PetroNOx Air
For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

PetroNOx Environnemental Technologies India

PET- Global SNCR Centre of Excellence & Ammonia Storage, Handling / Vaporization



It's in our Nature

PET - Global SNCR Centre of Excellence

Organization
PetroNOx Environmental Technologies India - SNCR Centre of Excellence

Experience
>60 projects | 85 lines commissioned | 9 years execution Applications: Cement kilns, WtE plants, industrial boilers, process heaters
>700 SNCR projects delivered globally together with our former team PetroNOx PetroMiljo

Geographical References
Multiple installations in Europe, Asia, Middle East, Americas

Engineering Scope
Process design and injection optimization Retrofit engineering for existing furnaces Automation, P&ID and globally compliant documentation

Manufacturing & Compliance
ISO 9001 fabrication partner (50,000 sq ft, 150 personnel) PED 2014/68/EU Module A2 pressure equipment In house NDT and RT, nuclear approved vendor

Manufacturing & Compliance
ISO 9001 fabrication partner (50,000 sq ft, 150 personnel) PED 2014/68/EU Module A2 pressure equipment In house NDT and RT, nuclear approved vendor

Execution Characteristics
Structured engineering • predictable delivery • performance - oriented operation

SNCR technology

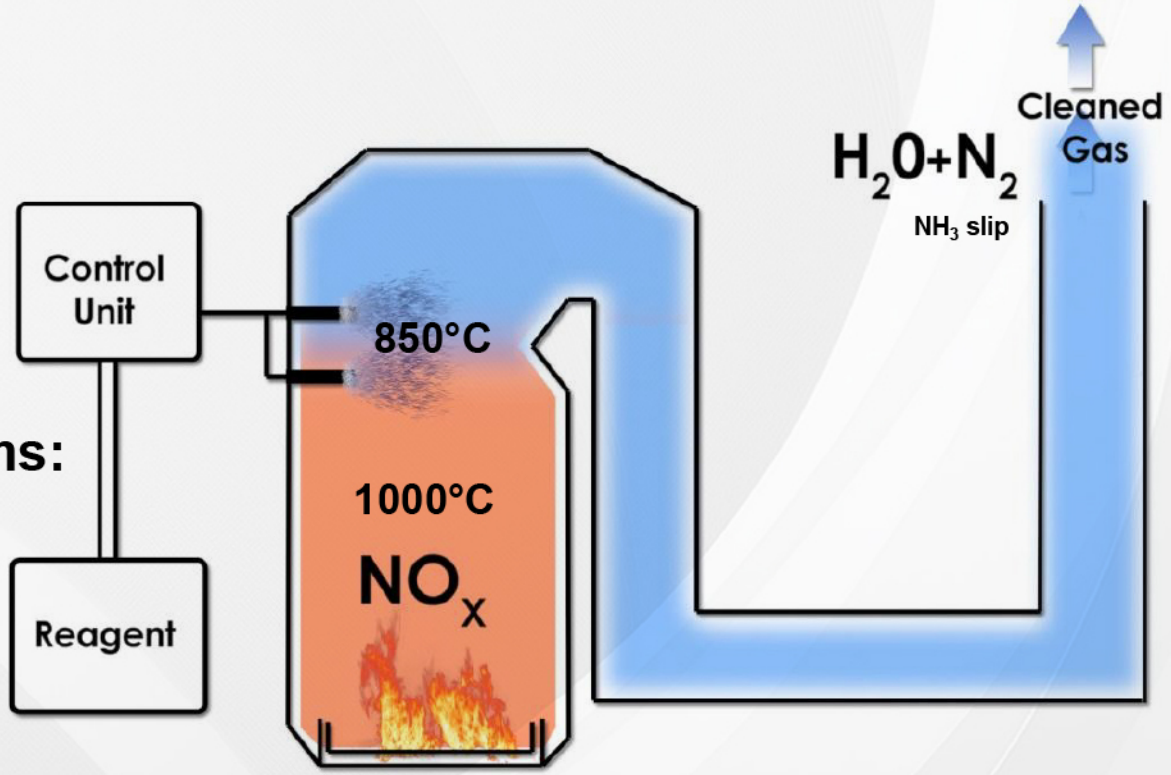
SNCR systems built to fit your plant needs

- Completely new systems based on standard or customized modules
- Expansion or modification of existing systems to fit your purposes

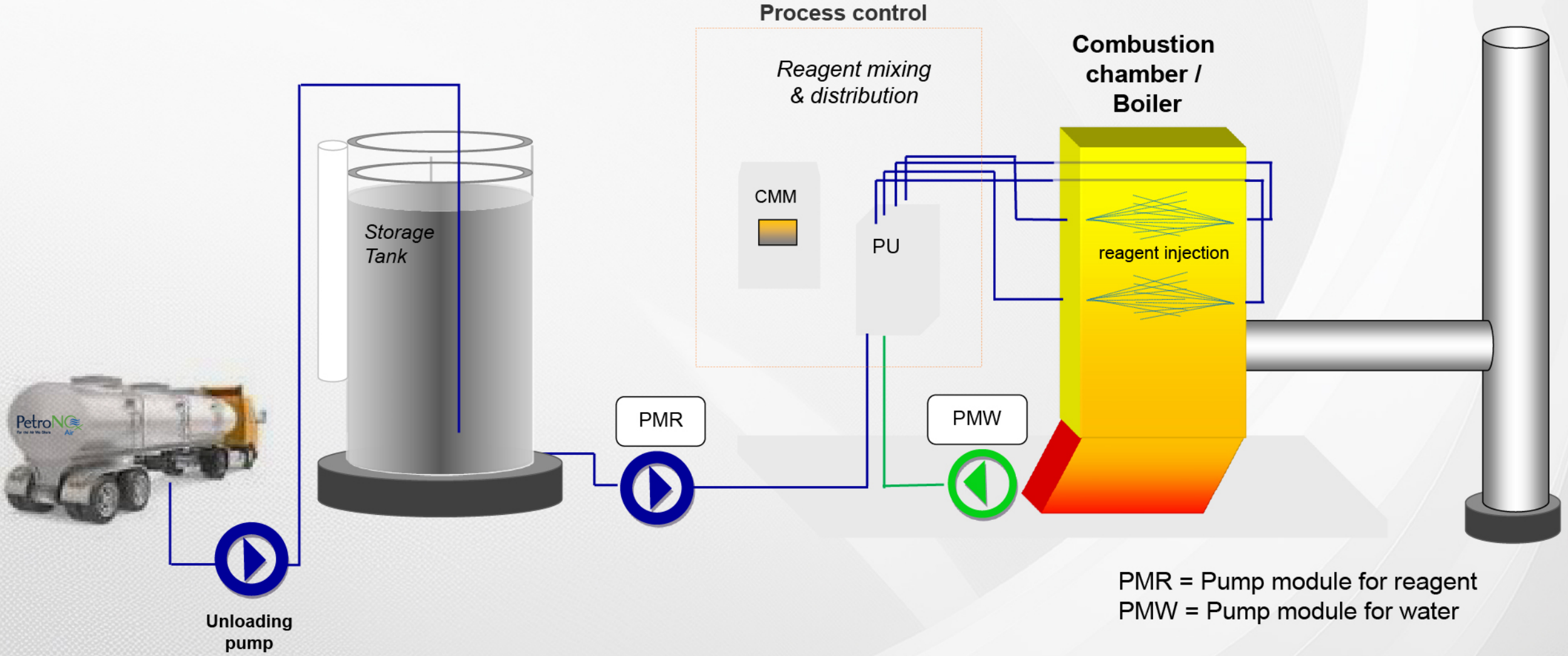
PetroNOx commercializes two SNCR systems:

- Standard SNCR, which achieves the minimum level of NOx emissions permitted
- Low NOx system, which reaches much higher reduction levels of NOx emissions

$$NH_3 + NOx \longrightarrow N_2 + H_2O$$



SNCR Module Flow Arrangement



PMR = Pump module for reagent
PMW = Pump module for water

SNCR Complete System Offering

Storage & Reagent Handling

- Ammonia Storage Tank-Single / Double wallfor Aqueous (StainlessSteel Ammonia) along with Hose pipes with TODO connections
- Tank instrumentation & accessories (ATEX certified)
- Tank Top -Scrubber unit
- Urea Preparation System - 40% Solution with Big
- Urea Storage Tank - GRP Construction

Injection & Process Equipment

- Process Unit with 2 / 4 / 6 / 8 / 10 / 12 Injectors (Mixing & Metering Cabinet Based)
- High- Flow Injectors Optimized for Cement Kiln Applications
- Low - Flow injectors for Power applications.
- Dust Free Containerized Solution (10 ft / 20 ft) for PH Floor Installation

