pit properly covered.
3. 4 transformer area, cables on the cable tray are found tied with armoured wire, Armoured wire used for Cable dressing is not correct, it gets rusted in due



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



course and may cut the insulation and cause unwanted incident. PI use AI Clamp.

4. In case of transformer fire only 2 nos. Of 22.5 Kg CO₂ extinguishers are available, ensure adequacy of firefighting equipment.

3.18. CANTEEN:

1. Canteen up keep is good.
2. Canteen waste is found dumped outside the canteen openly, provide bins with cover for dumping the waste.

3.19. MAIN STORES:

1. Storage racks load bearing capacity to be tested by authorised person and to be displayed on the racks.
2. For rejected material dedicated storage place shall be identified and rejected material shall be stored at locked area, so that rejected material is not being used by mistake, which eventually may become cause for some unwanted incident.
3. For the liquefied CO₂ storage container, the due date of approval is displayed as 30.09.2025, no evidence of further approval. It is to be corrected in case approval is taken or otherwise approval is to be taken.

3.20. Laboratory:

1. SOP on Safe handling of laboratory chemicals needs to be prepared & all the laboratory team needs to be trained on this SOP.
2. O₂ analyser is to be provided in the closed room where gases used for analysis.
3. Burette stands are getting damaged needs renewal.

3.21. Mechanical Department:

1. Consider recording every preventive maintenance test conducted by the department in hard copy for references.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



2. Recommending conducting Illumination, Noise and Ventilation survey reports at necessary locations
3. All parts of the plant, equipment, machinery which in the likely event of failure may give to an emergency situation shall be examined by the competent person as per Rule-95, Schedule-XV under chemical works as per Factories Rules.
4. According to Rule-56 of Factories rules, all air receivers/pressure vessels must be Hydro tested once in every two years in presence of Competent person and is to be certified.
5. Recommending integrity checks for all pipe lines at regular intervals
6. Full Body harness and Life lines must be tested and certified by a competent person under Rule 61C of factories rules.
7. It is an important that usage of MEKP liquid for making FRP should take care on usage, storage and transportation.

3.22. Civil Department:

1. It was observed that some of the process and utility buildings and structures are seems to be getting corroded.
2. As per Building Regulations Act 1989, buildings below 15 years of age, need to obtain Stability Certificate once in every 5 years and if the buildings are above 15 years of age need to obtain Stability Certificate once in every 3 years, So Consider conducting Structural Stability tests for buildings accordingly by a Factories department approved competent person.
3. It is important that scaffolding which is using at present at most of the places is fully non-standard. it is to be taken care that standard scaffolding materials are to be used.

3.23. Electrical Department:

1. Earth leak mats and HT hand gloves should be tested for potentiality for every one year according to IS-4770.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



2. Qualified Electrical Safety Officer to be designated and ratified by CIG.
3. All license holders' names with contact numbers to be displayed in MCC rooms.
4. Consider providing Firefighting system for the Transformer like increasing Fire extinguishers and sand buckets which could lend a hand in emergencies.
5. Instruments like Multi meter, Megger etc., must be calibrated and recorded.

3.24. Road Safety:

1. Recommending pasting of Inspiring Road Safety Signage's with Speed limit boards at entrance of the factory
2. Road crossing systems like Zebra crossing system, pedestrian walk ways to be implemented at all intersections
3. Speed control bumps/speed breakers needs to be places at critical turnings & People crossings.
4. Convex mirrors at blind corners needs to be placed.
5. Pedestrian walkways are to be marked clearly and caution to pedestrians to be displayed regarding usage of pedestrian path, especially from main gate entry to administration block / inside plant, stores area and other areas where vehicle and pedestrian movement is there.
6. Display caution at main gate cautioning two-wheeler raiders entering the plant on
"WEARING OF CRASH HELMETS"

