BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
WESTERN ZONE BENCH
AT PUNE

ORIGINAL APPLICATION No: 113/2024 (WZ)
EARLIER ORIGINAL APPLICATION NO. 206/2024 PB

KIRITSINH CHHATRASINH SINDHA & ORS. ....Appellant

Vs

STATE OF GUJARAT & ORS ....Respondent

AFFIDAVIT ON BEHALF OF RESPONDENT NO.4 TO RECORD ITS SUBMISSIONS WITH REGARD TO THE CONTENTS OF THE APPLICATION

NOTARY Shrikant Sharma Gurugram Regn. No. 16714 GOVT OF INDIA

16 DEC 2024

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
WESTERN ZONE BENCH
AT PUNE

ORIGINAL APPLICATION No: 113/2024 (WZ)
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INDEX

S. No	Particulars	Page No.
1	Affidavit on behalf of Respondent No.4 as per directions of the Hon'ble Tribunal dated 15.10.2024	1 – 10
2	**Annexure A-1** Copy of Respondent No.4's reply dated 5.10.2023 to the GPCB order no. 753704 dated 20.09.2023, confirming and reassuring the proactive measures undertaken following the incident.	11 – 57
3	**Annexure A-2** Acknowledgement of Test reports dated 02.05.23 undertaken for Bromine Storage Tank' and submitted to the Hon'ble officers at the Office of Dy Director -DISH on 12.04.2024	58
4	**Annexure A-3** Analysis reports for the MPP-7 Stack	59
5	**Annexure A-4** Analysis reports for the MPP-9 Stack	60

NOTARY Shrichand Sharma Gurugram Regd. No. 16714 GOVT OF INDIA

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

ATTESTED
SHRICHAND SHARMA
ADVOCATE & NOTARY
GURUGRAM
6 DEC 2024

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,
WESTERN ZONE BENCH
AT PUNE

ORIGINAL APPLICATION No: 113/2024 (WZ)
EARLIER ORIGINAL APPLICATION NO. 206/2024 PB

KIRITSINH CHHATRASINH SINDHA & ORS. ....Applicants

Vs

STATE OF GUJARAT & ORS ....Respondents

AFFIDAVIT ON BEHALF OF RESPONDENT NO.4

I, Bipin Thomas, the authorised representative of the Respondent No. 4, i.e. M/s. PI Industries Limited, located at Plot No.SPM-28, 29/1, Sterling SEZ and Infrastructure Ltd., At & Po.: Sarod, Tal.: Jambusar, District- Bharuch Gujarat, do hereby solemnly affirm, and state through this Affidavit as under:

1. I say that I am serving as the Senior General Manager – Legal of M/s PI Industries Limited, and I am aware of the facts and circumstances of the present case and am duly authorised on behalf of the Company to make this Affidavit.

NOTARY Shelendra Sharma Gurugram Regn. No. 16714 GOVT OF INDIA

2. I state that pursuant to the Dasti No. NGT/W2B/PUNE/1070/24, which was received by us on 30.11.2024, we have been informed of the Original

For PI INDUSTRIES LIMITED

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Application No. 113/2024 (WZ) LP ("Application") and the Hon'ble Tribunal order dated 15.10.2024 ("Order"). Upon perusal of the Order, it is hereby acknowledged that the Hon'ble Tribunal has impleaded M/s P I Industries Limited as Respondent No. 4 and has additionally directed, by Order dated 15.10.2024, that a reply affidavit be filed within four (4) weeks from the date of the said Order. The Deponent respectfully declares that, having only received the notice to appear on 30.11.2024, the present submissions are now being submitted to this Hon'ble Tribunal through this Affidavit.

3. In view of the said Order, having been passed, the Deponent is filing the present Affidavit for the limited purpose of stating certain facts for consideration of this Hon'ble Tribunal. That, the Deponent is not dealing with or responding to the contentions of the main Application, however, is hereby denying all the allegations and averments made and the contentions that may have been raised in the main Application against M/s PI Industries Limited.

4. PI Industries Limited (PI) is a leading technology-driven agri-sciences company that delivers innovative farming solutions to millions of farmers and business partners worldwide. With a robust foothold in agri-input sector for more than 60 years, PI is committed to enhancing the planet's

For PI INDUSTRIES LIMITED

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health by innovating and supplying high-tech plant protection and plant growth solutions that foster sustainable and regenerative agriculture. PI Industries Limited's expertise encompasses the entire agri sciences value chain, including discovery, custom synthesis, large-scale manufacturing, and marketing & distribution. PI Industries Limited has also recently diversified into the pharma field as a Contract Research, Development, and Manufacturing Organization (CRDMO).

5. That PI Industries Limited is a certified organization under ISO 14001:2015 - Environmental Management Systems, and we are unwavering in our commitment to environmental protection, strict adherence to legal and regulatory requirements, and the continuous pursuit of sustainability objectives, thereby ensuring the long-term well-being of both our environment and operations.

NOTARY Shikhar Sharma Gurugram Regn. No. 16714 GOVT OF INDIA

6. That PI Industries Limited is also certified under ISO 45001:2018 - Occupational Health and Safety Management Systems, with a resolute focus on fostering a safer and healthier workplace while ensuring full compliance with applicable legal and regulatory frameworks. This certification further underscores our organization's dedication to safeguarding the well-being of our employees, enhancing our reputation and trust with clients, stakeholders, and employees alike. We are also

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

aligned with the United Nations Sustainable Development Goals (SDGs) and making significant year on year progress.

7. That at PI Industries Limited, we firmly believe that workplace safety is a core value of the Company and to reinforce our unwavering commitment to workplace safety, we put lot of emphasis on the Health & Safety training for our employees to ensure a safe and healthy work environment. Over the last few years, our Company has significantly increased safety training hours by 80% with an aim to maintain a safe and healthy workplace for all. Furthermore, the Company invests in programs designed to enhance the competency and capability of personnel facing assets, as well as to develop leadership in Workplace and Process Safety functions. It is pertinent to mention here that these programs are developed in collaboration with IIT Chennai for Process Safety and NITIE Mumbai for Workplace Safety.

8. That I would humbly affirm to the Hon'ble Tribunal that our Company has proven track record and established protocols to ensure full compliance with all applicable regulations and local safety standards, thereby ensuring that its pressure vessels remain safe, reliable, and in adherence to industry norms. These measures serve to minimise risks to both employees and the environment. The Company conducts regular inspections at specified intervals, performed by qualified personnel, to detect signs of wear,

For PI INDUSTRIES LIMITED

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corrosion, leaks, or damage. Periodic leak testing, including hydrostatic testing and gas leak detection systems, is carried out to maintain the integrity of pressure vessels and associated piping. The Company has implemented comprehensive training programs for its staff to minimise human error and ensure consistent compliance with safety protocols.

9. We deeply regret the unfortunate incident of the bromine gas leak that occurred at our unit on 23.08.2023. Despite implementing all the pre-emptive measures outlined above, the incident appears to have been caused by an unavoidable defect, *which,* at first glance, seems to be a manufacturing defect. While we express our sincere regret over this incident, we are profoundly grateful for the dedication of our workforce and the robust systems and protocols we have instituted in our daily operations. These actions allowed us to act quickly and decisively by shutting down the plant, evacuating all personnel for their safety, and swiftly putting emergency response procedures into place to effectively manage and contain the situation without causing harm to people, the environment, or wildlife, both within and outside our manufacturing facility unit.

10. We would also like to humbly inform the Hon'ble Tribunal that we shut down the plant, evacuated the workers, and initiated urgent measures to

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

control the leakage and prevent its spread. Due to this untoward incident, approximately 28 individuals working near the site of the incident were taken to Jambusar General Hospital purely as a precautionary measure for a medical checkup. Following the checkups and observations, 24 employees were discharged within a few hours on the same day, while the remaining 4 employees were kept under medical observation and discharged the following day, on 24.08.2023. The hospital has also provided the required fitness and relieving certificates for all 28 employees

11. That, we acknowledged the GPCB order no. 753704 dated 20.09.2023 ('GPCB Order') and promptly responded to the Hon'ble Authority on 5.10.2023, confirming and reassuring the proactive measures we had undertaken following the unfortunate incident. A copy of our reply dated 5.10.2023 is also annexed herein as **Annexure A-1**. In our aforementioned response, we not only confirmed that the 'Bromine storage Tank' (ST7A0211) has remained unused since the incident, but also provided the safety/HAZOP study to the consideration of GPCB officials.

Response to the 'recommendations' made by the Joint Committee in its report September 2024 to the Hon'ble Tribunal on Page 46 of the Report ('Joint Committee Report').

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

12. It is hereby re-affirmed that all the relevant compliance workflows related to the 'Bromine Storage Tank' (ST7A0211) were duly met with the prevailing and applicable norms. We duly presented the required test reports dated 02.05.23 undertaken for this tank under consideration to the Hon'ble officers at the Office of Dy Director -DISH on 12.04.2024. The acknowledgement of the report is attached herein as **Annexure A - 2**. That we hereby reiterate that the 'Bromine Storage Tank' (ST7A0211) is maintained at atmospheric pressure only except for the momentary situations wherein the transfer pump priming is done by applying the Nitrogen pressure (1.4kg), and a comprehensive system is in place to ensure regular inspections of their proper functioning at specified intervals.

13. The Honourable Tribunal may kindly note that the report titled 'Bromine Tank Failure Study,' issued by the independent third-party agency LRQA, has indicated that the probable causes of damage and leakage from the storage vessels are attributable to various factors. Furthermore, in our humble opinion, which the Honourable Tribunal may wish to consider, all of these factors converge to support the conclusion that this unfortunate incident was precipitated by an unanticipated manufacturing defect in the storage tank.

NOTARY Shalchna Sharma Gurugram Regd. No. 16714 GOVT OF INDIA

For PI INDUSTRIES LIMITED

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14. That we have duly acknowledged and accepted that direction from the GPCB Order and affirm that we shall not operate the new 'Bromine Storage Tank' (ST7A0211) until the GPCB has issued us the direction or revoked the direction issued under the GPCB Order.

15. That it is further pertinent to mention that the Company has been consistent in compliance with the various conditions, given in consent of GPCB, pertaining to water consumption, wastewater generation and disposal, and fuel consumption.

NOTARY Shrichand Sharma Gurugram Regn. No. 16754 GOVT OF INDIA

16. It is pertinent to bring to the attention of this Hon'ble Tribunal that, during earlier sampling by the GPCB officer, emissions from process stacks MPP-7 and MPP-9 exceeded the prescribed limits due to partial choking in the circulation line. We observed that there was partial choking, which may have caused some unreacted residual Mono Methyl Hydrazine (MMH) to escape from the vent, resulting in ammonia being detected in the process stack analysis. We have made significant process improvements to prevent further occurrences of such partial choking, and the frequency of periodic checks has been increased to monitor this closely. These efforts have already yielded positive results, as confirmed by the subsequent sampling tests conducted on 18.09.2024 carried out by the GPCB Officers. The results show that all emission parameters are now within the consented

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

limits. Attached are copies of the analysis reports as **Annexure A-3** and **Annexure A-4** for the MPP-7 Stack and MPP-9 Stack, respectively.

17. That I respectfully wish to bring to the attention of this Hon'ble Tribunal the recommendation outlined in the Joint Committee Report concerning the root cause analysis for the abnormally high concentration of NH3 in the MPP-9 plant and its submission to the GPCB. It is humbly informed to the Hon'ble Tribunal that the Company has already engaged an independent Schedule 1, NAAC A+ accredited auditor to conduct this study, which is nearing completion. Nonetheless, the Company will fully comply with the directions provided in the Joint Committee Report and will arrange for the root cause analysis of the elevated NH3 concentrations in the MPP-9 plant to be carried out by a nationally reputed institution and submit to the GPCB office.

NOTARY Shricha... Gurugram Regn. No. 16714 GOVT OF INDIA

18. I respectfully reiterate that I have reviewed the GPCB Order, as well as the conclusions and recommendations in the Joint Committee Report. Without addressing the merits of the issue, I assure you that all the directions and recommendations in the Joint Committee Report will be diligently followed. To a large extent, we have already complied with these requirements or are in the process of doing so, and we will carry them out in good faith. Additionally, PI Industries Limited will take all necessary

For PI INDUSTRIES LIMITED

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steps to prevent a recurrence of this incident in the future. We will also regularly provide status reports on all 'compliances and recommendations' mentioned in the Joint Committee Report to the GPCB Office.

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

DEPONENT

NOTARY Shichand Sharma Gurugram Regd. No. 16714 GOVT OF INDIA

VERIFICATION

Whatever stated hereinabove is true and correct to the best of my knowledge and belief and nothing material has been concealed there from. Also, the Annexures enclosed herewith this Affidavit are true copies of the Original Documents. Solemnly affirmed at Gurgaon on this 6th day of December, 2024.

For PI INDUSTRIES LIMITED

AUTHORISED SIGNATORY

DEPONENT

ATTESTED

SHRICHAND SHARMA ADVOCATE & NOTARY GURUGRAM

16 DEC 2024

ANNEXURE A-1

Inspired by Science

PIIND/GPCB/ NoD-753704/2023

Date: 05.10.2023

PCB id: 28087

To,
The Unit Head-Bharuch,
Gujarat Pollution Control Board,
"Paryavaran Bhavan," Sector 10-A,
Gandhinagar-382010.