Unloading , Dosing Modules and Containerized Solution

- Filling Pump Module (PMF-D) - Single / Redundant
- Reagent Dosing Pump Module (PMR-D)-Single / Redundant
- Water Pump Module (PMW-D) -Single / Redundant
- Dust - Free Containerized Solution (10 ft / 20 ft) for PH Floor Installation

Automation & Control

- PLC Based Operation-Siemens S7 (Standalone or Redundant CPU)
- DCS Communication Interfaces -Optical Fibre / Modbus / Profinet
- Power Distribution Panel with a step down transformer (Single Source of Power from Client)
- Guided Operation Video & Mobile Service Ticketing System at Handover

Engineering & Documentation

- Complete System Engineering
- Site Layout Engineering
- 3D Modeling & Integration Support

SNCR System - Standards & Regulatory Compliance

- The PetroNOx SNCR system is designed and manufactured in accordance with the EU Machinery Directive 2006/42/EC for safe and reliable automatic operation.
- The design standards for PetrNOx's SNCR-systems are:

  Pressure Equipment Directive, PED, 2014/68/EU

  Low Voltage Directive, LVD, 2006/95/EC

  ATEX Directive 94/9/EC

  Electrical design according to EN 60 204 -1

  Requirements for flue gas DENOX - systems, EN 12952 - 14

SNCR Technology - CE Marking & IIA Certification

- The conformity is declared in a IIA certificate and with a CE marking.
- IIA certificate and CE marking by PetroNOx provides:

  Complete delivery including software

  Standardized system of well proven design

  Standardized well proven components
- In case of not complete delivery, only IIB certificate is issued.
- IIA certificate by other before start-up of system.

CE marking



PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

SNCR DeNOx Utility and Power



PetroNOx Low NOx SNCR system

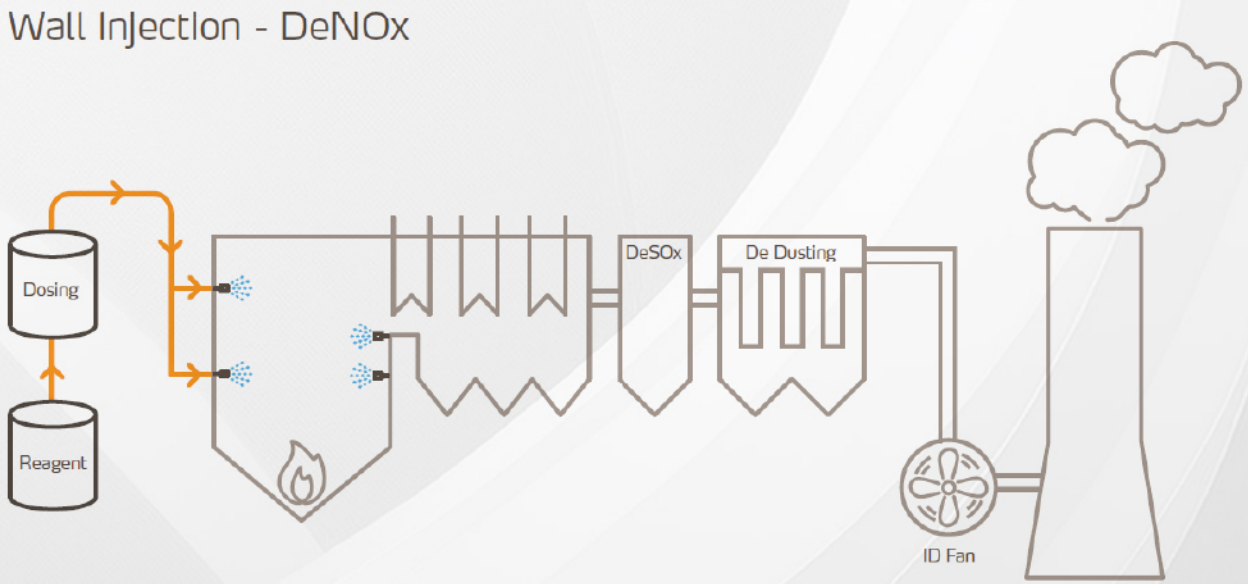
Unique features:

- Reduction agent - Ammonium hydroxide
- Three or more injection levels
- Two injection levels in operation simultaneously
- Unique injectors of PetroNOx design
- Special software program developed by PetroNOx
- Well proven design

SNCR in WtE

Wall injection SNCR

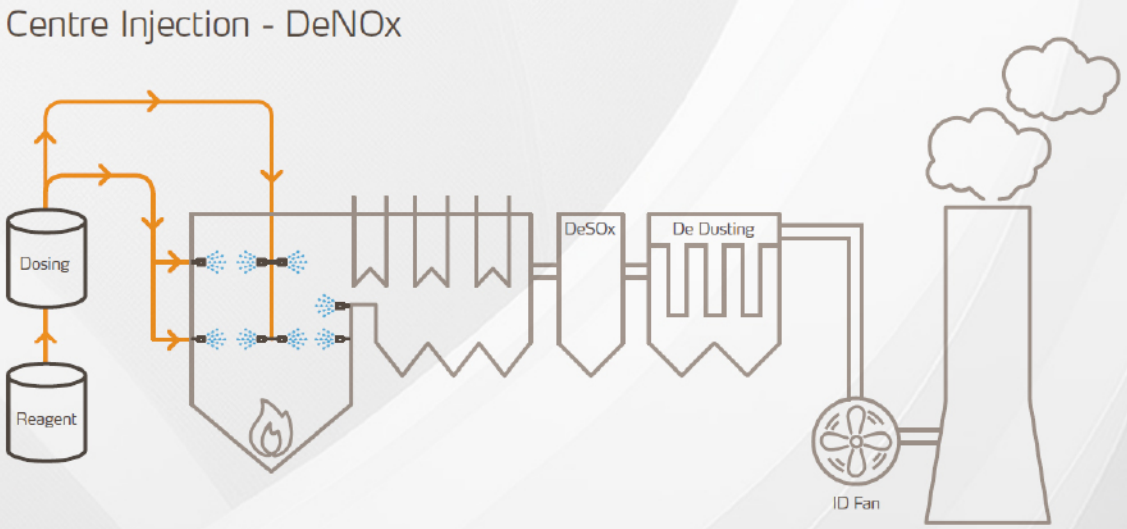
- + less equipment
- + easy modular design
- + typically no adaptation on pressure parts of boiler required
- Limited in geometrical dimensions → reduction efficiency → reagent utilization



SNCR in WtE

Combined „Wall injection – Centered injection“ SNCR

- + easy modular design
- + better flexibility in geometrical dimensions → reduction efficiency → reagent utilization
- - Adaptation on pressure parts of boiler required
- - Only possible if accessibility is given
- Limited in geometrical dimensions reduction efficiency reagent utilization

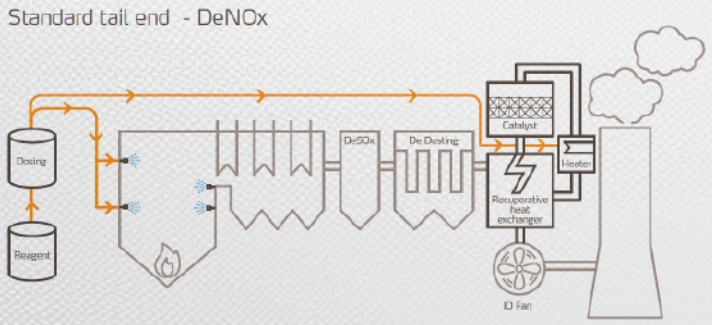


Catalyst Operation Temperature in Biomass (Tail End)

- Depending on SO2/SO3 concentration the catalyst is typically operated at temperatures between 180 to 300 °C
- Presently 3 types of „tail end SCR“ systems are used:

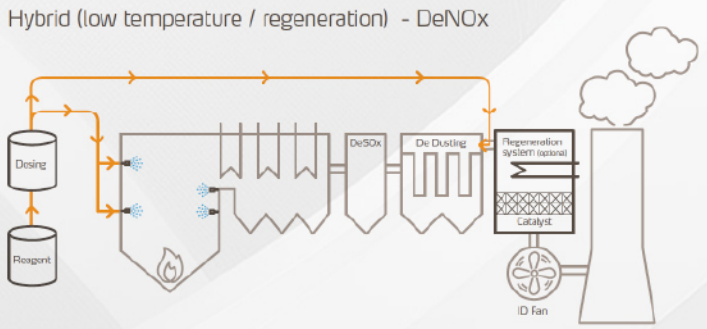
Standard Tail End

Flue gas is reheated to optimum temperature with steam, natural gas and optionally with a recuperative heat exchanger



Tail End with Regeneration System

Flue gas is operated most of the time close to the salt formation temperature of ammonium bi sulfate, regularly it is heated up to 290-320°C to regenerate the catalyst during operation



SNCR System – Musami Waste-to-Energy Plant

- Owner: Musami (Municipal Solids Waste Incineration Plant)
- Client: TME. S.p.A Termomeccanica Ecologia
- Project description :
- The plant site is located in the area of Client MUSAMI Ecoparque Sao Miguel Island - Azores, Portugal.
- The project regards the construction of one line for the incineration of urban waste. It includes node for the thermal transformation of urban waste, based on the grate furnace boiler, flue gas purification system, recovery, transformation and conveyance node for electric power and heat.