3.25. Safety Department:

1. It is noted that announced mock drills are being conducted periodically as per statutory requirement of once in six months. Consider doing unannounced mock drill and mock drill in evening / night shift or on holidays.
2. assembling points are identified in case of any on site emergency, review the Onsite emergency plan and consider providing one or two more assembling points as the distance to assembling points to some plants areas seem to be more.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



3. For the assembling **point # 1** at administration building, it was observed that the area is getting blocked with cars parking, consider moving the point to opposite park area by providing suitable approach to the area as it is at a little height.
4. Emergency Control Centre should be located with all required items as specified in factories rules.
5. Consider providing static discharge pads at all production blocks entrances, solvent storage tank forms and also at Laboratory as hydrogen is being used.
6. Doctor (head nurse until regular Doctor is appointed), should be added as a member in Safety committee meeting.
7. Along with the existing Work permits like hot work; work at heights, confined space, Electrical works, consider implementing permit for vessel / pipeline opening also. As at times pipeline / vessel opening may cause incidents due to locked up pressures / locked up hazardous chemicals / dust etc.,
8. Site evacuation route plans along with Assembly point locations needs to be displayed at various locations in the plant.
9. Way to Assembly point and Assembly point markings to be displayed.
10. Existing assembly points is to be relocated, because it is on the road.
11. Consider implementing Process Safety Management system for all process related activity.
12. Before starting of any new equipment / process or activity or starting a unit / process after longer shut down, consider implementing **Pre-Start Up Safety Review (PSSR)** by preparing suitable checklists.
13. For any modifications or changes in the plant / process consider implementing **Management of Change (MOC)** and carry out hazard analysis by doing HAZOP for evaluating Process Hazards and HIRA for all general activities.
14. Consider evaluating ergonomical hazards also in general activities.
15. Recommending Vertical Life line with Fall arrestor system for all vertical ladders especially at tall structures such as chimneys, cooling tower cat ladders etc.,
16. Recommending Hazardous area classification (HAC) study for entire plant as many haz chemicals are being used.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



17. Emergency Siren codes to be displayed at Siren location and other important locations of the plant and also this siren codes to be displayed at security.
18. Recommending improving Personal Protective Equipment usage in the plant.
19. For the chemical cartridge respirators expiry to be marked and the duration of usage is to be noted.
20. About the usage of chemical cartridge respirator personnel using them are not aware of how to test whether they have fully tightened the face mask or not, further training is to be imparted.
21. SCBA set face masks are to be properly kept, many areas they are found to have dust, At power plant area they kept them neatly. Similar way other areas can also follow.
22. Also, SCBA sets can be kept at a convenient height so that persons can wear them easily and quickly during emergency.
23. As there are modifications in the plant On-Site Emergency Response Plan is to be updated by considering all emergencies and provide training for all the plant personal. So also Safety Report is to be revised.
24. OHS policy is clubbed with Quality and Environment as QESH policy (signed on 01.12.2021, by Executive Director, technical and also is occupier,) the policy is to be displayed at all plants and prominent places and workmen training is to be covered on policy points and their roles responsibilities in the implementation of policy.

3.26. Security:

1. Lot of incoming and outgoing truck tanker movement is there for the transportation of materials at entry gates. The truck tanker movement is to be controlled by drawing a suitable plan for the incoming and outgoing trucks.
2. Regular security checks are being carried at the gate for personnel and vehicles entering the plant, the checks shall be more thorough as sabotage and terrorist activities can cause catastrophic situation in a hazardous chemicals handling



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



- plant. Arrange to Check the vehicles underneath by probing with mirrors and check for possible flammable materials / detonators etc.
3. Emergency Escape layout of entire plant should also be displayed at gate.
 4. Emergency Response team and Action plan also to be displayed at security.
 5. In the Safety Induction presentation to all visitors consider including what are the Hazardous chemicals used in the plant and primary care to be taken in case of exposure.
 6. Emergency Siren Codes to be displayed at gate.
 7. Currently to know the Head count of personnel present inside the plant it is taking about 1/ 2 an hour time for the security, consider implementing a suitable system for giving the head count in real time.
 8. Consider taking Roll call of personnel present at each assembly point in case of emergencies or during emergency mock drills.