Sub.: Compliance against the Direction under Section 31- A of The Prevention of Air (Pollution & Control of Pollution) Act 1981 issued by the Hon. Board.
Ref: Your Order No: 753704 Dtd: 20/09/2023.
Dear Sir,
We have been issued a Direction, under Section 31- A of The Prevention of Air (Pollution & Control of Pollution) Act 1981 vide your Order Dtd: 20/9/2023 referred above, in reference to an incident of leakage of Bromine which took place in our unit on 23/08/2023. In this context, we are submitting our point-wise compliance, along with relevant documents, as under, for your perusal and kind consideration please.

Sr.No.	Justification / Compliance
1	To stop use/operation of Bromine storage tank (MSGL Tanks no. ST-7A 0211, 10 KL)
	Site has isolated the Bromine storage tank (No. ST-7A 0211) immediately after unloading the left-out material on 23.08.2023 after the incident. This tank is not in use since then. Further we are also planning to replace the leaked tank with new tank. PO copy is attached herewith as an *Annexure-1* for purchasing on new tank.
2	To take all necessary measures to ensure safety of all reactors, equipment, storage tanks etc. to prevent further mis-happening and environmental damage.
	We would like to add following details of safety measure we carry out at our site. i. All processes are evaluated for Hazards through the HAZOP studies and all controls resounded are implemented and verified. ii. QRA (Qualitative/Quantitative risk assessment) Studies done and verified by external expert agencies. iii. All plants are DCS controlled site and also ISO 14001 & ISO 45001 certified. iv. All critical reactions have process safety interlocks and provided with process safety equipment like rupture disc, safety valve, emergency shutoff valves, knock out pots, scrubbers etc. v. Low boiling solvent storage tanks are provided with nitrogen blanketing with condenser. vi. Secondary containments (e.g. dyke) are provided for storage of chemicals. vii. Periodic inspection and preventive maintenance of all critical equipment/tanks is conducted at defined interval following standard protocol.
3	To carry out safety audit/HAZOP study and root cause analysis.
	HAZOP Study report of Bromine receipt, storage and transfer is enclosed as per *Annexure-2*. We have completed root cause analysis (RCA) for above incident and copy of same is attached as an *Annexure-3*.

NOTARY Shrichand Sharma Gurugram Regn. No. 16714 GOVT OF INDIA

PI Industries Limited

ATTESTED

Responsible Care

PI Industries Ltd.
Plot No. SPM-28, 29/1, Sterling SEZ, AT & PO. Sarod, Taluka Jambusar, District- Bharuch – 392180, Gujarat, India. Tel: +91-2644-225500/01
Regd. Off.: Post Box No.20, Udaisagar Road, Udaipur – 313001, Rajasthan, India. Tel.: +91-294-2491451-5, 6651100, Fax: +91-294-2491946
Email: info@piind.com, www.piindustries.com, CIN: L24211RJ1946PLC000469

SHRICHAND SHARMA ADVOCATE & NOTARY GURUGRAM 16 DEC 2023

4	To ensure safely collection of residues of chemicals/hazardous & other waste generated from the accident and dispose the same as per provisions of HOWM Rules 2016 under intimation to the Board.
	Total 700 L (approximately) water collected from dyke after mitigation was sent to ETP for further treatment. In addition to this, 2000 Kg of solid waste generated during the incident control activity was collected and disposed off to common facility as per approved disposal method given in CCA. Waste Transfer Slip along with hazardous waste disposal manifest are attached as *Annexure-4.*
5	To adopt adequate safety measures.
	We wish to submit that PI Industries Ltd (PI) is a pioneer and leading global Agri-sciences company of India and one of the largest exporters of agro and fine chemicals from Gujarat State. PI ranks in the top quintile of the global chemical industry for its very high standards on ESG parameters and initiatives for improvement of operational eco efficiency, achieving best in class workplace and Process safety standards. Bromine storage facility is having well designed safety management system which is provided with DCS controls (Flow controls, level controls and temp controls) along with Bromine sensors & alarms, ammonia flooding system and water sprinkler system. Storage facility is also provided with emergency dump tank (no. ST7A0213, 10 KL) and dyke (filled with water) underneath of storage tank to collect the leaks and spills if any. We have all safety equipment including fire tenders (2 nos.), fire hydrant system, 24×7 working Emergency Control Centre (ECC). We have dedicated Emergency Response Team (ERT) to handle the emergency. We conduct emergency drills at regular periodic intervals including in silent hours. Other safety measures which are being carried out at site are mentioned in point No. 2 above.
6	To submit compliance of direction/order/report issued by DISH.
	DISH officers have visited the site post incident. However, we are yet to receive input from DISH office.
7	To pay Rs. 50 Lacs as interim Environment Damage Compensation (EDC) immediately through XGN portal.
	In spite of have best in class infrastructure, safety measures and trained resources, we are pained due to an unfortunate incident and severely aggrieved by the Directions issued by your above referred Order Dtd: 20/9/2023.We are a law abiding organisation and committed to social responsibility and protection of environment, we are depositing the amount of EDC (*Ref: Payment ID- 478722, Transection No. YSBI2088653997, Dated: 25.09.2023*) with all our rights to appeal reserved. A copy of payment receipt herewith attached as Annexure-5.
8	To submit Bank Guarantee (BG) of Rs. 7.5 Lacs for compliance assurance at the time of revocation.
	Original Bank Guarantee (*BG, No 01310100005331*) of Rs. 7.5 Lacs Dated: 22.09.2023 valid up to 30.09.2024 issued from Axis Bank, Issued in favour of Chairman, Gujarat Pollution Control Board, Gandhinagar towards compliance assurance, is attached herewith as *Annexure-6.*
9	This order shall be effective with immediate effect.
	We have noted the point and we assure you to implement this order with immediate effect.

NOTARY GOVT OF INDIA

PI Industries Limited

Annexure - 1

PI Industries Ltd

Inspired by Science

Vendor Code : 100492
GMM PFAUDLER LTD.
Anand Sojitra Road
388325 Anand
GST No : 24AABCG0563A1ZD

Purchase order

PO number/date
4500529993 / 19.09.2023
Your reference: Divyesh
GST DETAIL
GST No. :24AABCP2183M2ZA
PAN :AABCP2183M

Please deliver & invoice to:

PI Industries Ltd... (Manufacturer)
PLOT NO. SPM - 28, STRLING SEZ
AT & PO SAROD, TAL. JAMBUSAR
392180 JAMBUSAR, DIST. BHARUCH

NOTARY
Shaishav Shukla
Gujarat
Regd. No. 18714
GOVT OF INDIA

Terms of delivery: FOR PI Jambusar
Terms of payment: OTHER PAYMENT TERMS AS BELOW
All documents should quote the Purchase Order number & the rate in Invoice should as per the Purchase Order.Test Report, Tax Invoice, Trem Card & MSDS (wherever applicable), should accompany the consignment.
LD Clause : 0.5% per week to max 5% after grace period of 2 weeks.

Payment terms: 90% within 30 days of material receipt & 10% against PBG.
We require an order acknowledgment for the following items:

Sr	Mat.Description Mat.Code GST No	Order Qty. UoM HSN/SAC Code	Price Tax Desc	Net Value
10	TANK MS GLASS LINED 12500LT 94048718 24AABCP2183M2ZA Deliv. date Day 10.10.2023	1 Number 73090090	2,365,000.00 SEZ: A/P: I GST) - 18% (CV)	2,365,000.00

TANK MS GLASS LINED 12500LT

TANK MS GLASS LINED 12500LT for Bromine Appliaction.

Equipment No. ST7A0214 Confirmed
Equipment Service Bromine Storage Bromine Storage
Quantity 1 No. 1 No

PI Industries Limited

In view of the above facts and submissions, we would, once again, very humbly submit that we have a best-in-class safety and environment management system in place at our sites, which ensures the safety of people and the environment

We hope you will find our above compliances in order and to the best satisfaction of the Hon. Board.

Thanking You.

Yours Sincerely,

For, PI Industries Ltd.,

05/10/2023

Authorized Signatory

Encl as above

Cc: The Regional officer, GPCB, Bharuch

NOTARY
GOVT OF INDIA

ATTESTED

6 DEC 2024

SHRICHAND SHARMA
ADVOCATE & NOTARY
GURUGRAM

Annexure-2

HAZOP COVERSHEET			
Circuit No.	01OF 21		
Circuit Description	BROMINE HANDLING SYSTEM		
Design Intention	BROMINE HANDLING SYSTEM		
Raw Materials/ Chemicals	BROMINE		
Drawings	Drg. No. 14004-R-001, Sheet 01 of 21		
Equipment's	ST7A0210/11/13 (10 Kl, MSGL), OP7A 0210/211 (Magnetic driven type pump, PVDF, 5 m3/hr, 28 m Br2 head), OV7A 0211 (MSGL, 0.2 Kl), OV7A 0212 (PP/FRP, 5 Kl), OP7A 0212/213 (PVDF, 10 m3/hr), HE7A 0212 (Graphite, 10 sq m), OC7A 0212 (Pack column, PP/FRP), OB7A 0212/13 (PP/FRP, 500 m3/hr)		
SOP/ WI NO	WI for LIQUID BROMINE ISO TANKER UNLOADING		
Any Other Reference:	Equipment layout , MSDS, SOP, Continuous interlock		
Available Control Schemes	☐ Manual ☐ Hardwiring/PLC ☐ DCS		
Source of Power	Normal: GEB		
	Back Up: DG Set (Manual Startup - 15 Minutes)		
	UPS power: DCS & Field Instruments		
Services	Operating Parameters		
	Temperature (°C)	Pressure (Kg/cm2 a)	Flow rate/ Quantity
Bromine	15 - 20	1.5	8500 L / 26435 Kg (Max)
Notes: 1. DG backup details to be shared (w.r.t. capacity and distribution)			

Name of Participants Amit Shrivastav, Suresh Sharaf, Bhoumik Modi

PI Industries Limited

NOTARY Shrichand Sharma Gurugram Regd. No. 18714 GOVT OF INDIA

ATTESTED

16 DEC 2024

SHRICHAND SHARMA ADVOCATE & NOTARY GURUGRAM

HAZOP WORK SHEET

Circuit No:	01OF 21														
P&ID No:	Drg. No. 14004-R-001, Sheet 01 of 21														
Circuit Intent:	BROMINE HANDLING SYSTEM														
Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Node No:	1															
Node Description:	Stationing of tanker, Connection of Hose pipe (Dia. 50 NB, MOC - SS+PTFE lined braded) from tanker to pump OP7A 0210/211 (PVDF, 5 m3/hr, Magnetic driven type seal-less pump) suction by applying nitrogen (1.5 Kg/cm2g) pressure in tanker & connect the vent of ST7A 0210/0211/0213 to Br scrubber & after tanker unloading release tanker vent to Br2 scrubber via P-7A02525-PV-50-D From tanker unloading point to suction of OP7A 0210/211 (PVDF, 5 m3/hr, Magnetic driven type seal-less pump) via line No. P-7A02501-PV-50-D Tanker unloading activity will be done by manual mode (display in DCS) and day tank makeup activities will be by DCS logic															
Brief:	1. ST7A 0210/211/213 installed on load cell 2. LT-02010/2011/2013 on ST7A 0210/211/213 respectively 3. Insure tanker equipped with the spark arrestor 4. Metallic stoppers blocksare provided. 5. Incorrect movement of tanker & improper positioning of tanker is to be reviewed during PSSR as per final layout. 6. ST7A 0210/ST7A0211 are considered for operation & while ST7A 0213 is considered as emergency tank. 7. ST7A 0210/211/213 Max Filling volume : 85 % 8. Bromine loading & unloading considered from top. 9. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g & tightening shall be verified during water trial which will get verified in PSSR in second stage PSSR during HAZOP verification. Flange protection guard to be provided for all bromine pipeline flanges. 10. Pipeline support system should be as per M/s. George Fisher standards. 11. Vapor space in storage tank : 22% 12. Vapor pressure 0.52 bar @ 40 oC & 0.23 bar @ 20 oC 13. Bromine transfer pipe length from ST7A0210/211/213 to OR7A0201 assumed 200 mtrs 14. Solid PTFE gaskets to be used in all bromine handling lines 15. OP7A0210/11 MOC of pump will be PFA instead of PVDF. 16. OV7A0212 MOC of vessel will be FRVE instead of PP/FRP.															
Leakage from tanker	Incorrect MOC Incorrect thk / wear & tear of tanker leakage from top joints of tanker fittings	Health Hazard Major release to environment	5	5	5	1. Tanker should be pressure vessel MOC - MSGL 2. Periodic testing of tanker 3.Blind flange provided on top of valve 4. Inspection check list before Br2 unloading 5. ISO Tanker 6. Two number of Br2 sensors will be installed in Br2 storage tank area.	5	1	1	Br2 sensors to be installed in tanker positioning area & to be connected to Emergency control panel (DCS room) Secondary Containment plan to be developed	5	1	1		Risk mitigation plan for such emergency scenario to be developed & incorporated in site emergency plan SWP to be prepared for Br2 tanker unloading.	SM