Waste-to-Energy Musami
Urea Handling & SNCR Supply









PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

SNCR DeNOx Cement



SNCR Installation - Kaspi Cement, Georgia







SNCR Installation
Italcementi Sarche Cement Plant









PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

Reference Projects Diverse Appn



PET SNCR Reference Projects
Diverse Applications

Mineral & Industrial Boilers



Project Name:
Medcem
Client: Medcem

Project location: -
Turkey
Application:
Cement kiln
Technology:
SNCR



Project Name:
EPRL Thetford Power station
Client: EPRL

Project location:
UK
Application:
Biomass fired combustion plant
Technology:
SNCR



Project Name:
Stericyle Oldham
Client: Stericycle

Project location:
UK
Application:
Medical Waste Incinerator
Technology:
SNCR



Project Name:
Stericyle Bolton
Client:
Stericycle
Project location:
UK
Application:
Medical Waste Incinerator
Technology:
SNCR

PET SNCR Reference Projects
Diverse Applications

Mineral & Industrial Boilers



Project Name:
Tracim Cement
Client: Tracim Cement

Project location:
Turkey
Application:
Cement kiln
Technology:
SNCR



Project Name:
BCE Energie
Client: CNIM

Project location:
Serbia
Application:
Muncipal Waste to Energy
Technology:
SNCR



Project Name:
Mangalam Captive Power Plant
Client: Mangalam Cement

Project location:
India
Application:
Atmospheric Fluidized bed boiler
Technology:
SNCR



Project Name:
Berkes , French Guiana
Client:
Berkes
Project location:
French Guiana
Application:
Waste to Energy
Technology:
SNCR

PET SNCR Reference Projects
Diverse Applications

Waste to Energy/Captive Power Plants



Project Name:
JK Cement captive Power plant
Client: JK Cement Captive Power Plant

Project location:
India
Application:
Atmospheric Fluidized bed boiler
Technology:
SNCR



Project Name:
Suez Rambervillers
Client: CNIM

Project location:
France
Application:
Muncipal Waste to Energy
Technology:
SNCR



Project Name:
B&W Petrobio
Client: B&W

Project location:
Swden
Application:
Biomass Boiler
Technology:
SNCR



Project Name:
Thermomeccanica Sao Miguel
Client:
Thermomeccanica
Project location:
Portugal
Application:
Waste to Energy
Technology:
SNCR

PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

Client Reference letters

Successful Commissioning & Client Testimonials



YARA
Knowledge grows

VOTORANTIM cimentos

Commissioning Certificate

We are pleased to provide this commissioning certificate to M/s Yara Environmental Technologies Pvt. Ltd, India for successfully commissioning the De NOx system (Ammonia) for Cement Project at PraçaBrasil, 16, Santa Helena, Votorantim -SP

Client: Votorantim Cimentos.

Engineer: Suyog Kale

Activities:

- Check of equipment
- Hot startup

Results of the performance test

The system has proved to operate automatically, following the NOx signal from the stack. No major issues have been observed.

Best Regards,

For M/S Votorantim Cimentos

01.637.895/0174-50
VOTORANTIM CIMENTOS S.A
VOTORANTIM - SP

Yara Environmental Technologies Pvt Ltd.
(Formerly known as Tolex Engineers Pvt Ltd)



Italcementi
HEIDELBERGCEMENTGroup

Italcementi
Cementeria di Sarche
Via della Pioraaia, 1 loc. Sarche
38076 Madruzzo (TN)
Italia
Phone +39 0461 564 727

D. 21/04/2022

Cold Commissioning Certificate

We are pleased to provide this cold commissioning certificate to M/S Yara Environmental Technologies Pvt ltd for cold commissioning the SNCR System at Italcementi, Sarche, Italy

Best Regards,

For M/S Italcementi , Sarche

ITALCEMENTI S.p.a.

Italcementi S.p.A.
Società Unipersonale
Sede legale:
Via Stezzano, 87
24126 Bergamo - Italia

Capitale sociale i.v. Euro 401.715.911,00
C.C.I.A.A. Bergamo n. 50 R.E.A.
Registro Imprese di Bergamo
C.F. 00931710164 – P.IVA 00322700162



CEMENTOS ARTIGAS

Commissioning Certificate

To Whomsoever it May Concern

We are pleased to provide this commissioning certificate to Yara Environmental Technologies Pvt. Ltd. for successfully commissioning the DeNOx system (SNCR) for our cement plant.

Details of the project are as given below:

- Scope of Supply: 1 X SNCR system for our cement plant.
- P. O. No.: 4540007874
- Vendor Job No.: 22.012_Cementos Artigas S.A.
- Engineer : Dhanesh Chandrakant Naik

We are pleased with the services provided by Yara Environmental Technologies Pvt Ltd.

Best Regards,

M/S Client

Jose Gozon
Mechanical
project
supervisor

FOR ELECTRICAL DEPARTMENT
BALANTAIS

Ing. E. UMPIERREZ GÓMEZ
REPRESENTANTE TÉCNICO
CEMENTOS ARTIGAS S.A.



YARA
Knowledge grows

BCE
Beo Čista Energija doo

Commissioning Certificate

D. 12-03-2023

We are pleased to provide this commissioning certificate to M/s Yara Environmental Technologies Pvt. Ltd. India for successfully commissioning (on liquid fuel, without waste) the DeNOx system (SNCR) for Boiler Project at. Beo Cista Energija. we also require remote support during commissioning on waste.

Client: Beo Cista Energija.

Engineer: Suyog Kale

Activities:

- Check of equipment
- Manual start-up
- Auto start-up

Results:

The system has proved to operate automatically, following the NOx signal from the stack as well as the ammonia slip. No major issues have been observed.

Best Regards,

For M/S Beo Cista Energija.

DURAND .T

Successful Commissioning & Client Testimonials



Termomeccanica Ecologia

LETTER OF APPRECIATION

Date: 01/08/2023

We would like to express our appreciation and inform you that Mr. Suyog Kale from M/s Yara Environmental Ltd. has completed the commissioning of SNCR System successfully as per the proposed plan with good coordination and fast and quality work at Musami Operações Municipais do Ambiente, EIM., SA – Sao Miguel, Portugal by TM.ESpA Termomeccanica Ecologia Via del Molo 1/B, 19126 - La Spezia, Itália

Client: TM.ESpA Termomeccanica Ecologia Via del Molo 1/B, 19126 - La Spezia, Itália
Ref PO: 2019630022/001.

Project no: 23.001

Engineer: Suyog Kale.

Best Regards

TM.ESpA Termomeccanica Ecologia Via del Molo 1/B, 19126 - La Spezia, Itália



ARABIAN CEMENT العربية للاسمنت

Commissioning Certificate

Date: 18/07/2023

We are pleased to provide this commissioning certificate to M/s Yara Environmental Technologies Pvt. Ltd, Mumbai, India. for successfully Commissioning the SNCR(De-NOx) System for the cement plant both line 1 &2 at M/s Arabian cement company, km23 Ain Sokhna Cairo Road, Suez- Egypt.

Client: M/s ARABIAN CEMENT COMPANY(ACC)

Ref: PO# P170113, dt. 18-12-2017.

Project no: PMA

Engineer: Karunakar Singh

Activities:

i. Check of equipment
ii. Manual start-up
iii. Auto start-up

Results:

The system has proved to operate automatically, following the NOx signal from lines 1 &2 stacks for both, and no major issues have been observed.

Best Regards,

M/s ARABIAN CEMENT COMPANY(ACC)

ARABIAN CEMENT العربية للاسمنت



YARA

tsi

Commissioning Certificate

Date: 29/08/2024

We are pleased to provide this commissioning certificate to M/s Yara Environmental Technologies Pvt. Ltd, Mumbai, India. for successfully Commissioning the SNCR(De-NOx) System for the plant TSI USA (RoyOMartin) at 1923 US-287, Corrigan, TX 75939, United States.

Client: M/s TSI USA (RoyOMartin).

Ref: PO# 220221.11 dt. 21-02-2022.

Project no: 22.008

Engineer: Suyog Kale.

Activities:

i. Check of equipment
ii. Manual start-up
iii. Auto start-up

Results:

The system run well in manual mode as well as in auto mode. Customer has portable NOx Analyser to check the NOx.

Best Regards,

M/s TSI USA (RoyOMartin).

Successful Commissioning & Client Testimonials



Stericycle
We protect what matters.