3.27. GENERAL OBSERVATIONS AT OTHER AREAS:

1. Though caution regarding cell phone usage is displayed at high hazardous areas such as Hydrogen storage and handling, Chlorine plant and at storage of flammable chemicals such as Methanol storage etc., no control is evidenced. Consider keeping guarding at such areas and when persons are entering the area the cell phones are to be handed to the guard. For workmen who need to communicate intrinsic safe communication phones (**such as ATEX or IECEx**) are to be used.
2. Consider installing Earth-leakage circuit breaker (ELCB) or Residual Current Circuit Breaker (RCCB) in high Earth impedance electrical installations to prevent shock. It detects small stray voltages on the metal enclosures of electrical equipment, and interrupts the circuit if a dangerous voltage is detected.
3. It was observed that for earthing (grounding) of vessels / equipment strips are being used and in case of usage of more strips they are welded / brazed at joints, these weld joints over a period gets failed causing failure of earthing, periodical



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



survey for the continuity of grounding from equipment to earth pit is to be ensured and recorded.

4. For almost all the chemical storage tanks in the plant, working platform on the tank roof top is not evident. Work men seem to be standing directly on the roof top for carrying out any work, this practice is un safe. Provide working plat form on tank tops.
5. For most of the piping flanges carrying hazardous chemicals such as strong acids, alkalis etc., flange guards are not evident. As at many times flange gaskets are prone to leak, provide flange guarding to prevent chemical leak / splash on persons working at near by area.
6. For the chemical storage tanks display clearly the name of the content in the tank, tank capacity and important chemical properties of the Chemical and the PPE required at the area. Labeling is very important in chemical storages and chemical plants as wrong labeling or no labeling may cause unwanted incidents.
7. Though MSDS / Dos & Don'ts are displayed on walls or boards, the displays are found to covered by material storages etc., The display is to be clearly visible to all the workmen working at that area.
8. Also, MSDS or Dos & Don'ts is also to be displayed in local language Telugu for the benefit of those who doesn't know English.
9. Awareness on the MSDS of the chemicals being handled by the workmen is to be tested periodically and if required they are to be trained about the chemical properties.
10. Presently though, the training programs are being conducted but there seems to be no training calendar prepared. training calendar basing on competence evaluation and training needs requirements as per annual appraisal system and accordingly prepare training schedules. Training programs to include safety related topics such as work permit system, emergency response, hazard identification and control, Material safety data sheets, legal requirements etc., Training programs to include video shows / clippings on safety and environment. Also include the topic on behavior-based safety.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



11. Consider arranging specialized training program on static electricity and its hazards and controls.
12. Also training programs / pep talks to contract employees are to be conducted
13. A multi-functional team may be constituted and a thorough inspection of each department may be carried out by setting a periodical inspection schedule. The inspection to focus on 1.) Process safety, such as possible process hazards, material compatibilities during storage and handling, functioning of trips and by passes, alarms, pressure relief systems 2.) Electrical safety such as defective electrical equipment, cabling, condition of panels, switch yard, intrinsic safe electrical system, earth pits, probable static charges and their grounding etc., 3.) Structural safety such as condition of buildings, roof structures, slabs provided on drains, stair cases, walk way platforms and their supports etc., 4.) Mechanical safety such as equipment condition and base supports, tools and tackles, pressure vessels / pressure pots, guarding of equipment etc., and 5. On general safety, such as housekeeping etc.,
14. List of first aid trained personnel, Rescue team members, Emergency response team members, Names and contact numbers of key personnel shall be displayed at plant control rooms or at prominent places.
15. At administration block Personnel lift door opening at ground floor is facing towards the road, personnel are directly entering the road once they come out of the lift, with a probable risk of a person being hit by moving vehicles on the road. Hence, it is advised to provide a bull guard in front of the lift gate at the ground floor to restrict person entering on to the road directly from the lift.
16. Number of gas cylinders are found kept in cylinders bay without any HAZCHEM information. HAZCHEM information shall be displayed in a standard size of 600 mm x 450 mm (recommended for 10-15m viewing) refer IS 9457: 2005 - Safety colours and safety signs - Code of practice.
17. For the piping laid on the pipe tracks (bridges) colour coding is not evident any area in the plant, colour coding is to be displayed at strategic areas.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