220

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Emissions from tanker	Leakage from tanker fittings / safety mountings	Health Hazard Minor release to environment	2	5	2	1. Tanker should be pressure vessel MOC - MSGL 2. Periodic testing of tanker 3.Blind flange provided on top of valve 4. Inspection check list before Br2 unloading & after unloading 5. ISO Tanker 6. Two number of Br2 sensors	2	3	0	Br2 sensors to be installed in tanker positioning area & to be connected to Emergency control panel (DCS room) Secondary Containment plan to be developed	2	3	0		Risk mitigation plan for such emergency scenario to be developed & incorporated in site emergency plan SWP to be prepared for Br2 tanker unloading.	SM
Leakage	Gasket damaged / Hose failure	Health Hazard Minor release to environment	2	5	2	1. SS+PTFE lined hose will be designed @ 15 Kg/cm2g 2. Br2 sensor alarm AE-02001 / 2 is provided near storage tank.	2	5	2	1. Br2 sensor alarm to be provided near tanker unloading area.	1	4	0		1. SOP to mention " before unloading the bromine both vent valves as well as bromine hose tobe pneumatically tested @ 1 Kg/cm2g" 2. SOP to be mentions that " Every time new solid PTFE gasket to be used during hose connection to tanker for unloading purpose"	JM JM
leakage during hose connection	Poor workmanship during hose connection with tanker nozzle	Health Hazard Minor release to environment	2	5	2	1. SS+PTFE lined hose will be designed @ 15 Kg/cm2g 2. Br2 sensor alarm AE-02001 / 2 is provided near storage tank.	2	5	2	1. Br2 sensor alarm to be provided near tanker unloading area.	1	4	0		1. SOP to mention " before unloading the bromine both vent valves as well as bromine hose tobe pneumatically tested @ 1 Kg/cm2g" 2. SOP to be mentions that " Every time new solid PTFE gasket to be used during hose connection to tanker for unloading purpose"	JM JM

221

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
More pressure	High Nitrogen supply pressure (3.5 Kg/cm2g) due to failure PRV-02001	Health Hazard Minor release to environment	1	5	1	1. Storage tank ST7A0213 design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2. All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001/2 is provided near storage tank area. 4. PT-02014 5. PSV-02006 2 Kg/cm2g considered on nitrogen PRV station. 6. ST7A 0213 vent open to Br2 scrubber	1	2	0							
More pressure	PT-02014 callbration error	Operator get mislead	1	5	1	1. Storage tank ST7A0213 design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2. All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001/2 is provided near storage tank area. 4. PRV-XXX provided for reducing nitrogen pressure from 3.5 to 1.5 Kg/cm2g 5. PSV-XXXX 2 Kg/cm2g considered on nitrogen PRV station. 6.PG provided @ before PRV, after PRV & header of nitrogen line	1	2	0							

NOTARY GOVT OF INDIA

Industries Limited

222

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Less Pressure	Less nitrogen pressure from source / power failure	Pump damage due to dry run	3	4	2	1. Following instruments provide on Nitrogen transfer line PT-02014, PRV-02001, PG-02024/25/22, 2. LS-02005 provided in pump suction line 3. OP7A 0210/211 installed with water pit arrangement.	2	4	1	1. PT-02014 & PG-02022 location of both instruments to be interchanged. 2. OP7A 0210/0211 to be stopped @ 0.7 Kg/cm2g pressure in tanker. (PT-02014 to be interlocked with pump) This interlock will be active only during tanker unloading mode selection.	2	3	0			
Less Pressure	XV-02096 internally pass	More nitrogen along with Br2 vapors release in scrubber, no safety hazards				PCV-02012 interlocked with PT-02012 on OV7A 0211 Manual valve below XV-02096										
More flow	Not possible															
Less flow	Pump failure	Covered in less pressure deviation														
Less flow	Leakage & spillage from pipeline	Health Hazard Minor release to environment	2	5	2	1. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g 2. SS+PTFE lined hose will be designed @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001 / 2 is provided near storage tank. 4. Solid PTFE gaskets to be used in all bromine handling lines	2	3	0							
Less flow	Leakage from glass pot OV7A 0210	Health Hazard Minor release to environment	2	5	2	Hydraulic tested of glass pot 1.0 kg/cm2 Vent of glass pot open to bromine scrubber	2	4	1	1. Mesh arrangement to be provided for the protection of glass pot 2. Pot should be under dyke area (water sump area)	1	4	0			
Reverse flow	Not safety issue															
High Temp.	More vapor temp of bromine due to atm condition (Max 0.46 kg/cm2 @ 45degC)	Covered in more pressure deviation														
Low Temp	Low vapor temp of bromine due to atm condition (0.22kg/cm2 @ 15degC)	No safety hazard														

223

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
High level in tank	LT-02013 calibration error	Overfilling of tank & leading to bromine carryover to scrubber				1. WI-02013 interlocked with OP7A 0210/11 & XV-02104 @ 85 % fill (Approx.)									1. SOP to mention ST7A0213 is to be used in case of Emergency only.	RB
High level in tank	WT-02013 calibration error	Overfilling of tank & leading to bromine carryover to scrubber				1. LT-02013 interlocked with OP7A 0210/11 & XV-02081 @ 85 % fill									1. SOP to mention ST7A0213 is to be used in case of Emergency only.	RB
Low level of tank	Not possible															
Phase - As well as	Cavitation in pump suction line at the end of tanker unloading (N2 along with bromine)	covered in less pressure deviation				Top unloading from tanker & dip pipe upto sump of tanker										
Communication - Part of	During Shift change or responsibility change	No safety hazard														
Else where	XV-2078 open by human error instead of XV-2079	Overfilling of OR0201 to BX Scrubber beyond scrubber capacity. May lead to health hazard	4	4	3	1. Level indication through LT-02010 / WI-02001 on ST7A 0210 & Level indication through LT-02011 / WI-02002 on ST7A 0211 & Level indication through LT-02013 / WI-02013 on ST7A 0213 2. Dedicated supervision during tanker unloading. 3. LT2001 is provided at reactor 4. XV in provided in receiving line of OR0201 and Interlocked with LT of OR7A0201.	4	1	0								

224

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Else where	XV-2105 open by human error instead of XV-2081/2087	Material will fill-up in another tank ST7A0213 which will reamin empty as it is considered as an emergency tank. No safety issue				1. LT702013 is provided on ST7A0213. 2. WT702013 is provided on ST7A0213.				1. XV702105 to be interlocked to close at high level of LT702013 @ 85%.					1. SOP (Bromine tanker unloading) to mention ST7A0213 is to be used in case of Emergency only. 2. SWP to be prepared for transferring of Bromine in Emergency tank ST7A0213 from ST7A0210/0211 and to be displayed near by Bromine tank. 3. Tralning to be conducted for awarness of SWP.	RB RB/JP JP
Mixing	CHW may enter in bromine tank	Overfilling of tank & leading to bromine laden water carryover to scrubber	1	4	0	Design pressure of jacket 6.0 Kg/cm2 MSGL storage vessel										
Mixing	More moisture contain in N2	Moisture increase the corrosion rate	2	4	1	1. Air dryer provided in N2 plant & monitoring of nitrogen dew point 2. Auto moisture separator in N2 line before PRV 3. MSGL tank 4. PVDF pipe line	2	2	0							
More pressure in Tank	XV-02083/2091 fail close due to IA supply failure	Pressurization of tank up to pump discharge pressure+ back pressure of tank due to vapor pressure (2-2.5 kg/cm2) by considering 85% fill level (~5 m Br, equivalent head = 15.5met) & max vapor pressure head=5 met)	1	4	0	1.Storage tank design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2.All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3.PT-02010/2011 in ST7A0210/0211	1	3	0							

225

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Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
More pressure in Tank	Scrubber blower OB7A 0212/213 & OP7A 0212/213 not started by operator	Blower discharge connected to common plant acidic general scrubber. More load on acidic general scrubber	2	5	2	1.Storage tank design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2.All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3.PT-02010/2011 in ST7A0210/0211	2	4	1	1. Interlock to be providede in such a way that When OB7A 0212/0213 and OP7A212/013 will start then only OP7A 0210 / 0211 can be started.	2	3	0			
More pressure in Tank	Scrubber not generating vacuum	Blower discharge connected to common plant acidic general scrubber. More load on acidic general scrubber	2	5	2	1.Storage tank design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2.All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3.PT-02010/0211 in ST7A0210/0211 4. PCV-02012 will be interlocked with PT-02012 to maintain vacuum more than 50mmwc in catch pot OV7A 0211	2	3	0							
Compatibility	Column outlet line to blower incompatiable with bromine	Leakage of column outlet line, Leads to health hazard	3	4	2	1. PCV-02012 will be interlocked with PT-02012 to maintain vacuum more than 50mmwc in catch pot OV7A 0211	3	3	1	Column outlet line MOC to be changed from MSHDPE to MSPTFE or PVDF	3	2	0			
Leakage from tank & top nozzles	Incorrect MOC Incorrect thk / wear & tear of tank leakage from top joints of tank fittings, body of tank	Health Hazard Major release to environment	5	5	5	1. Tank should be pressure vessel MOC - MSGL 2. Periodic testing of tank 3. Two number of Br2 sensors will be installed in Br2 storage tank area. 4. Under ground water pit provided to accommodate 17 Kl of Br2 with 500 mm of water layer above 17 Kl Br2. 5. Ammonia spray system is provided to detect bromine leakage. 6. Water sprinkler system provided. 7. Emergency storage tank (MSGL, 10 Kl) provided. 8. Br2 detectors with alarm provided near storage tanks.	3	1	0							

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Others - pressurization of tanker	Release of tanker nitrogen+Br2 vapors pressure to scrubber after completion of tanker unloading	More load on secondary general acidic scrubber	2	5	2	PCV-02012interlocked with PT-02012 on OV7A 0211 to maintain XX mmwc vacuum	2	4	1	Interlock to be provided, XV-02096 open only when OB7A 0212/213 in operation	2	3	0			
Instrument air failure	XV-02095 fail close	No safety hazard as there will no flow of nitrogen to tanker.														
Instrument air failure	XV-02096 fail close	Valve is used @ end of tanker unloading process for release of Br2 vapor to scrubber, minor release of Br2 vapors to atm if hoses disconnected without depressurizing	2	4	1	1. SOP mentions that " before disconnecting of tanker hose pipe, pressure inside tanker should be atm"	2	3	0							
Instrument air failure	XV-02073/74/76/77/80/86/104 fail close	Covered above in less flow (In same node)														
Instrument air failure	XV-02071/72 fail close	Pipeline & tanker will reach to nitrogen pressure leading to leakage	2	5	2	1.All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 2. Tanker should be pressure vessel MOC - MSGL 3. Periodic testing of tanker 4. ISO Tanker	2	3	0							
Instrument air failure	XV-02079/81/87/2105 fail close	Pump discharge line will pressurize upto pump shutoff pressure & leads to leakage from pipeline & pump failure	5	4	4	1. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g 2. SS+PTFE lined hose will be designed @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001 / 2 is provided near storage tank. 4. Solid PTFE gaskets to be used in all bromine handling lines 5. Pumps installed above water pit sump	3	3	1	1. Interlock to be provided in such a way that XV02079 will open only if any one XV out of XV02081/87/105 is opened. 2. XV-02079 interlocked with OP7A 0210/211	3	2	0			
Instrument air failure	PCV-02012 fail open	No pressurization in ST7A 0210/11. Hence no safety issue														
Node No:	2															

227

Deviation	Cause	Consequences	Before SG S	Before SG L	Before SG R	Safeguards (IPAP)	After SG S	After SG L	After SG R	Recommendation for RR (IPAP)	After RR S	After RR L	After RR R	Comments	Actions	FPR
Node Description:	Br2 transferring from ST7A 0210/211(MSGL, 10 Kl) to OR7A0201 (25 KL, MSGL) via magnetic driven pump OP7A 0210/211 (5000 L/hr) by applying nitrogen (1.0 Kg/cm2g) pressure in ST7A 0210/11 & transfer through FT-02006 and FT-02007 via line no P-7A-02063-PV-40-D From XV-02084/02089 to OR7A0201 through FT-02006 and FT-02007 (in series) via line no P-7A-02063-PV-40-D.															
Brief:	1. ST7A 0210/211/213 installed on load cell 2. LT-02010/2011/2013 on ST7A 0210/211/213 respectively 3. ST7A 0210/0211 is considered for operation & while ST7A 0213 is considered as emergency tank. 4. ST7A 0210/211 Max Filling volume : 85 % 8. Bromine unloading considered from top. 9. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g & tightening shall be verified during water trial which will get verified in PSSR in second stage PSSR during HAZOP verification. Flange protection guard to be provided for all bromine pipeline flanges. 10. Make of PVDF pipe - M/s. George Fisher 11. Pipeline support system should be as per M/s. George Fisher standards. 12. Vapor space in 10 Kl storage tank : 22% 13. Vapor pressure 0.52 bar @ 40 oC & 0.23 bar @ 20 oC 14. Property & compatibility related references taken from Bromine safety Handbook by DSBG 15. Bromine transfer pipe length from ST7A0210/211/213 to OR7A0201 assumed 200 mtrs 16. Bromine line bellow MOC - PTFE 17 Solid PTFE gaskets to be used in all bromine handling lines															
Leakage	Gasket damaged in pump suction line Line No. P-7A02510-PV-40-D	Health Hazard Minor release to environment	2	5	2	1. All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 2. Br2 sensor alarm AE-02001/2 is provided near storage tank area. 3. Solid PTFE gaskets will be used for Br2 handling pipelines. 4. Flange guards provided on bromine handling lines. 5. Under ground water pit provided to accommodate 17 Kl of Br2 with 500 mm of water layer above 17 Kl Br2.	1	4	0						Emergency action plan with safe auto shutdown mode to be prepared upon operator communication to DCS operator.	SS/JP