D. 06/12/23

LETTER OF APPRECIATION

We would like to express our appreciation and inform you that Mr. Suyog Kale from M/s Yara Environmental Ltd. has completed the commissioning of SNCR System successfully as per the proposed plan with good coordination and fast and quality work at SRCL Limited Bolton (Stericycle Limited) The Incinerator Building, Royal Bolton Hospital, Minerva Road Bolton, BL4 0JR, United Kingdom.

Client: M/s SRCL Limited Bolton (Stericycle Limited).

Ref: PO_ 30148384_ Dt_13.06.2023

Project no: 23.006

Best Regards,

M/s SRCL Limited Bolton (Stericycle Limited).

C Seary.
Manager Facility Engineering



Stericycle
We protect what matters.

D. 26/01/24

LETTER OF APPRECIATION

We would like to express our appreciation and inform you that Mr. Suyog Kale from M/s Yara Environmental Ltd. has completed the commissioning of SNCR System successfully as per the proposed plan with good coordination and fast and quality work at SRCL Limited Leeds (West)(Stericycle Limited) Knowsthorpe Lane, Leeds LS9 0PJ4 0JR, United Kingdom.

Client: M/s SRCL Limited Leeds (West) (Stericycle Limited).

Ref: PO_ 30148382_ Dt_13.06.2023

Project no: 23.008

Engineer: Suyog Kale

Best Regards,

M/s SRCL Limited Leeds (West) (Stericycle Limited).

C Seary.
Manager Facility Engineering



Stericycle
We protect what matters.

Commissioning Certificate

Date: 26/01/24

We are pleased to provide this commissioning certificate to M/s Yara Environmental Technologies Pvt. Ltd, Mumbai, India. for successfully Commissioning the SNCR(De-NOx) System for the plant at M/s SRCL Limited Leeds (East)(Stericycle Limited) Knowsthorpe Lane, Leeds LS9 0PJ4 0JR, United Kingdom.

Client: M/s SRCL Limited Leeds (Stericycle Limited).

Ref: PO_ 30148382_ Dt_13.06.2023

Project no: 23.008

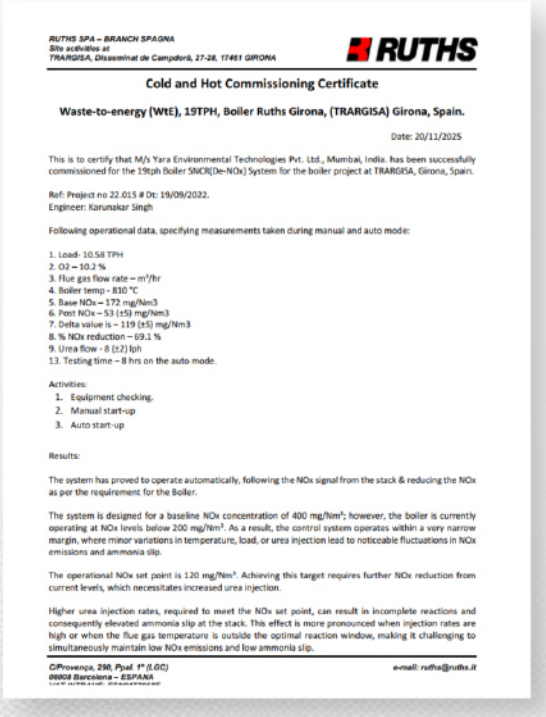
Engineer: Suyog Kale
i. Check of equipment
ii. Manual start-up
iii. Auto start-up
Activities:

Results:
The system has proved to operate automatically, following the NOx signal and no major issues have been observed.

Best Regards,

Colin Seary
Manager – Facility Engineering
M +44 (0) 774 747 4338 | cseary@stericycle.com
stericycle.com

Successful Commissioning & Client Testimonials



RUTHS SPA – BRANCH SPAGNA
Site activities at
TRARGISA, Disseminat de Campdorà, 27-28, 17461 GIRONA

RUTHS

Cold and Hot Commissioning Certificate

Waste-to-energy (WtE), 19TPH, Boiler Ruths Girona, (TRARGISA) Girona, Spain.

Date: 20/11/2025

This is to certify that M/s Yara Environmental Technologies Pvt. Ltd., Mumbai, India. has been successfully commissioned for the 19tph Boiler SNCR(De-NOx) System for the boiler project at TRARGISA, Girona, Spain.

Ref: Project no 22.015 # Dt: 19/09/2022.
Engineer: Karunakar Singh

Following operational data, specifying measurements taken during manual and auto mode:

1. Load- 10.58 TPH
2. O2 – 10.2 %
3. Flue gas flow rate – m³/hr
4. Boiler temp - 810 °C
5. Base NOx – 172 mg/Nm3
6. Post NOx – 53 (±5) mg/Nm3
7. Delta value is – 119 (±5) mg/Nm3
8. % NOx reduction – 69.1 %
9. Urea flow - 8 (±2) lph
13. Testing time – 8 hrs on the auto mode.

Activities:

1. Equipment checking.
2. Manual start-up
3. Auto start-up

Results:

The system has proved to operate automatically, following the NOx signal from the stack & reducing the NOx as per the requirement for the Boiler.

The system is designed for a baseline NOx concentration of 400 mg/Nm³; however, the boiler is currently operating at NOx levels below 200 mg/Nm³. As a result, the control system operates within a very narrow margin, where minor variations in temperature, load, or urea injection lead to noticeable fluctuations in NOx emissions and ammonia slip.

The operational NOx set point is 120 mg/Nm³. Achieving this target requires further NOx reduction from current levels, which necessitates increased urea injection.

Higher urea injection rates, required to meet the NOx set point, can result in incomplete reactions and consequently elevated ammonia slip at the stack. This effect is more pronounced when injection rates are high or when the flue gas temperature is outside the optimal reaction window, making it challenging to simultaneously maintain low NOx emissions and low ammonia slip.

C/Provença, 290, Ppal. 1ª (LOC)
08008 Barcelona – ESPANA
e-mail: ruths@ruths.it



Termomeccanica Ecologia

Commissioning Certificate

Date: 01/08/2025

We are pleased to provide this commissioning certificate to M/s Yara Environmental Technologies Pvt. Ltd, Mumbai, India. for successfully Commissioning the SNCR(De-NOx) System for the Waste to Energy plant at Musami Operações Municipais do Ambiente, EIM., SA – Sao Miguel, Portugal by TM.ESpA Termomeccanica Ecologia Via del Molo 1/B, 19126 - La Spezia, Itália

Client: TM.ESpA Termomeccanica Ecologia Via del Molo 1/B, 19126 - La Spezia, Itália
Ref PO: 2019630022/001.

Project no: 23.001

Engineer: Suyog Kale.

Activities:

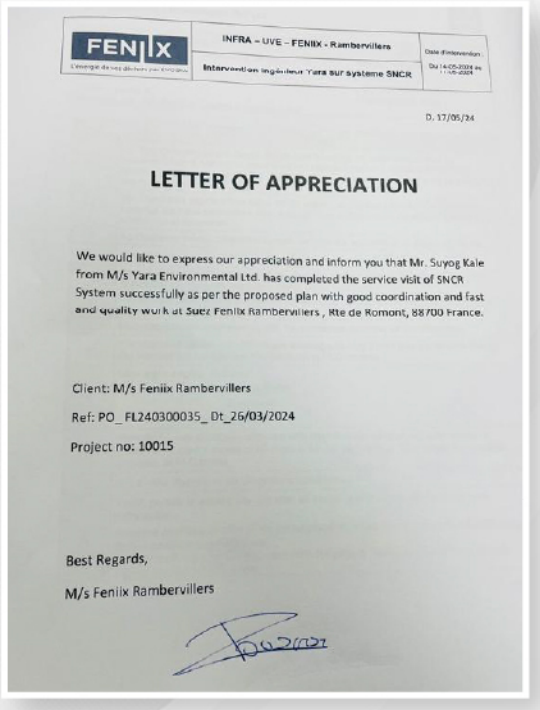
i. Check of equipment
ii. Manual start-up
iii. Auto start-up

Results:

The system has proved to operate automatically, following the NOx signal from stacks & reducing the NOx as per requirement for Boiler, no major issues have been observed.

Best Regards

TM.ESpA Termomeccanica Ecologia Via del Molo 1/B, 19126 - La Spezia, Itália



FENIX
L'énergie de vos déchets par Suez

INFRA – UVE – FENIX - Rambervillers
Intervention ingénieur Yara sur Système SNCR

Date d'intervention :
Du 14-05-2024 au 17-05-2024

D. 17/05/24

LETTER OF APPRECIATION

We would like to express our appreciation and inform you that Mr. Suyog Kale from M/s Yara Environmental Ltd. has completed the service visit of SNCR System successfully as per the proposed plan with good coordination and fast and quality work at Suez Fenilx Rambervillers , Rte de Romont, 88700 France.