18. Duly Signed Safety Policy (QESH policy) with signed Date from occupier should be displayed at entrance of the plant and at prominent places such as canteen administration block, control rooms of plant etc.,

ABBREVIATIONS USED IN THIS AUDIT REPORT

SRAAC	SREE RAYALASEEMA ALKALIS AND ALLIED CHEMICALS
LEA	LUMEN ENGINEERING ASSOCIATES
SA	SAFETY AUDIT
OHS	OCCUPATIONAL HEALTH & SAFETY
EHS	ENVIRONMENT, HEALTH & SAFETY
EQSH	ENVIRONMENT, QUALITY, SAFETY & HEALTH
SRV	SAFETY RELIEF VALVE
RD	RUPTURE DISK
OHC	OCCUPATIONAL HEALTH CENTER
PSSR	PRE START UP SAFETY REVIEW
SOP	STANDARD OPERATING PROCEDURE
ELCB	EARTH LEAKAGE CIRCUIT BREAKER
RCCB	RESIDUAL CURRENT CIRCUIT BREAKER
OCP	OPERATIONAL CONTROL PROCEDURE
HAZOP	HAZARD AND OPERABILITY
HAZCHEM	HAZARDOUS CHEMICAL
AFFF	AQUA FILM FORMING FOAM



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



4.0 CONCLUSION

The OHS performance of the organization requires to be further improved. Being a hazardous chemicals handling plant, organization should focus more on Process Safety and accordingly area in charges to put more efforts for achieving continual improvement of its EHS performance and shall aim for many good achievements / laurels. They should lead the people, working under them, to be vigilant all the time and their behaviors should be reinforced time and again to achieve the desired goal of continual improvement of Occupational Health and Safety of the work force and other interested parties.

Accountability regarding Occupational Health and Safety should be with the area / department in charges, rather than the responsibility of safety department alone.

This audit is based on random sampling only and few of the areas where hazard potential existed are given in this report. Similar hazards may arise in the other work areas also., The continual improvement of OHS is possible by identifying the hazards and taking necessary control measures. Auditing is a good tool for identifying the weaknesses of the system and compliance to audit points covers the gaps in the system performance. The area managers shall take interest in the compliance of audit observations on priority basis and by implementing the available and suitable new technologies for improvising the process safety, thus achieving the desired goals and improvising the OHS performance of the organization.



SAFETY AUDIT REPORT-2025

TGV SRAAC LIMITED - KURNOOL



5.0 DISCLAIMER

As mentioned earlier, this audit is based on random sampling only and few of the areas where hazard potential existed are given in this report.

Also, the suggestions given in the report are based on the observations made and on the prevailing situations at the time of audit and basing on the interaction with the plant personnel and on the professional experience of the auditors.

Users of this report are informed that this report cannot be a substitute for qualified engineering analysis. Any changes or modifications carried out basing on the suggestions are to be further reviewed under Management of change before actual change or implementation and expert guidelines are to be sought wherever required.

Lumen Engineering Associates and its auditors do not hold any legal obligation in case of occurrence of any incident / accident / emergency in the plant while implementing the recommendations.

The validity of this report is one year from concluding date of the Audit or next External Safety Audit due as per Statutory Requirements.

26th December 2025,
Gondiparla Village, Kurnool.

for Lumen Engineering Associates

V.V. Seshagiri Rao
Chemical Engineer.



SAFETY AUDIT REPORT-2025
TGV SRAAC LIMITED - KURNOOL



6.0. ANNEXURE