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228

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
More pressure in ST7A 0210/0211	High Nitrogen supply pressure (3.5 Kg/cm2g) due to failure PRV-02001	Health Hazard Minor release to environment	1	5	1	1. Storage tank design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2. All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001/2 is provided near storage tank area. 4. PT-02014 5. PSV-02006 with set pressure of 2 Kg/cm2g considered on nitrogen PRV station. 6. logic provided to ensure reactor vent open before receiving of bromine	1	2	0							
More pressure in ST7A 0210/0211	XV-02084/02089 fail close / chocking of scrubber	Maximum 1 Kg/cm2g pressure develop in ST7A 0210/0211 hence no safety hazard														
More pressure in ST7A 0210/0211	PT-02010/02011 calibration error	Operator get mislead	1	5	1	1. Storage tank design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2. All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001/2 is provided near storage tank area. 4. PRV-02001 provided for reducing nitrogen pressure from 3.5 to 1 Kg/cm2g 5. PSV- 02006 with set pressure of 2 Kg/cm2g considered on nitrogen PRV station. 6.PG provided @ before PRV, after PRV & header of nitrogen line	1	2	0							

229

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
More Pressure on pump	Pump discharge line manual valve in closed condition	Pump discharge line will pressurize upto pump shutoff pressure & leads to leakage from pipeline	5	5	5	1. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g 2. Br2 sensor alarm AE-02001 / 2 is provided near storage tank. 3. Solid PTFE gaskets to be used in all bromine handling lines 4. Pumps installed above water pit sump	3	4	2	1. SOP to mention " before Br2 transferring startup, supervisor ensure that pump discharge manual valve is in open condition"	3	3	1			
Less Pressure in ST7A 0210/0211	Less nitrogen pressure from source / power failure	Pump damage due to dry run	2	4	1	1. Following instruments provided on Nitrogen transfer line PRV-2001, PG 2. LS-2005 provided in pump suction line and intrlocked with pump. 3. OP7A 0210/211 installed with water pit arrangement. 4. PT-02010/02011 on ST7A 0210/0211 5. OP7A 0210/0211 are intrlocked to stopped @ 0.7 Kg/cm2g pressure in tank. (PT-02010/02011 to be interlocked with pump) This interlock will be active only during tank unloading mode selection.	2	2	0							
Less Pressure in ST7A 0210/0211	XV-02083/02091 internally pass	More nitrogen along with Br2 vapors release in scrubber, no safety hazards				1. PCV-02012 interlocked with PT-02012 on OV7A 0211				1. Logic to be provided, If XV-02082/02090 will be open that XV 02083/02091 will remain closed						
More flow	Not possible															
Less flow	Pump failure	Covered in less pressure deviation														

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Less flow	Leakage & spillage from pipeline	Health Hazard Minor release to environment	2	5	2	1. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g 2. SS+PTFE lined hose will be designed @ 15 Kg/cm2g 3. Br2 sensor alarm AE-02001 / 2 is provided near storage tank. 4. Solid PTFE gaskets to be used in all bromine handling lines	2	3	0							
Reverse flow	Not possible, No safety issue (Dip pipe of bigger size 100-150 NB is provided in reactor)															
High Temp. in ST7A 0210/0211	More vapor pressure of bromine due to atm condition (Max 0.46 kg/cm2 @ 45degC)	Covered in more pressure deviation				1. Chilled water utility provision done in ST7A 0210/0211 jacket. 2. PT02015/16 & TI-02012/11 provided on CHWS/R header in Br2 storage area 3. TI-02008 provided on ST7A 0210										
High Temp. in ST7A 0210/0211	CHW utility failure from source	More vapor pressure of bromine due to atm condition (Max 0.46 kg/cm2 @ 45degC), No safety issue				1. Cold insulation provided to ST7A 0210/211										
Low Temp in ST7A 0210/0211	Low vapor temp of bromine due to atm condition (0.22kg/cm2 @ 15degC)	No safety hazard														
Low Temp in ST7A 0210/0211	Low Temp of supply utility (CHW 10 0C)	bromine freezing point -7.3 oC, No safety hazard														

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Phase - As well as	Cavitation in pump suction line at the end of tank unloading (N2 along with bromine)	Dry run of pump	2	5	2	1. LS-2005 provided in pump suction line & trip OP7A 0210/0211 2. OP7A 0210/211 installed with water pit arrangement. 3. ST7A 0210/0211 LT-02010/0211 to be interlocked with OP7A 02 10/211 @ low level (1000 lit volume)	2	3	0							
Communication - Part of	During Shift change or responsibility change	No safety hazard				1. SOP mentions to be that " Br2 transfer activity should be fall during shift change of transfer handling supervisor)										
Else where	XV-2079 open by human error instead of XV-2078	Material will fill-up in another tank ST7A0213, No safety issue				XV-02105 provided in transferring line from OP7A 0210/211 to ST7A 0213										
More pressure in OR7A0201	XV-02046 in vent close	Pressurization of reactor up 0.1 + back pressure of bromine due to vapor pressure in reactor = 0.5-0.6 kg/cm2 max. No safety issue				1.Reactor design pressure @ 6 Kg/cm2(g) & Hydro test pressure 6 Kg/cm2g 2.All Br2 handling pipelines will be PVDF & hydro tested @ 15 Kg/cm2g 3. Reactor system pneumatic at 1.0 kg/cm2										
Others - pressurization of ST7A 0210/0211	Release of tank nitrogen+Br2 vapors pressure to scrubber before tank loading	More load on secondary general acidic scrubber	2	5	2	1. Interlock is provided to close PCV702012 if PT702012 on OV7A 0211 is >-3.5 mmHg.	2	4	1	1. Interlock to be provided XV-02096 open only when OB7A 0212/213 in operation	2	3	0			
Instrument air failure	XV-02082/90/ 2107 fail close	No safety hazard as there will no flow of nitrogen to tank.														
Instrument air failure	XV-02083/91/ 2108 fail close	Covered above in more pressure in tank (In node 1)														
Instrument air failure	XV-02075/76/77/84/89 /2106 fail close	Covered above in less flow (In node 1)														

232

Deviation	Cause	Consequences	Before SG			Safeguards (IPAP)	After SG			Recommendation for RR (IPAP)	After RR			Comments	Actions	FPR
			S	L	R		S	L	R		S	L	R			
Instrument air failure	XV-02078/02032 fail close	Pump discharge line will pressurize upto pump shutoff pressure & leads to leakage from pipeline.	5	4	4	1. All pipelines & system shall be Hydro / pneumatically tested @ 15 Kg/cm2g 2. Following Bromine sensors provided at: 1. Bromine storage area 2. BX reactor ~~Day tank~~ 3. Bromine Scrubber area **(Detectors configured with DCS & @ 0.1 ppm alarm will be on DCS & 0.2 PPM alarm will be safety beacon.)** 3. Solid PTFE gaskets to be used in all bromine handling lines. 4. Logic sequence control for charging of bromine from tank farm to reactor and all related XVs in line will be operated through sequence. 5. XV-02078 to be interlocked with XV-02032. 6. XV-02078 interlocked with OP7A 0210/211	4	1	0							

233

Annexure-3

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DOC ID NO : F:EMS:SYS:52	PROCEDURE REF : P:EMS:SYS:19	
REVISION NO: 00	REVISION DATE :	
Investigation Report –Process Safety Event		
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1	**Process Safety (PS) Incident /Category**	**Process Safety Incident / Tier-I**	**Location/Site**	~~PN01/PN02~~/**JMB**/~~UDR~~
			Date & Time of Accident	23/08/20203, around 13:00 hrs.
2	**Incident Title**	Release of Bromine		
3	**Plant & Area**	MPP-06, Liquid Bromine Storage Tank		
4	**Incident description**	Release of Bromine from the dish end of horizontal Liquid Bromine storage Tank.		
5	**Injured or exposed person(s)/ Designation**	28 persons sent for medical observation only as precautionary measure.	**Category of employee/ worker**	Employees / Workers

6	**Category of Process Safety Hazard/Risk involved in incident**	Toxic Material release	X	Thermal decomposition	-	Electrostatic hazards	-
		Fire (Flash/Pool/Jet/ Combustion)	-	Runaway reaction	-	Pressure hazards (Over/under-pressure)	-
		Explosion (Deflagration/ Detonation/UnCV CE/CVCE/BLEVE)	-	Dust explosion (Primary Dust explosion/Secondary dust explosion)	-	Structure or building collapse	-
		Reactivity (Instability)	-	Corrosively	-	Loss of Primary Containment (LOPC)	X
		Safety Interlock inoperative/ bypassed	-	Activation of Safety Critical Interlock	-	Operation of Rupture Disc/ PSV	-
		Failure of lifting/ rigging equipment		Fall of equipment/ vessel etc.	-		
7	**Type of control on process/ operation/ activity involving the incident**	Manual handling		-	DCS operation		X
		Manual operation		-	PLC operation with manual intervention		-

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REVISION NO: 00	REVISION DATE :	
Investigation Report –Process Safety Event		
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8	**Stage/status of process/operation during the incident**	Normal process/ operation	X	Commissioning	-	Maintenance/ Inspection/ Testing	-
		Start-up	-	Trouble shooting	-	Cleaning or decontamination	-
		Shut-down	-	Trial	-	Emergency shut-down	-
9	**Type of operation/activity involving incident**	Loading/Unloading	-	Initial work-up	-	Final work-up	-
		Transferring	-	Reaction	-	Packaging	-
		Warehousing / Storage	X	Recovery	-	Waste management	-
10	**Name of supervisor/ operator responsible for the associated activities**	Mr. Chintan Kumar Patel, Shift In-Charge, MPP-6 Mr. Prerak E Peters, Plant In-charge, MPP-6 Mr Nirankar Singh, Manager- Engineering, MPP-6					
11	**Name of the Witnesses of incident**	Mr. Jwalant Patel, Head, Manufacturing Mr. Vasant L Sojitra , Head, Engineering Mr. Navin Gautam, Head, Work Place Safety Mr. Harshal Bherulal Solanky, Site Lead, Work Place Safety Mr. Chetan Suthar, Plant Head, MPP-6 Mr. Prerak E Peters, Deputy Plant Head, MPP-6					
12	**Names of persons interrogated for investigation**	Mr. Chetan Suthar, Plant Head, MPP-6 Mr. Dharmesh Patel, Tank Farm, Assistant Executive Mr. Sudhir Upadhyay, Tank Farm, Officer. Mr. Jwalant Patel, Head, Manufacturing Mr. Vasant L Sojitra , Head, Engineering Mr. Chintan Kumar Patel, Shift In Charge, MPP-6 Mr. Prerak E Peters, Plant In-charge, MPP-6 Mr Nirankar Singh, Maintenance Manager, MPP-6					
13	**Name of the team members involved in investigation**	Mr. Ravi Vidiyala (Head-Process Safety) – Team Leader Mr. Kamlesh Bachubhai Mehta, (Head-Technical Services) Mr. Ajit Pal Singh, (Head, EHS) Mr. Ankush Nagori (Head, Engineering-PN01) Mr. Nilkanth Raval, (Production Head, MPP-10)					
14	**Incident description**	On 23rd August, 20203 at 13:00 hrs, Bromine leaked from the Dish end of the bromine storage tank (ST7A0211).					