Client: M/s Fenilx Rambervillers

Ref: PO_FL240300035_ Dt_26/03/2024

Project no: 10015

Best Regards,

M/s Fenilx Rambervillers

PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

SNCR Modules



Ammonia/Urea Storage Tank - GRP/SS









SNCR Pumping Skid Overview
Reagent, Water & Filling





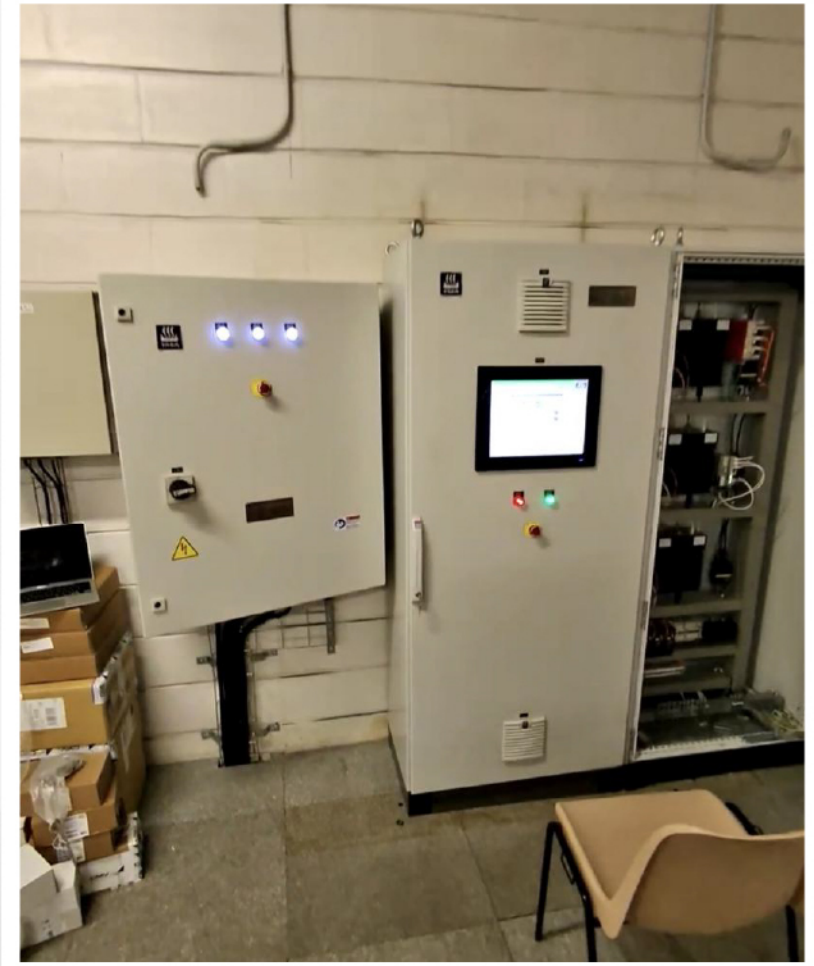
SNCR Process Unit
Mixing & Metering Cabinet