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REVISION NO: 00	REVISION DATE :	
Investigation Report –Process Safety Event		
Controlled, if Stamped in red	COPY NO.	PAGE 3 OF 07

15	**Sequence of activities/chronology of activities**	a) On 23/08/23 at 12.53 Hrs, beacon alarm received for bromine detection in DCS control room. Refer **Annexure – I** for DCS records of Bromine Detectors. b) DCS operator informed shift in charge about activation of bromine detector located at bromine tank area. c) Shift in charge immediately informed the plant manager. d) The Plant manager along with Manager – Engineering (MPP-06) reached the bromine storage area to ascertain the location for leak of bromine. Dropwise leakage was observed from the insulation of the tank ST7A211 and the same was contained within the dyke filled with water. e) The Plant manager, immediately, initiated the transfer of Bromine from (ST7A0211) to Bromine Emergency Tank (ST7A213). f) Shift In-Charge Immediately cordoned off the area and started Water sprinkler and ammonia sprinkler systems. g) While the transfer was in progress, at around 13:10 hrs., bromine leak aggravated. h) Additional Fire Water curtains were laid by the Site Emergency Response Team members to contain the bromine fumes. i) Manufacturing Head reached the site, assessed the situation and informed ECC to: i. Initiate alert siren and subsequent announcement in PA system for evacuation. ii. Communicate to all plant managers to initiate safe shutdown of plants. j) At around 13:18 Hrs., some amount of liquid brome leaked in the area. k) Liquid Bromine leak subsided by 13:20 Hrs. l) Residual traces of Bromine continued to be detected by Bromine sensors till 15:08 Hrs. Subsequently, situation continued to be assessed by leadership as per Emergency response plan and all clear siren was declared at 15:10 hrs. m) The production operations were resumed at 15.45 Hrs. **Additional Observations** a) As part of periodic preventive maintenance (PM) program of storage tank (ST7A0211), the PM was conducted in May, 2023 as per the defined protocol and check list, which included Jacket Hydro testing at 3.5 Kg/Cm2, Glass line Thickness testing and spark test at @ 5KV. b) Bromine contaminated water collected within the dyke area disposed to GPCB approved vendors after suitable treatment

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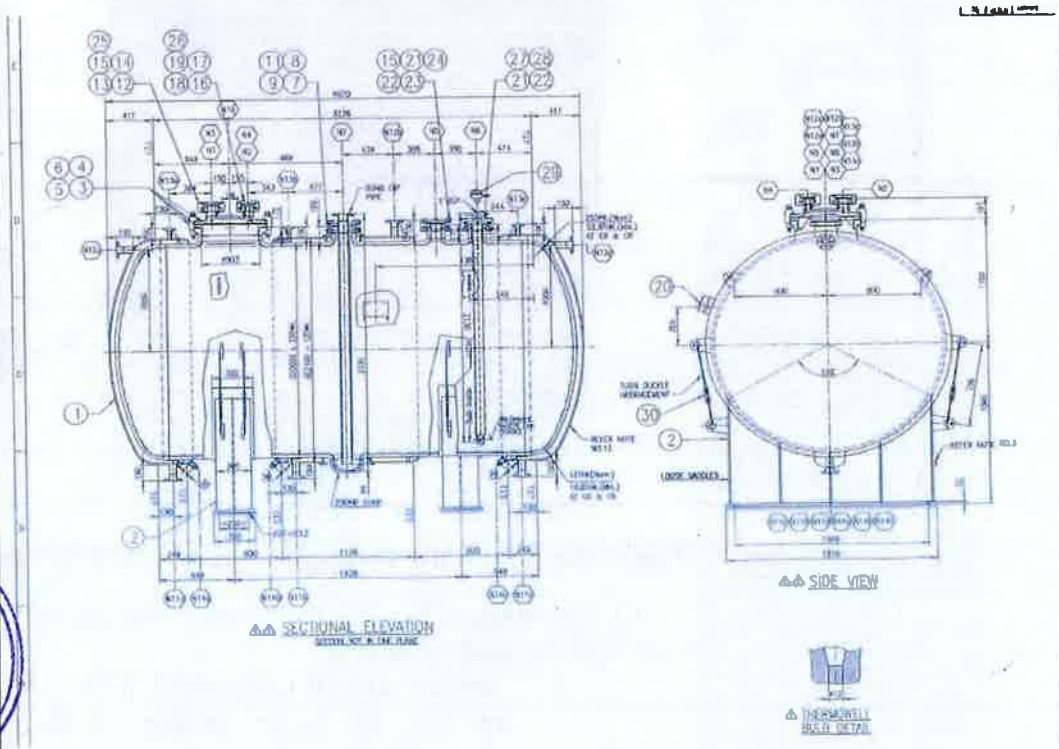
DOC ID NO : F:EMS:SYS:52	PROCEDURE REF : P:EMS:SYS:19	
REVISION NO: 00	REVISION DATE :	
Investigation Report –Process Safety Event		
Controlled, if Stamped in red	COPY NO.	PAGE 4 OF 07

c) Details of the Leak was communicated to all external stakeholders.

16 Analysis

a) Details of Bromine Storage Tank (ST7A0211), Capacity 10 KL, Material of Construction MS Glass Lined, was installed in June, 2015 by OEM, "De Dietrich Process Systems". The tank is provided with Jacket having chilled water circulation. Refer **Annexure – II** for detailed GAD.

GAD of Bromine Storage Tank



b) The Storage Tank Design is in conformance to the requirements of ISO 28721-1, Vitreous and porcelain enamels — Glass-lined apparatus for process plants and ASME standards. Refer **Annexure III** for Factory Acceptance Test Report.

c) The last inspection and testing was carried out in month of May, 2023. The thickness (mm) of glass lining was observed in the range 1.5 MM to 1.8 MM. The thickness at the time of FAT in 2015 was 1.22 MM to 1.94 MM. *As per the ISO 28721-1*, the acceptable range of glass lining thickness is 1.0 MM to 2.0 MM.

d) Post Incident, the tank was decontaminated and on inspection, the glass lining thickness was observed 0.6 MM near to the point of leak

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and thickness at other various locations was observed within the acceptable range i.e, more than 1 mm.

e) The inspection records of 2019 and 2021 were reviewed and the glass lining thickness was observed more than 1.1 MM.

f) In all the past inspection records, no deviation observed in glass lining thickness, spark test, Jacket Hydro test and visual inspection was noted.

g) Photograph of Tank Failure

The following are the probable cause of tank failure:

h) Corrosion: The following are the probable types of corrosion which could lead to failure:

i. **Jacket space corrosion**: After reviewing the past inspection records for hydro testing of the jacket, **the jacket space corrosion is ruled out as there was no deviation recorded.**

ii. **Corrosion by acids**. The bromine sample from the tank was analyzed for fluorides and it was observed that fluorides were not present. **Hence, Glass lining corrosion due to HF acids is ruled out.**

i) Impact and /or fluctuations in operating parameters

i. The Storage tank has not been subjected to any external impact / relocation since tank commissioning and **hence, failure of Glass lining due to physical impact is ruled out.**

ii. The operating data for last six months were reviewed and it is observed that there are no abnormal temperature and pressure

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DOC ID NO : F:EMS:SYS:52	PROCEDURE REF : P:EMS:SYS:19	
REVISION NO: 00	REVISION DATE :	
Investigation Report –Process Safety Event		
Controlled, if Stamped in red	COPY NO.	PAGE 6 OF 07

		excursions observed in DCS records. **Hence, failure of glass lining due to mechanical / Thermal stress is ruled out.** j) **Manufacturing / Fabrication defects**. i. Reduction of Glass lining thickness was observed within the 250 mm radius of the point of failure and it was below 1 mm. The Glass lining thickness at other various locations was observed within the acceptable range i.e, more than 1 mm. ii. Further possibilities to identify the reason for manufacturing/fabrication defect being explored through technical discussion with OEM.
17	**Root cause**	Based on the analysis of Point 16 (h), Point 16 (i), Point 16 (j) and Inspection and test records, the most probable cause for failure of the Tank could be attributed to Manufacturing / Fabrication defect at the point of the leakage. This probable cause is further being investigated by conducting metallurgical studies by an external expert.

18	**Recommendations to prevent reoccurrence:**	**Recommendation impact category** (Elimination/ Prevention/ Protection/ Mitigation/ Response)	**FPR**	**Target Date**
1.	Existing bromine storage tanks (ST7A210) and Emergency Tank to be re - inspected by competent external inspection agency for healthiness of the Tanks	Prevention	Vasant L Sojitra	25/10/2023
2.	The bromine sensor will be provided in the Jacket space for the early detection of bromine leakage if any from the shell side.	Response	Vasant L Sojitra	30/12/2023
3.	To conduct the inspection by an external expert and carry out various metallurgical studies for identifying the probable causes for tank failure (ST7A211).	Prevention	Vidiyala Ravi	15/10/2023
4.	To review and revise the existing Inspection and Test Plan of Bromine storage Tanks as per the Global standards and codes.	Prevention	Vasant L Sojitra	30/10/2023

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REVISION NO: 00	REVISION DATE :	
Investigation Report –Process Safety Event		
Controlled, if Stamped in red	COPY NO.	PAGE 7 OF 07

18	Recommendations to prevent reoccurrence:	Recommendation impact category (Elimination/ Prevention/ Protection/ Mitigation/ Response)	FPR	Target Date
5.	To review the design of Installation of Bromine Storage Tank and Transfer systems as per the global standards by an external expert.	Prevention	Rakesh Tyagi	30/11/2023
6.	Review of Emergency handling system (Sprinklers, Ammonia, Dyke, Bromine evacuation etc) provided for the Tanks to handle bromine leakage.	Mitigation	Vidiyala Ravi	30/10/2023
7.	Review of HAZOP and strengthen the operating SOPs for safe unloading, storage, transferring of Liquid Bromine	Prevention	Vidiyala Ravi	20/10/2023

Signature of Team Members involved in investigation:

Name	Department	Signature	Name	Department	Signature
Vidiyala Ravi	EHS				
Kamlesh Bachubhai Mehta	Technical Services				
Ajit Pal Singh	EHS				
Ankush Nagori	Engineering				
Nilkanth Raval	Production				

Prepared By: Ravi Vidiyala
(Investigation Team Leader)
Dated: 20/09/2023

Approved By:

Note: (1) Put X (Cross) in appropriate boxes

	Signature	Date
Prepared By: MR&A		
Approved By: Location Head		

ATTESTED
SHRICHAND SHARMA
ADVOCATE & NOTARY
GURUGRAM
16 DEC 2024

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Annexure – I

DCS records of Bromine Detectors.

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Regn. No. 16714

			AI7A02001.PV	AI7A02002.PV	AI7A02013.PV
			BROMINEGAS DETE, TANK	BROMINEGAS DETEC PUMP	BR2 GAS DETECTOR
			0	0	0
			10	10	10
			1	1	1
			PPM	PPM	PPM
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23-08-2023	23-08-2023	12:29:16 India Standard Time	-0.5	-0.2	-0.1
23-08-2023	23-08-2023	12:30:16 India Standard Time	-0.5	-0.2	-0.1
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23-08-2023	23-08-2023	12:33:16 India Standard Time	-0.5	-0.2	-0.1
23-08-2023	23-08-2023	12:34:16 India Standard Time	-0.5	-0.2	-0.1
23-08-2023	23-08-2023	12:35:16 India Standard Time	-0.5	-0.2	-0.1
23-08-2023	23-08-2023	12:36:16 India Standard Time	-0.5	-0.2	-0.1
23-08-2023	23-08-2023	12:37:16 India Standard Time	-0.5	-0.2	-0.1
23-08-2023	23-08-2023	12:38:16 India Standard Time	-0.5	-0.2	-0.1
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23-08-2023	23-08-2023	12:41:16 India Standard Time	-0.5	-0.1	-0.1
23-08-2023	23-08-2023	12:42:16 India Standard Time	-0.5	-0.2	-0.1
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23-08-2023	23-08-2023	14:37:16 India Standard Time	10	8.6	-0.1
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23-08-2023	23-08-2023	14:43:16 India Standard Time	10.2	9.8	-0.1
23-08-2023	23-08-2023	14:44:16 India Standard Time	10.2	9	-0.1
23-08-2023	23-08-2023	14:45:16 India Standard Time	10.2	9	-0.1
23-08-2023	23-08-2023	14:46:16 India Standard Time	10.2	9	-0.1
23-08-2023	23-08-2023	14:47:16 India Standard Time	10.2	9	-0.1
23-08-2023	23-08-2023	14:48:16 India Standard Time	10.2	9	-0.1
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23-08-2023	23-08-2023	14:50:16 India Standard Time	10.2	9	-0.1
23-08-2023	23-08-2023	14:51:16 India Standard Time	10.2	9	-0.1
23-08-2023	23-08-2023	14:52:16 India Standard Time	10.2	9.8	-0.1
23-08-2023	23-08-2023	14:53:16 India Standard Time	10.2	9.8	-0.2
23-08-2023	23-08-2023	14:54:16 India Standard Time	10.2	9.1	-0.2
23-08-2023	23-08-2023	14:55:16 India Standard Time	10.2	10.1	-0.2
23-08-2023	23-08-2023	14:56:16 India Standard Time	10.2	2.4	-0.2
23-08-2023	23-08-2023	14:57:16 India Standard Time	10.2	3.6	0
23-08-2023	23-08-2023	14:58:16 India Standard Time	10.2	5.7	-0.1
23-08-2023	23-08-2023	14:59:16 India Standard Time	10.2	3.8	-0.1
23-08-2023	23-08-2023	15:00:16 India Standard Time	10.2	4.9	-0.1
23-08-2023	23-08-2023	15:01:16 India Standard Time	10.2	3.3	-0.1
23-08-2023	23-08-2023	15:02:16 India Standard Time	10.2	5.6	-0.1
23-08-2023	23-08-2023	15:03:16 India Standard Time	10.2	5.3	-0.1
23-08-2023	23-08-2023	15:04:16 India Standard Time	10.2	6.2	-0.2
23-08-2023	23-08-2023	15:05:16 India Standard Time	10.2	8.2	-0.2
23-08-2023	23-08-2023	15:06:16 India Standard Time	10.2	3.1	-0.2
23-08-2023	23-08-2023	15:07:16 India Standard Time	10.2	9.7	-0.2
23-08-2023	23-08-2023	15:08:16 India Standard Time	0	2.3	-0.2
23-08-2023	23-08-2023	15:09:16 India Standard Time	0	0	-0.2
23-08-2023	23-08-2023	15:10:16 India Standard Time	0	0	-0.1

NOTARY GOVT OF INDIA

P Industries Limited

Annexure – II

Detailed GAD – Bromine Storage Tank

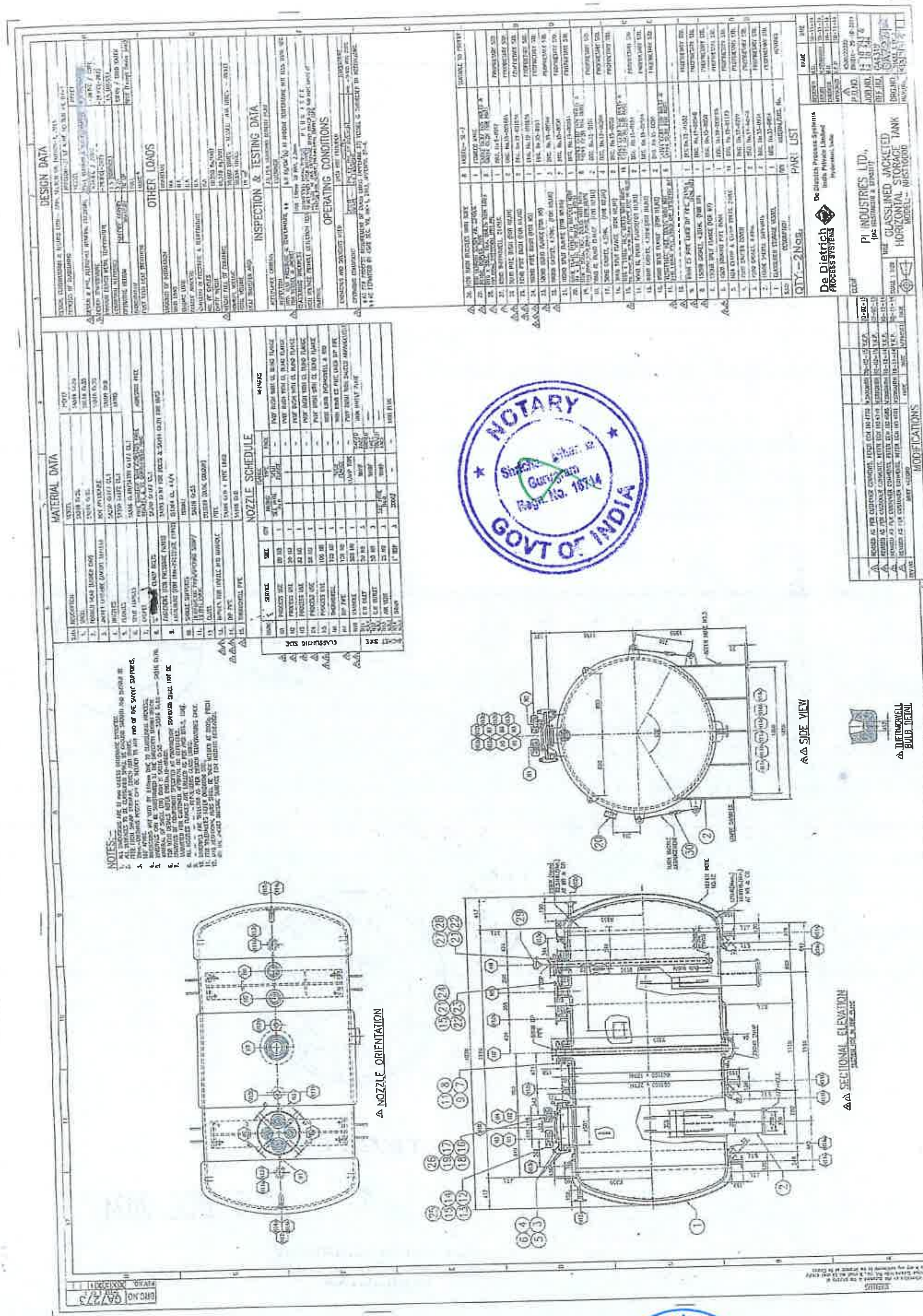
PI Industries Limited

NOTARY
Shri Chand Sharma
Gurugram
Regn. No. 18714
GOVT OF INDIA

ATTESTED

6 DEC 2024

SHRICHAND SHARMA
ADVOCATE & NOTARY
GURUGRAM



NOTARY Govt of India (stamp)

PI Industries Limited (stamp)

Annexure – III

Factory Acceptance Test Reports

PI Industries Limited

NOTARY
Gurugram
GOVT OF INDIA

VISIT REPORT

TUV Control No.:	8111860404	Branch: Hyderabad	Report No:01\060515
DEC/PMC Name(if any)	-----	DEC Assignment number (If applicable):	-----
Client :	M/s.PI Industries, Jambusar	Project:	MPP-6 & MPP-7 Plant
Vendor Name and Sub vendor name(if applicable) :	M/s. De Dietrich Process Systems India Pvt Ltd.	Client's PO No.(on vendor)	4510095261 / C393, Dt.17/05/2014.
Vendor's PO No. on sub vendor(if applicable):	----	Place of Inspection:	Hyderabad.
Inspection Call Received On:	05-05-2015	Inspection Date:	06-05-2015

Stage of Inspection:

☐Kick off/Pre – Inspection meeting	☐Material Identification	☐Interim stage
☐ Document review	☑Final	☐ Re-inspection

Sr. No	P. O. Mat. no.	Item Description	PO quantity	Quantity offered	Remarks
60	94000421	Tank M S Glass Lined, Capacity - 10000 LT, Tag No: ST7A0311	01 No's	01 No's	---

Reference Documents:

S.No	Document Title	Vendor document no.	Client Document no.	Approval Status
01	Drawing	GA7274 Rev-4	------	Approved with Comments
01	QAP/ ITP	NQP/STD/01/135 Rev.0, Dt: 01-12-2014	------	Approved with Comments

Inspection Activities carried out:

1) Visual and Quantity are verify as per P.O and found satisfactory.
2) Checked dimensions and found Acceptable Reports attested for records.
3) Witnessed the tank and jacket hydrostatic test as per the drawing - Found Acceptable Reports attested for records.
4) Witnessed the Glass liner thickness & Spark tests as per the drawing - Found Acceptable Reports attested for records.
5) All Measuring Instruments/ Equipment Were Verified For Continued Suitability For Intended Use, Proper Identification And Maintenance And Calibration Status & Found Satisfactory.

NOTARY Gurugram Regn. No. 10714 GOVT OF INDIA

All measuring instruments/ equipment were verified for continued suitability for intended use, proper identification and maintenance, calibration status, traceability to national standards & found satisfactory.

Disclaimer: This issue of inspection report does not relieve the supplier / manufacturer from their responsibility towards the client to supply the item(s) concerned in full compliance with requirements of its order specification.

Distribution list: ☐ Client ☐Vendor ☐ TUV Branch

PI Industries Limited

TÜV INDIA
TUV NORD GROUP

VISIT REPORT

Conclusion (Accepted/Accepted with comments/Rejected):	
Accepted offered tank (Final painting to be done)	
Identification of inspected item/equipment:	
• TUV hard punch on the Mfr's name plate of the receivers.	
Areas of concern:	
• Final painting to be done and reports to be submitted for review as per QAP. • Drawings & Quality plan Reviewed – Approved by customer with comments, Comments incorporated Drawings & Quality plan final approval to be obtained.	
Non Conformities raised(if any) (mention NCR no's):	
--------NIL-------	
Attachments (Vendor records, NCR's, Deviation requests etc.):	
• Stage witness Inspection reports	
Name of inspector : Kumar. PVNH	Date: 06-05-2015 06/05/15 De Dietrich Process Systems India Pvt. Ltd. Hyderabad 500 076. Nacharam
Signature & TUV stamp: Technical Inspection Services TUV TUV India	Vendor signature & stamp(where applicable):

NOTARY
Shrichand Sharma
Gurugram
Regn. No. 18714
GOVT OF INDIA

PI Industries Limited

All measuring instruments/ equipment were verified for continued suitability for intended use, proper identification and maintenance, calibration status, traceability to national standards & found satisfactory.

Disclaimer: This issue of inspection report does not relieve the supplier / manufacturer from their responsibility towards the client to supply the item(s) concerned in full compliance with requirements of its order specification.

Distribution list: ☐ Client ☐Vendor ☐ TUV Branch

De Dietrich PROCESS SYSTEMS	FACTORY ACCEPTANCE TEST REPORT	ISO 9001 : 2008 CERTIFIED BY IRQS Sheet: 1 of 2

Customer: PI INDUSTRIES LTD.,	P.O.No. : 4500222385 Date : 29-10-2014.
Job No. : 1410244 (TAG No. ST7A0311)	Drg. No. : GA 7274 Rev. 4
Equipment Model : NHST, CSGL Jacketed Horizontal Storage Tank. Capacity : 10000 Ltrs	Quality Plan : NQP/STD/01/135, REV.1

Measurement of critical parameters are made with calibrated instruments as per details given

1	Scope of supply:				
1.1	Type of Agitator		NA		
1.2	Type of Thermo well / Baffle		Thermo well with RTD		
1.3	Motor	Make : NA	HP : NA	S. No. NA	
1.4	Gear Box	Make: NA	Ratio : NA		
		Model: NA	S. No. NA		
1.5	Speed Variator	Type: NA	Make: NA	S. No. NA	
		Model: NA			
1.6	Stuffing Box / Mechanical Seal	Make : NA	Drg. No.: NA	NA	
		Size : NA	SO. No.: NA		
1.7	PTFE Bushes	06 nos (N1,N2,N3,N4,N5 & N10)			
1.8	Attachments (Nos) Fitted in nozzle	Reducing flanges	Dip Pipe	Sparger	
	MOC	GL	PTFE/PTFE Lined / GL	PTFE / PTFE Lined / PTFE BEND PIPE	
	QTY	NA	01	NA	
	Fitted in Nozzle	NA	N7	NA	
1.9	Type of PTFE enveloped gasket	PTFE Envelop With Asbestos free inserts & SS Corrugated Ring.			
1.10	Agitating Nozzles	NA			
1.11	Spares to be Dispatched with Equipment	NA			

2.0	Check for Compliance:			
2.1	Dimensional	As per drawing	Observed	Remarks
2.1.1	Height of nozzles from TL (Nozzle face to TL)	N5-150 mm N6,N7 -175 mm	N5-150 mm N6-178,N7 -176 mm	All dimensions are with in limits
2.1.2	Support bracket C.C	NA	NA	—
2.2	Minimum sensing volume in Ltrs.	270	272	Accepted
2.3	Minimum stirring volume in Ltrs.	NA	NA	—
2.4	Lift (Gap between agitator bottom & bottom nozzle face)	NA	NA	—

NOTARY GOVT OF INDIA

P.I. Industries Limited

De Dietrich PROCESS SYSTEMS	FACTORY ACCEPTANCE TEST REPORT	ISO 9001 : 2008 CERTIFIED BY IRQS Sheet: 2 of 2 JOB NO: 1410244

3.0 Glass Lining:

			As per drawing	Observed	Remarks
3.1	Visual Inspection		---	Satisfactory	Accepted
3.2	Spark test	Spark tester - sl no. B-140 Calibration valid until 28-07-2014	10 KV	10 KV	No Evidence of Leak
3.3	Glass Lining thickness at random Ref Foil Sl no. 552		1.0 -2.2 mm	1.22 - 1.94 mm	Accepted
4.0	Test Results:				
4.1	Agitator Shaft run out	Dial Indicator: slno: Calibration Valid Until: Dt:	---	NA	---
4.2	Hydro test : Please see Hydro Test Report for calibration detail of gauges vessel Jacket /~~limpet coil~~		6 Kg/Cm² (g) 6 Kg/Cm² (g)	6 Kg/Cm² (g) 6 Kg/Cm² (g)	No leak or drop in pressure
4.3	Agitator RPM		NA	NA	---
4.4	Shaft sealing		NA	NA	---
4.5	Currents drawn on load (Amps)		NA	R : –, Y : –, B : –	---
4.6	Gap between couplings in mm	Drive side Driven side	NA NA	NA NA	--- ---
4.7	Surface Temperature of motor in Deg Cent.		NA	NA	---
4.8	Surface Temperature of Gear Box		NA	NA	---
4.9	Vibration -		---	NA	---
4.10	Type of FBV		NA	NA	---
4.11	RTD Sensor No.		---	---	---
4.12	Hydro test of FBV	Pressure gauges sl nos: Calibration valid until Dt:	NA	NA	---
4.13	Spark test	Spark tester sl no: Calibration valid until Dt:	NA	NA	---
4.14	Instructions if any				
4.15	CHECKED BY: ENGINEER-QC		Mr. R.MAHENDER		06/05/2015
4.16	VERIFIED BY: CUSTOMER REPRESENTATIVE		Mr. PVNH. KUMAR	Reviewed Witnessed	06/05/2015

NOTARY Govt of India

De Dietrich Process Systems India Pvt. Ltd. Hyderabad 500 076.