CMM Main Control & Power Distribution Panel





SNCR Modular Container Installation



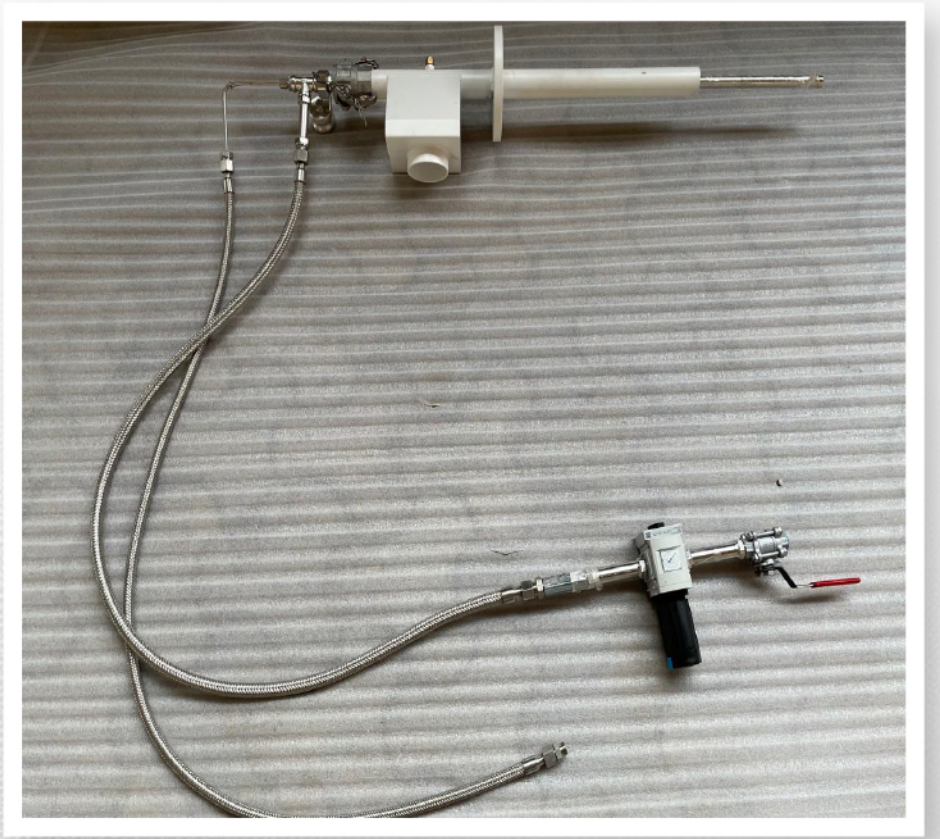






3050L X 2420B X 2600H

SNCR Injector Assembly
Cement & Industrial Boilers





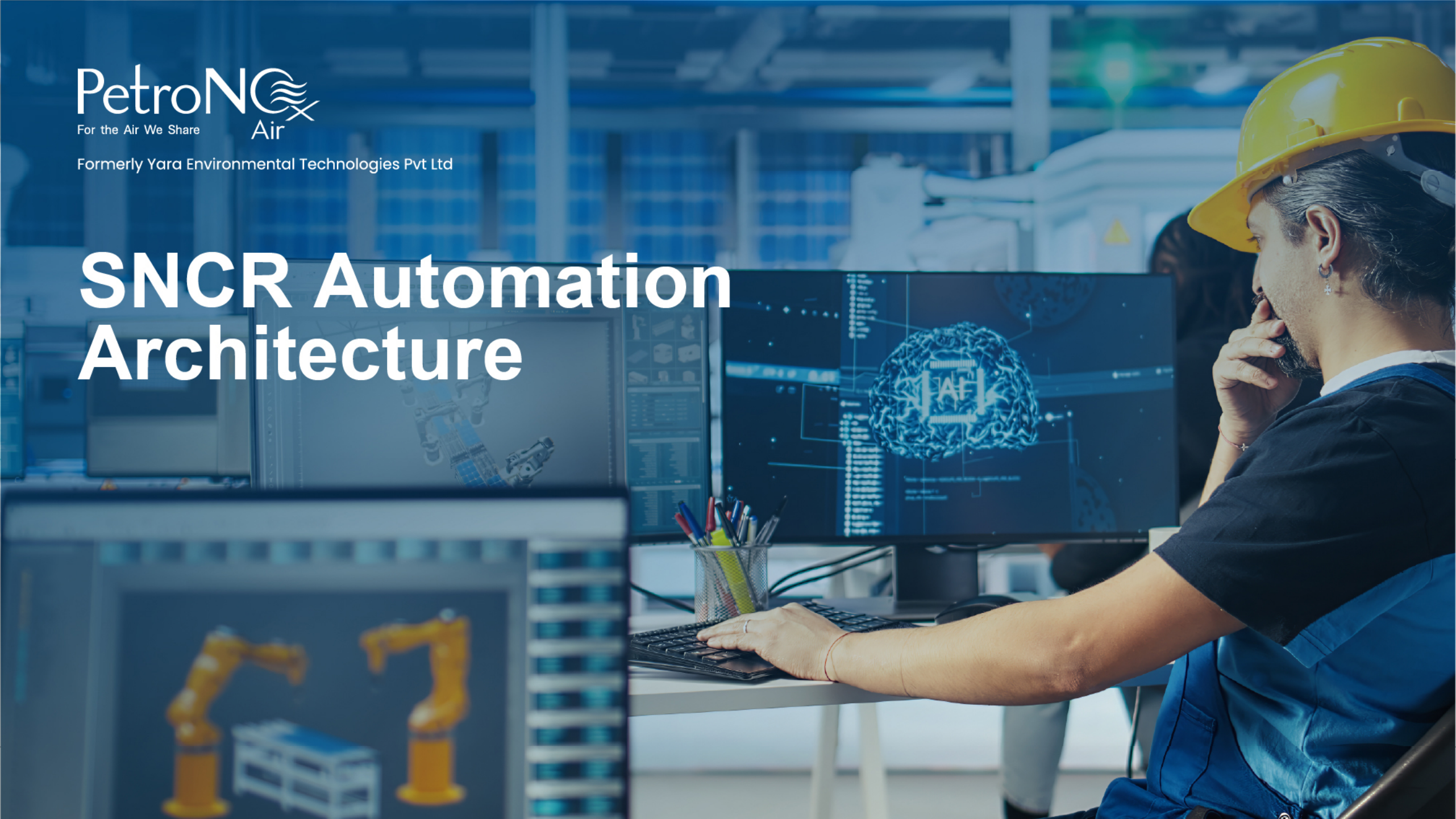


PetroNOx Air

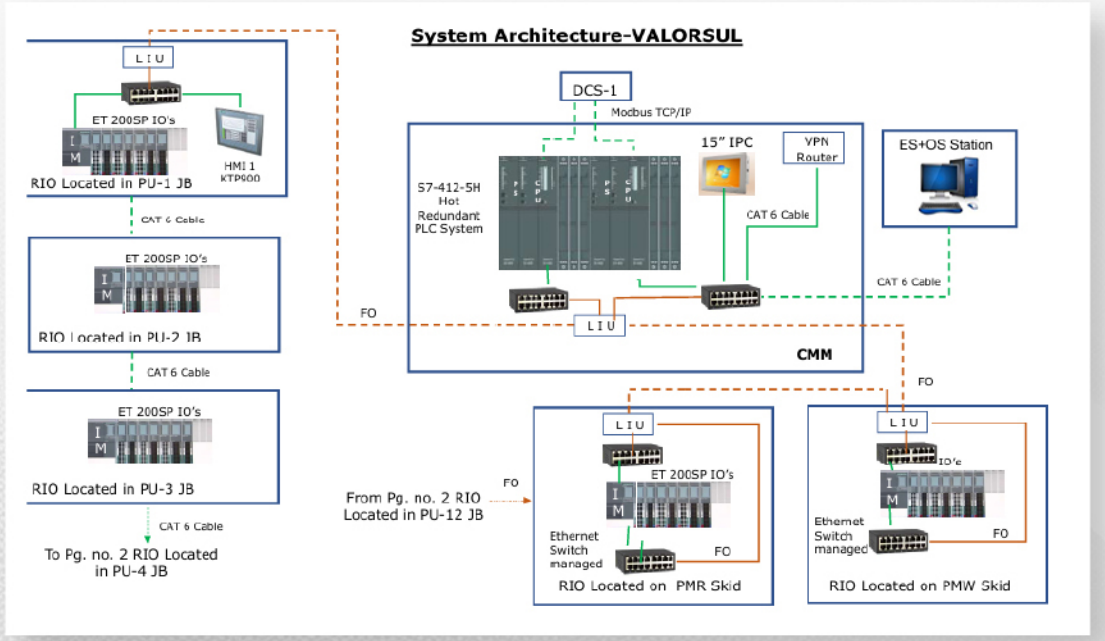
For the Air We Share

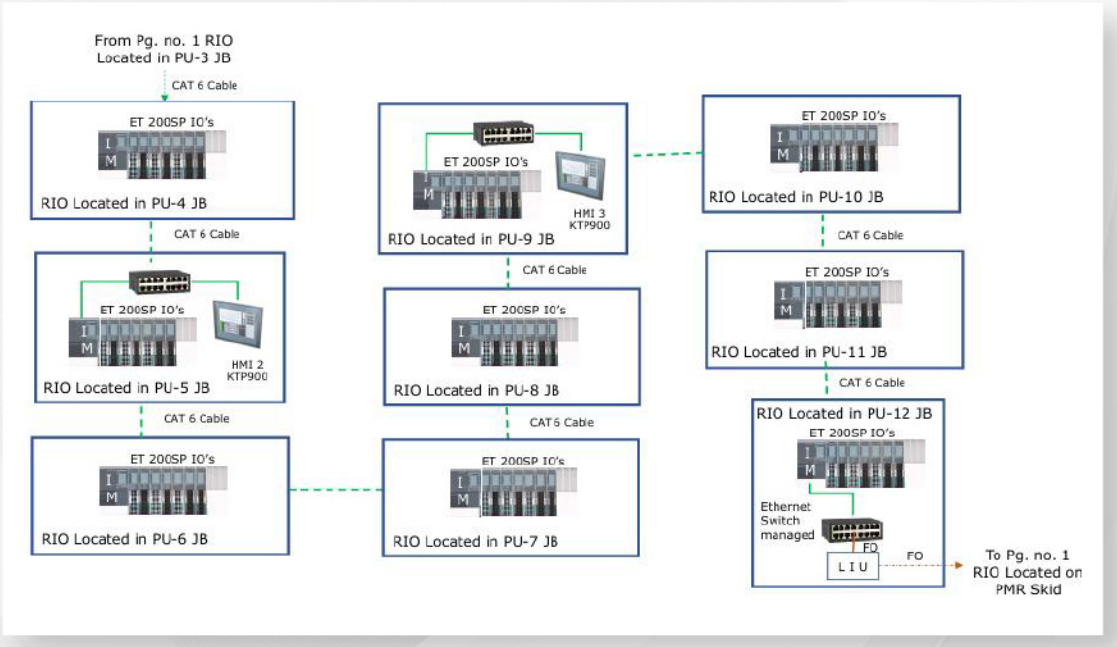
Formerly Yara Environmental Technologies Pvt Ltd

SNCR Automation Architecture



SNCR Automation Layout
Valorsul Lisbon





Control Philosophy – Valorsul

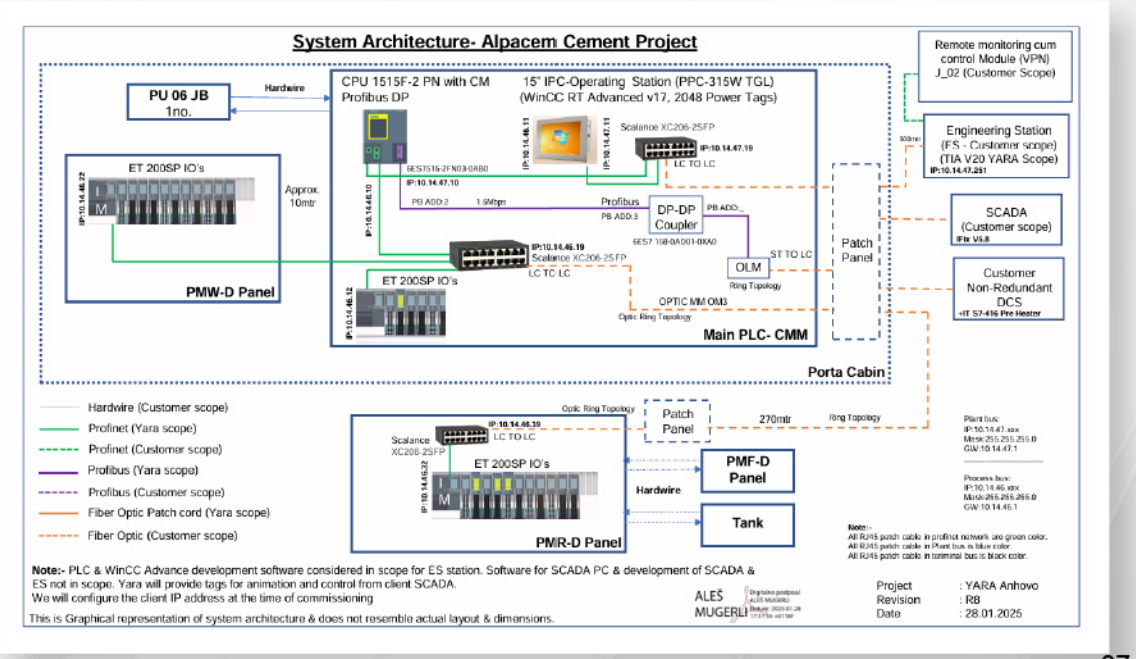
Architecture – Key Points (Valorsul SNCR System)

- **Central PLC:** Siemens **S7-412-5H hot-redundant PLC** in CMM executes SNCR control logic and interlocks
- **Remote I/O:** Multiple **ET200SP RIO** panels installed in **PU junction boxes and skids (PMR & PMW)** collect field signals
- **Boiler Layout: 3 Boilers** in total I **4 Process Units (PU) per boiler** I Each PU connected through local RIO panels
- **HMI Arrangement: 1 HMI provided for every 4 PUs (per boiler)** I Local operation available near process area
- **PLC Communication:** RIO ↔ PLC via Profinet over CAT6 Ethernet
- **Network Backbone (Important): Fiber-optic ring topology using managed switches & LIU modules** I Provides communication redundancy - if one cable fails, network remains active from opposite direction
- **Plant Integration:** PLC communicates with DCS via **Modbus TCP/IP**
- **Operator Stations:** 15” IPC and ES+OS station for monitoring, alarms, and operation
- **Remote Access:** VPN router for diagnostics and support