P.I Industries Limited

De Dietrich PROCESS SYSTEMS	HYDROSTATIC TEST REPORT	DATE: 06/05/2015

DRAWING NO. :	GA 7274, R.4.	PRESSURE GAUGE NO.	811 & 812
JOB NO. :	1410244 (TAG No. ST7A0311)	CALIBRATION VALIDUPTO :	06.10.2015
CAPACITY :	NHST –10000 Lts		
CUSTOMER NAME :	PI INDUSTRIES LTD.,		

PARAMETERS	VESSEL	JACKET
1. DESIGN PRESSURE	6 Kg/Cm² (g)	6 Kg/Cm² (g)
2. DESIGN TEMPERATURE	-28.8/220°C	-28.8/220°C

TEST

ITEM	HYDROSTATIC PRESSURE Kg/Cm² (g)	TEST TEMPERATURE °C	TEST MEDIA	DURATION TEST	REMARKS
VESSEL	6	33°C	Water	1 Hour	NO LEAK OR DROP IN PRESSURE
JACKET & LIMPET COIL	6	33°C	Water	1 Hour	
PIPE / COLUMN	---	---	---	---	

DEFORMATION

(MEASURE THE CIRCUMFERENCE OF SHELL OF JACKETED / ~~UNJACKETED~~ VESSEL)

BEFORE HYDROSTATIC TEST	DURING HYDROSTATIC TEST	AFTER HYDROSTATIC TEST	REMARKS
6605 mm	6606 mm	6605 mm	OK

Remarks:

	Q.A. ENGINEER	~~CUSTOMER~~ / INSPECTION AGENCY
NAME	Mr. R.MAHENDER	Mr. PVNH. KUMAR
SIGNATURE	[signature] 06/05	[signature] Reviewed Witnessed

NOTARY GOVT OF INDIA

De Dietrich Process Systems India Pvt. Ltd. Hyderabad 500 078.

PI Industries Limited

Annexure-4

PI INDUSTRIES LTD.

F: EMS: SHE: 01/Rev:02

REQUISITION FOR WASTE TRANSFER

Sr. No.: 34351

❖ **To be filled by generating plant :**

From Plant: MPP-06, **Treatment destination:** ☐ ETP / ☑ Incinerator / ☐ MEE / ☐ Drum Decontamination Area

(B) **Date :** 24/08/23

Details			Tick Mark Suitable State/ Type		Quantity	
					No. of Drums /Bags	Weight (Kg.) /Volume (Lit.)
Product	:	OCTOPUSSY	Liquid			
Product Stage	:	-				
Waste Description	:	Contaminated Solid waste	Semi Solid / Solid	✓	-	2000 Kgs
SAP Code	:					
Vessel No. from where transferring done	:	Bromine Tank Farm Area	Contaminated drums		1	1
Initial Level	:	-	Scrap			
Final Level	:	-	Insulation			
Analysis	:	-	Packaging			

(N) Nagendra
Signature of Operator / Supervisor
Time : 16:30

(B) Rohit
Signature of Shift Incharge
Time : 16:30

❖ **To be filled by receiving Plant / Section :**

Received at : ☐ Incinerator, ST : ✓ / ☐ ETP, ST - / ☐ MEE, ST -

☐ Drum Decontamination Area -

Sopanrao
Signature of Receiver
Time : 21:18

ATTESTED
6 DEC 2021
SHEICHAND SHARMA
ADVOCATE NOTARY
GURUGRAM

NOTARY
Sheichand Sharma
Gurugram
Regn. No. 1871
GOVT OF INDIA

PI Industries Limited

PI INDUSTRIES LTD.

F: EMS: SHE: 01/Rev:02

REQUISITION FOR WASTE TRANSFER

Sr. No.: 34350

❖ **To be filled by generating plant :**

From Plant: MP06 , **Treatment destination:** ☑ ETP / ☐ Incinerator / ☐ MEE / ☐ Drum Decontamination Area

B

Date : 24/08/23

Details			Tick Mark Suitable State/ Type		Quantity	
					No. of Drums /Bags	Weight (Kg.) /Volume (Lit.)
Product	:	OCTOPUSY	Liquid	L		700 LTRS
Product Stage	:	-				
Waste Description	:	ETP-LOW COD EFFLUENT	Semi Solid / Solid			
SAP Code	:	-				
Vessel No. from where transferring done	:	BROMINE TANK FARM AREA	Contaminated drums			
Initial Level	:	-	Scrap			
Final Level	:	-	Insulation			
Analysis	:	-	Packaging			

Signature of Operator / Supervisor

Time : 11.30

B Ro LTT

Signature of Shift Incharge

Time : 11.30

❖ **To be filled by receiving Plant / Section :**

Received at : ☐ Incinerator, ST : - ☑ ETP, ST ✓ / ☐ MEE, ST - /

☐ Drum Decontamination Area -

Signature of Receiver

Time : 21:18

NOTARY GOVT OF INDIA

PI Industries Limited

Saurashthra Enviro Projects Pvt Ltd
[28203]

Manifest No: 2205909 22/09/2023 — **Copy 1**

To be forwarded by To be forwarded by the occupier to the State Pollution Control Board or Committee.

Sender's Details			
Sender Name	Pi Industries Limited [28087]		
Address	Sterling SEZ,At & PO Sarod Taluka :JAM Distict:BHA Pin no:392180		
Contact Details	9537454672 praveen.mishra@piind.com	GPS Coordinates	Lat :22.178999309882936 Long :72.79043443704445

Receiver's Details			
State	Gujarat	Type of Facility	Common HWIF
Facility Details	Saurashthra Enviro Projects Pvt Ltd [28203]		
Contact Details	9879512581 info@detoxindia.com	GPS Coordinates	Lat :23.344432329396145 Long:70.61421665971986
Address	VILLAGE- JUNA KATARIYA/ LAKADIYA, Taluka :BHA Distict:KUT Pin no:370150		

Waste Details					
Waste Details	I~29~29.1~Process wastes or residues				
Waste Intended for	Incineration	Total Qty	7.255MT	Consistency	Solid

Transporter Details			
Name	SEEP LOGISTICS	Contact Details	9737719996 krishnaroadlinesgim@gmail.com
Address	24, Rishabh corner, Nr. Gym Khana,,Plot No.93, Sector-8 District :Kutch East Taluka :Bhachau		

Vehicle Details					
Vehicle no	GJ12AT9418 (IMEI No :867556043909392)	GPS Enabled	Yes	Type of Vehicle	Truck
Driver name	RATANBHAI RAJPUT	Driver Contact No	9537974874		

Waste Transportation Details					
Vehicle Depart.	22/09/2023 6:46PM	Number of Drums	0	Loose Waste	0.000
Remarks	Process solid waste (including contaminated sodium sulfide		No of bags	25	

Sender's Declaration :

1. I hereby declare that contents of the consignment are fully and accurate described above by proper shipping name and are categorized , packed, marked , and labeled , and are all in all respects in proper condition for transport by road according to applicable national government regulations.
2. I hereby declare that we have obtained membership of common facility / carried out agreement with actual user for disposal/ actual use of hazardous waste.

PI INDUSTRIES LTD.
Plot No. SEZ - 28, Sterling Sez,
At. & Po. Sarod, Ta.Jambusar,
Dist. Bharuch - 392180

Name and stamp of sender: **Date:** 22/9/23 **Signature:**

Transporter's Acknowledgement of Receipt of waste
Stamp: **Date:** 22/9/23 **Signature:**

Receiver's Certification of Receipt of Hazardous waste

Stamp: **Date:** **Signature:**

NOTARY Shrichand Sharma Gurugram Regn. No. 16714 GOVT OF INDIA

By scanning QR code, copy of transporter will be display. (All copy has same information)

Print by 28087 @ 22/09/2023 06:48:53 PM af092da9-7b32-485e-8ecf-a564a00d9f81 Page 1 of 1

PI Industries Limited

Annexure – 5

Make Online Payment (Net Banking)

**** Do not double-click any button, or close the browser or Internet connection, or press the back or refresh buttons, until you see a message on your screen confirming the transaction. You shall also receive SMS confirming the transaction**

-

AMOUNT

Benificiary Id:28087

Status of e-Payment

Payment Id: 478722
Transaction No: YSBI2088653997
Inward ID: 1900382
Bank Code: SBI
Bank Branch: CHN7757585
Paid Amount: 5000000
Transaction Date: 25/09/2023 17:45:00
Inw Type: IEC
Payment Type: NET
Auth Status: 0300
Status: NA
Description: Completed successfully.

Close

NOTARY Gurugram Regd. No. 16714 GOVT OF INDIA

PI Industries Limited

Sr. No. 1303068

AXIS BANK LIMITED

AXIS BANK LIMITED
DLF, GURGAON [HR]
DLF, GURGAON [HR]
GROUND FLR, GL-005,006,007,008,
CROSS POINT,PHASE-IV
GURGAON-122009

Ref. No :01310100005331
Date:25-09-2023

To,

THE CHAIRMAN, GUJARAT POLLUTION CONTROL BOARD, PARYAVARAN BH
AVAN,SECTOR 10-A, GANDHINAGAR 382 021

Dear Sirs,

BG No.	: 01310100005331
Date of Issue	: 22-09-2023
Amount of BG	: Rs. 7,50,000.00 (RUPEES SEVEN LAKHS FIFTY THOUSAND ONLY)
Expiry Date	: 30-09-2024
Claim Expiry Date	: 30-09-2025
Name and Address of the Applicant	: MS. P I INDUSTRIES LTD : 5TH FLOOR,VIPUL SQUARE : B BLOCK, SUSHANT LOK PHASE-1 UDAIPUR

We forward herewith the above Inland Bank Guarantee in original issued by us in your favour.

1. The above Guarantee is issued subject to the condition that the Bank's liability is restricted to the amount mentioned above and in the said Guarantee. Our Guarantee shall remain in force till the expiry date. Unless a demand or claim under the guarantee is made on the Bank in writing and delivered to the bank on or before the Expiry date/Claim Expiry Date, the Bank shall be discharged from all liability under the said guarantee thereafter.

Please Note:

2. The beneficiary in their own interest should verify the genuineness of this guarantee from following office of the Bank in writing.

AXIS BANK LIMITED
BG Confirmation Desk,Transaction Banking Operations
5th floor, Gigaplex, Building No 1,Plot No I.T.5,
MIDC,Airoli Knowledge Park, Airoli,
Navi Mumbai 400708 (TelFax: 022-71315803)

NOTARY Distt. Gurugram Regn. No. 16714 GOVT OF INDIA

3. BG confirmation can also be sought by sending email to ibg.confirmation@axisbank.com

FOR AXIS BANK LIMITED

AUTHORISED SIGNATORY
NAME: HARDIK M. PATEL
SS No. SS NO.: 11113

ATTESTED

FOR AXIS BANK LIMITED

AUTHORISED SIGNATORY
NAME: Himansukumar Pancholi
SS No. S.S. No. 10248

Encl: Bank Guarantee Number 01310100005331

SH. SHARMA ADVOCATE & NOTARY GURUGRAM 16 DEC 2024

IBG

UTILITY FORMS PVT.LTD

PI Industries Limited

IN-GJ47682209553720V

INDIA NON JUDICIAL

Government of Gujarat

Certificate of Stamp Duty

सत्यमेव जयते

Certificate No.	:	IN-GJ47682209553720V
Certificate Issued Date	:	25-Sep-2023 12:49 PM
Account Reference	:	IMPACC (FI)/ gjelimp10/ ANKLESHWAR1/ GJ-BH
Unique Doc. Reference	:	SUBIN-GJGJELIMP1019645206574315V
Purchased by	:	MURARI KUMAR SINGH
Description of Document	:	Article 5(h) Agreement (not otherwise provided for)
Description	:	BANK GUARANTEE
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	PI INDUSTRIES LTD
Second Party	:	GPCB GANDHINAGAR
Stamp Duty Paid By	:	PI INDUSTRIES LTD
Stamp Duty Amount(Rs.)	:	300 (Three Hundred only)

NOTARY Gurugram GOVT OF INDIA

For AXIS Bank Ltd.
Authorised Signatory
HARDIK M. PATEL
SS NO.: 11113

ELPL ANKLESHWAR

86.013101000053 31

For AXIS Bank Ltd.
Authorised Signatory
Himansukumar Pancholi
S.S. No. 10248

0014340682

Statutory Alert:
1. The authenticity of this Stamp certificate should be verified at 'www.shcilestamp.com' or using e-Stamp Mobile App of Stock Holding. Any discrepancy in the details on this Certificate and as available on the website / Mobile App renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority

PI Industries Limited

NOTARY
GOVT OF INDIA
Regn. No. 18714

BANK GUARANTEE NO: 01310100005331 DATED 22ND SEPTEMBER 2023

To,
THE CHAIRMAN, GUJARAT POLLUTION CONTROL BOARD,
PARYAVARAN BH
AVAN,SECTOR 10-A, GANDHINAGAR 382 021

For AXIS Bank Ltd.
Authorised Signatory
HARDIK M. PATEL
SS NO.: 11113

EI Industries Limited

For AXIS Bank Ltd.
Authorised Signatory
Himansukumar Pancholi
S.S. No. 10248

BANK GUARANTEE NO: 01310100005331 DATED 22ND SEPTEMBER 2023

BG Amount: Rs.7,50,000/-(Rupees Seven Lakh Fifty Thousand Only)
BG Expiry Date:
BG Claim Expiry Date:

In the consideration of **The Chairman, Gujarat Pollution Control Board**, Paryavaran Bhavan, Sector 10-A, Gandhinagar – 382 021 (hereinafter referred to as "The Board") having appear or the direction issued vide outward no. 753704, dated 20.09.2023 and letter No. GPCB/BRCH/CCA-67(11)/ID:28087 dated 20.09.2023 to industrial unit of M/s. **PI Industries Ltd.**, Plot No. SPM-28, 29/1, Sterling SEZ and Infrastructure Limited, At & Po: Sarod, Ta. Jambusar, dist.: Bharuch, Gujarat, India (hereinafter referred to as "The Unit") time for the due compliance of Pollution Control Board Norms as suggested / stipulated vide dated 23.08.2023 and as under the provision of Section 37 of the air Act-1981, as amended from time to time on production of a Bank Guarantee for **Rs. 7,50,000/-(Rupees Seven Lakh Fifty Thousand Only)** We Bank Name, address **Axis Bank Limited**, a company incorporated under the Companies Act, 2013 and carrying on the business of Banking under the banking regulation act, 1949 and having its registered office at Axis Bank Limited, Trishul, Opposite Samartheshwar Temple, Law Garden, Ellis Bridge Ahmedabad - 380006, Gujarat (hereinafter referred to as "The Bank") at the request of the said M/s. PI Industries Ltd., Plot No. SPM-28, 29/1, Sterling SEZ and Infrastructure Limited, At & Po: Sarod, Ta. Jambusar, dist.: Bharuch, Gujarat, India Hereby undertake to pay to the board an amount not exceeding **Rs. 7,50,000/-(Rupees Seven Lakh Fifty Thousand Only)** against non-Compliance of consent conditions / directions or damages etc. caused to the environment by reason of any breach of provisions of said Acts, Notices, instructions etc. by the said company/Unit/Local body.