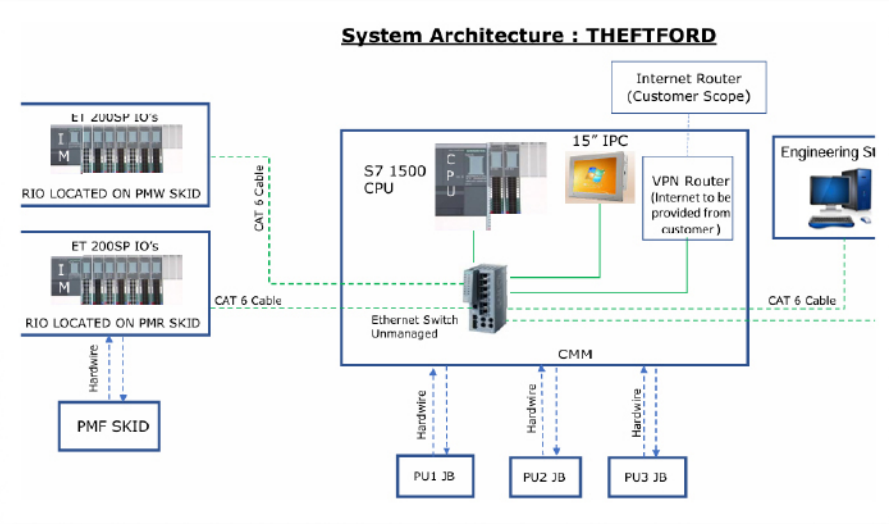
SNCR Automation Layout - Alpacem Slovenia

Architecture – Key Points

- **Central PLC:** Siemens PLC in main control panel executes SNCR logic, dosing control, and interlocks
- **Remote I/O:** ET200SP panels installed near field ment equipcollect all analog & digital signals
- **Field Signals:** Sensors, analyzers, valves, and pumps wired locally to RIO panels (short cabling)
- **PLC Communication:** RIO PLC via Profinet industrial Ethernet (CAT6)
- **Plant Integration:** PLC Plant DCS/SCADA via Profibus / Modbus TCP/IP
- **Network Backbone:** Fiber-optic network through aged manswitches for long distance & reliability
- **Operator Interface:** HMI and IPC stations for monitoring, alarms, trends, and manual operation
- **Remote Access:** VPN enabled for diagnostics and maintenance support



SNCR Automation Layout _Thetford UK

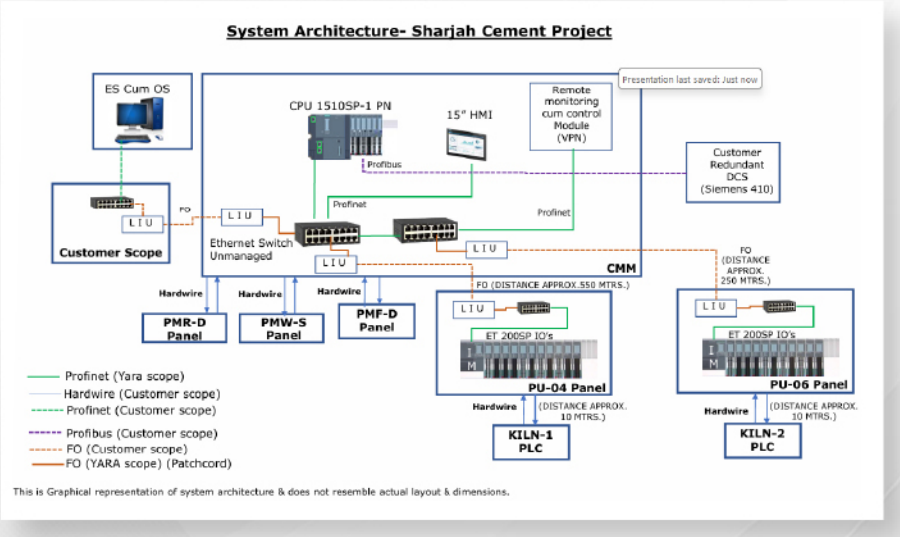


- **Central PLC:** Siemens S7-1500 CPU in CMM panel performs SNCR control logic and interlocks
- **Remote I/O:** ET200SP panels installed on PMR & PMW skids and plant junction boxes collect field signals
- **Field Signals:** Sensors, valves, and pumps hardwired locally to nearby RIO panels (short cabling)
- **PLC Communication:** RIO PLC via Profinet over CAT6 Ethernet
- **Plant Integration:** PLC exchanges signals with Customer DCS
- **Network:** Ethernet switch connects PLC, IPC and engineering station
- **Operator Interface:** 15" IPC used for monitoring and operation
- **Remote Access:** VPN router provided for remote diagnostics

SNCR Automation Layout_Sharjah Cement

- **Central PLC:** Siemens CPU 1510SP-1 PN installed in CMM panel performs SNCR control logic and interlocks
- **Remote** I/O: ET200SP panels located at PU-04, PU-06, PMR-D and PMWS panels acquire field signals
- **Field Signals:** Sensors, analyzers, valves and pumps hardwired locally to nearby RIO panels
- **PLC Communication:** RIO PLC via Profinet (industrial Ethernet)
- **Long Distance Network:** Fiber-optic Profinet links (approx. 250–550m) through LIU modules
- **Plant Integration:** PLC communicates with customer redundant Siemens DCS (S7-410) via Profinet/Profibus

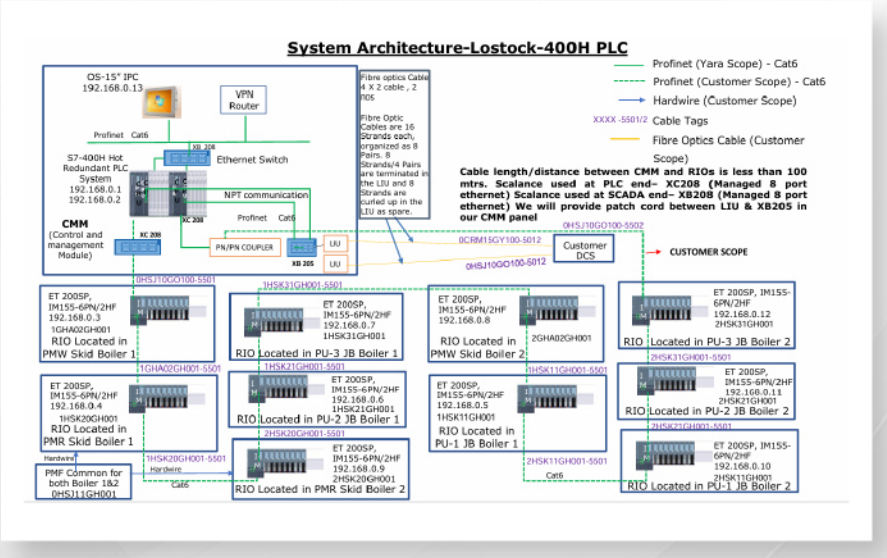
- **Kiln Interface:** Hardwired signals exchanged with Kiln-1 and Kiln-2 PLCs
- **Operator Interface:** 15" HMI and ES/OS station for monitoring and operation
- **Remote Access:** VPN module for remote monitoring and diagnostics



SNCR Automation Layout_Lostock UK

Architecture – Key Points (Lostock – 400H PLC System)

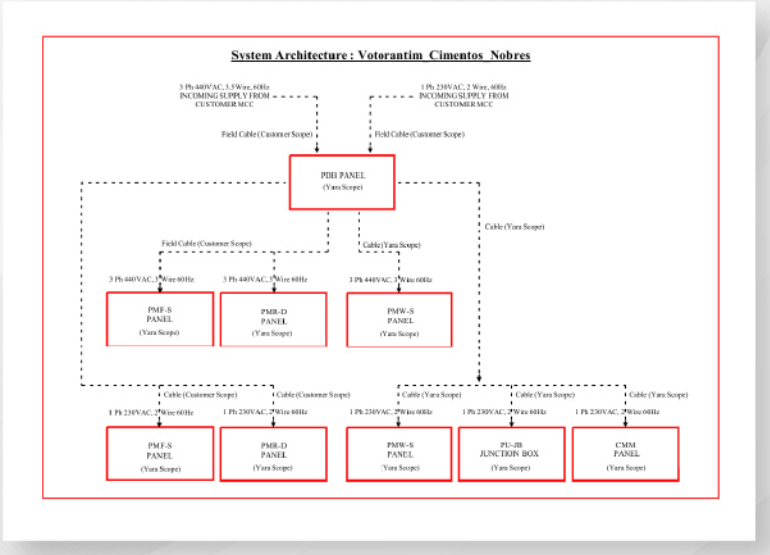
- **Central PLC:** Siemens S7-400H hot-redundant PLC in CMM panel performs full SNCR control and interlocks
- **Remote I/O:** Multiple ET200SP IM155-6PN/2HF RIO panels located across Boiler-1 & Boiler-2 skids and junction boxes
- **Field Signals:** Sensors, valves, analyzers and pumps hardwired locally to nearby RIO panels
- **PLC Communication:** RIO PLC via Profinet over CAT6
- **Network Backbone:** Managed Ethernet switches and fiber-optic links through LIU for reliable long-distance communication
- **Plant Integration:** Data exchange with customer DCS via network communication
- **Operator Interface:** 15” IPC operator station connected through Ethernet
- **Remote Access:** VPN router provided for diagnostics and support