1. We Axis Bank , address **Axis Bank Limited**, a company incorporated under the Companies Act, 2013 and carrying on the business of Banking under the banking regulation act, 1949 and having its registered office at Axis Bank Limited, Trishul, Opposite Samartheshwar Temple, Law Garden, Ellis Bridge Ahmedabad - 380006, Gujarat hereby undertake to pay the amount due and payable under this guarantee without any demur merely on a demand from the Board that the amount claimed is due for the reason of Non fulfilment of undertaking, Non-Compliance of Directions / Notice / Letter instructions issued by the Board / violation of provisions of any of the provisions of any of the mentioned here in above any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding **Rs. 7,50,000/-(Rupees Seven Lakh Fifty Thousand Only).**

2. We undertake to pay to the Board any money not exceeding **Rs. 7,50,000/-(Rupees Seven Lakh Fifty Thousand Only)** on demand not withstanding any dispute or disputes raised by the said company/Unit in any suit or proceedings pending before any court or tribunal or Board against the Board relating there to, Our liability under this present being absolute and unequivocal.

3. The payment so made by the Bank under this agreement shall be valid in discharge of our liability and unit shall have no claim against use in making such payment.

4. We Axis Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of

For AXIS Bank Ltd.
Authorised Signatory
HARDIK M. PATEL
SS NO.: 11113

PI Industries Limited

For AXIS Bank Ltd.
Authorised Signatory
Himansukumar Pancholi
S.S. No. 10248

undertaking/notice/letter etc. and that it shall continue to be enforceable till all the dues of Government/Board under or by virtue of said undertaking/notice/letter etc. have been fully paid it has claimed satisfied or discharge or till Government/Board certifies that the terms and conditions of the directions/Undertaking/notice/letter/any provisions of relevant law have been fully and properly carried out and complied by the said company/Unit and accordingly discharges this guarantee. Unless the demand or a claim under this guarantee is made on us in writing on or before **30/09/2024** we shall be discharge from all liability under this guarantee thereafter.

5. The Bank further agrees with the board that the board shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder.

6. To vary any of the terms and conditions of the said undertaking/notice/letter etc. or to extend time of compliance by the said company/unit from time to time or to postpone for any time or time to time any of power exercisable by the Board against the said company/unit and to forbear of enforce any of the terms and conditions relating to the said undertaking/notice/letter etc. and we shall not be relieved from liability by reason of any such variation or extension being granted to the said company / unit or for any forbearance, action commission on the part of the board or any indulgence by the board to the company / unit or by any such matter or thing whatsoever which under the law relating to sureties would but for the provisions, have effect of no relieving us.

7. This guarantee will not be discharge due to the change in the constitution of the bank of the company / unit.

8. The bank undertakes not to revoke this guarantee during its currency except with the previous consent of the board in writing.

NOT WITHSTANDING anything contained herein:

1. The banks liability under the guarantee shall not exceed **Rs. 7,50,000/-(Rupees Seven Lakh Fifty Thousand Only)**
2. The Guarantee valid up to **30/09/2024.**
3. The Bank is liable to pay the guarantee amount or any part thereof under this bank guarantee only and only. If you serve written claim or demand on or before **30/09/2025.**

NOTARY Gurgaon Regn. No. 1871/4 GOVT OF INDIA

DATE: 22ND SEPTEMBER 2023
PLACE:GURGAON

For AXIS Bank Ltd.
Authorised Signatory
HARDIK M. PATEL
SS NO.: 11113

Plot Industries Limited

For AXIS Bank Ltd.*
Authorised Signatory
Himansukumar Pancholi
S.S. No. 10248

ATTESTED
6 DEC 2024
SHRICHAND SHARMA
ADVOCATE & NOTARY
GURUGRAM

ANNEXURE A-2

Inspired by Science

તા;12/04/2024

નાયબ નિયામકશ્રી,

ઔધોગિક સલામતી અને સ્વાસ્થ્યની કચેરી,

બીજોમાળ ,બહુમાળી મકાન, ગાયત્રી નગર પાસે, કણબીવગા, ભરુચ

વિષય:- બ્રોમિન ટેંક નંબર ST 7A0211 નો હાઇડ્રો ટેસ્ટ રિપોર્ટ રજુ કરવા બાબત.

મહેરબાન સાહેબશ્રી,

ઉપરોકત વિષય અન્વયે જણાવવાનું કે તારીખ : 23/08/2023 ના રોજ બ્રોમિન સ્ટોરેજ ટેંક નંબર ST 7A0211 માંથી બ્રોમિન લિકેજનો બનાવ બનેલ હતો. જેના જેકેટમાં ચિંલિંગ વોટર ઉપયોગ થતો હોઇ તેનો હાઇડ્રો ટેસ્ટ રીપોર્ટ આ સાથે સામેલ છે. પરંતુ સેલનો હાઇડ્રો ટેસ્ટ રીપોર્ટ હાલ ઉપલબ્ધ નથી.જે નવી ટેન્ક મુકી ઉપયોગ માં લેતા પહેલા રજુ કરીશુ જે આપની જાણ સારું.

પી.આઇ.ઇન્ડસ્ટ્રીઝ લિ.

ઓથોરાઇઝ સિગ્નેચર

NOTARY Shrichand Sharma Gurugram Regd. No. 16/14 GOVT OF INDIA

12/04/24

Senior Clerk
Deputy Director
Industrial Safety & Health
BHARUCH

ATTESTED

SHRICHAND SHARMA
ADVOCATE & NOTARY
GURUGRAM

6 DEC 2024

PI Industries Limited

Responsible Care

ANNEXURE A-3

265

ANALYSIS REPORT FOR AIR

TYPE : Stack-Process

Gujarat Pollution Control Board
Bharuch
C-1/119/3, GIDC Phase-2
Narmadanagar
Bharuch-392015
Tele:(0264)2246333

Sample ID:456224 - Analysis Completion:21/09/2024

Pesticides (technical) (excluding formulation) / LAB Inward : **57420**

1. Name &	**: Pi Industries Limited - 28087**
2. Address of the Unit	**: Plot no: SPM-28,29/1,Sterling SEZ,At & PO Sarod Sarod - 392180,Taluka : Jambusar, District : Bharuch, GIDC : Not In Gidc**
3. Nature of Sample	**: REP-Representative/Grab , (Insp Type : APP-On Application)**
4. Sample Collected By	**: Shri Niraj Patel , DEE**
5. Date & Time of Collection & Receipt	**: 18/09/2024, (1710 to 1720)**
6. Date of Start & Completion of Analysis	**: 20/09/2024 & 21/09/2024**
7. Sampling Point	**: Process stack attached to MPP-7 ~**
8. Fuel	**: ---**
9. APCM	**: Acidic + water + alkali scrubber**
10. Thimble & Weight (gm)	**: ---**
11. Temperature on Collection	**: 29 & Volume-Absord Media : 50 mL for HCL,NH3 and 100 mL for Cl2**
12. Volume-Gas Passed	**: 19.6 ltr for each gases @ NTP**
13. Parameters	**: 3 & Oper Time(Min) : 10 min**

Sr	Parameter	Unit	Test Method	Range of Testing	Result
1	HCL-Stack	MG/NM3	Argentometric	-	10.50
2	NH3-Stack	MG/NM3	IS:11255(Part6),1999 (Reaffirmed 2009)	5-500 mg/NM3	8.67
3	Cl2-Stack *	MG/NM3	IS 5182 (Part XIX) 1982 R.1998	145-2900 ug/ m3	0.03

NOTARY GOVT OF INDIA

ATTESTED

SH. CHAND SHARMA ADVOCATE & NOTARY GURUGRAM

16 DEC 2024

Laboratory Remarks : Approved By:399-lab_399 Dt.: 24/09/2024

R.C.VASAVA,S.O

Field Observation :

Note :

1. The results relate only to the items sampled and tested.
2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.
3. The report shall not be reproduced except in full or part without approval of the laboratory.
4. The Board is not responsible for the authenticity for the samples not collected by the Board's officials.
5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
6. Permissible Limits: as per Schedule VI of EPA Rules, 1986 as ammended by Second and Third ammendment 1993 for Effluents
7. Physicochemical and microbiological parameters, Std.Methods for Water and Waste Water- 23nd Edition by APHA.
8. Bioassay test (for toxicity) -IS:6582:Part-2:2001; Reaffirmed 2007.

PI Industries Limited

***** END OF TEST REPORT *****

267

ANNEXURE A-4

ANALYSIS REPORT FOR AIR

TYPE : Stack-Process

Gujarat Pollution Control Board
Bharuch
C-1/119/3, GIDC Phase-2
Narmadanagar
Bharuch-392015
Tele:(0264)2246333

Sample ID:456227 - Analysis Completion:21/09/2024

Pesticides (technical) (excluding formulation) / LAB Inward : **57422**

1. Name &	**: Pi Industries Limited - 28087**
2. Address of the Unit	**: Plot no: SPM-28,29/1,Sterling SEZ,At & PO Sarod Sarod - 392180,Taluka : Jambusar, District : Bharuch, GIDC : Not In Gidc**
3. Nature of Sample	**: REP-Representative/Grab , (Insp Type : APP-On Application)**
4. Sample Collected By	**: Shri Niraj Patel , DEE**
5. Date & Time of Collection & Receipt	**: 18/09/2024, (1405 to 1415)**
6. Date of Start & Completion of Analysis	**: 20/09/2024 & 21/09/2024**
7. Sampling Point	**: Process stack attached to MPP-9 ~**
8. Fuel	**: ---**
9. APCM	**: water + alkali scrubber**
10. Thimble & Weight (gm)	**: ----**
11. Temperature on Collection	**: & Volume-Absord Media : 50 mL for both gases**
12. Volume-Gas Passed	**: 19.8 ltr for each gases @ NTP**
13. Parameters	**: 2 & Oper Time(Min) : 0**

Sr	Parameter	Unit	Test Method	Range of Testing	Result
1	HCL-Stack	MG/NM3	Argentometric	-	BDL
2	NH3-Stack	MG/NM3	IS:11255(Part6),1999 (Reaffirmed 2009)	5-500 mg/NM3	15.45

NOTARY Gurugram Regn. No. 16714 GOVT OF INDIA

ATTESTED

16 DEC 2024

SHRIKHAND SHARMA ADVOCATE & NOTARY GURUGRAM

Laboratory Remarks : Approved By:399-lab_399 Dt.: 24/09/2024

R.C.VASAVA,S.O

Field Observation :

Note :

1. The results relate only to the items sampled and tested.
2. Samples will be destroyed after 10 days from the date of issue of test report unless otherwise specified.
3. The report shall not be reproduced except in full or part without approval of the laboratory.
4. The Board is not responsible for the authenticity for the samples not collected by the Board's officials.
5. Total liability of our laboratory is limited to the invoiced amount. Any dispute arising out of this report is subject to Gujarat Jurisdiction only.
6. Permissible Limits: as per Schedule VI of EPA Rules, 1986 as ammended by Second and Third ammendment 1993 for Effluents.
7. Physicochemical and microbiological parameters, Std.Methods for Water and Waste Water- 23nd Edition by APHA.
8. Bioassay test (for toxicity) -IS:6582:Part-2:2001; Reaffirmed 2007.

PI Industries Limited

***** END OF TEST REPORT *****