SNCR Automation Layout_Lostock UK

Architecture – Key Points (Votorantim Cementos Nobres SNCR System)

- **Central PLC:** Allen-Bradley CPU-1769 in CMM panel performs SNCR control logic and interlocks
- **Remote I/O:** 1734-AENT remote I/O stations installed at PMR-D and PMW-S panels collect field signals
- **Field Signals:** Sensors, valves, and pumps hardwired locally to nearby RIO panels
- **PLC Communication:** RIO PLC via Profinet over CAT6 Ethernet through managed switch
- **Long Distance Network:** Fiber-optic communication (up to ~200 m) between plant areas and DCS
- **Plant Integration:** PLC communicates with customer PLC/DCS for monitoring and commands
- **Operator Interface:** 15” IPC operator station connected to PLC network
- **Remote Access:** VPN router for remote diagnostics and support



PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

SNCR System Guided Operation video

SNCR System Demonstration



PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

Anhydrous Ammonia Storage/Vaporization System

Major Equipment & System Components

The ammonia storage and handling system comprises seven critical components designed for safe, efficient NOx reduction in the thermal power plant's emission control system.

- **Unloading Skid**

Specialized equipment for safe ammonia transfer from delivery trucks to storage systems, featuring automated controls and safety interlocks.

- **Ammonia Vaporizer Skids**

3 units - Heat exchange systems converting liquid ammonia to gas phase for injection into the SCR system.

- **Support Structures**

Engineered pipe and cable rack systems providing secure mounting and routing for all interconnecting utilities.

- **Compressor Skid**

High-performance compression unit maintaining optimal pressure conditions throughout the ammonia distribution network.

- **Ammonia Flow Control Units**

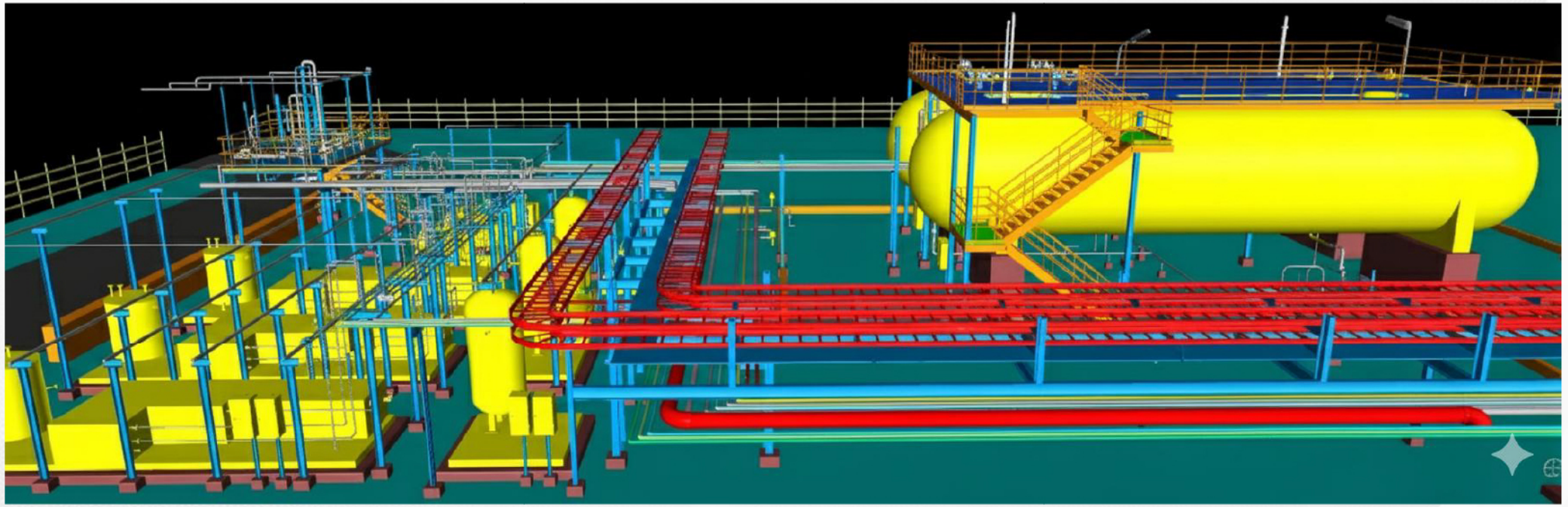
4 units - Precision flow control systems ensuring accurate ammonia dosing for optimal NOx reduction efficiency.

- **Anhydrous Ammonia Storage Tanks**

2 units - Pressure vessels designed for longterm, safe storage of anhydrous ammonia with advanced monitoring systems.

- **HCl Dosing Skid**

Hydrochloric acid injection system for mercury control and additional emission reduction capabilities.



Ammonia Supply & Handling System (ASHS)

The ASHS delivers anhydrous ammonia as a reagent to each boiler unit, consisting of two SCR of two SCR- Reactors per boiler. The system is designed with two storage tanks and specialized specialized unloading equipment for truck cisterns, all installed in a HAZARDOUS area area classification requiring stringent safety protocols and equipment specifications.

YARA supplied the Ammonia Supply & Handling System (ASHS) for the L&T-MHPS Boilers Private Limited (LMB) project SJNV, BUXAR 2x660 MW project. This comprehensive system serves two hard coal-fired boilers, each generating live steam for 660 MWel output with separate SCR units for emissions control.

Main System Components

Unloading Station

Two unloading arms and compressors for safe truck-to-tank transfer with gas balancing system.

Storage Tanks

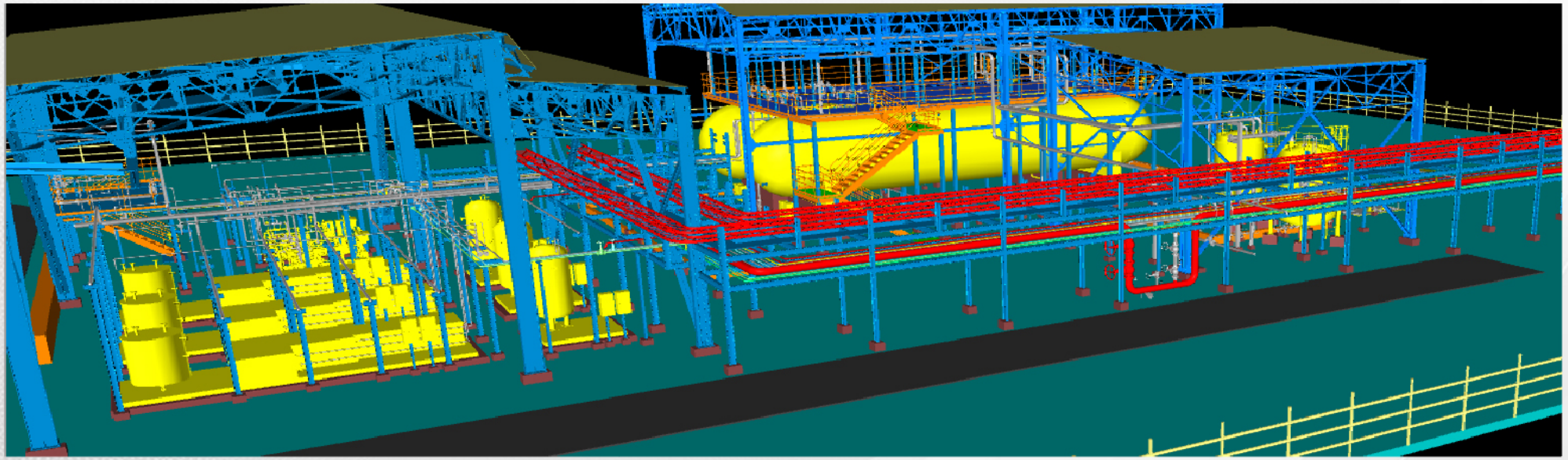
Two 233m³ tanks, each storing 14 days of ammonia supply at maximum load capacity.

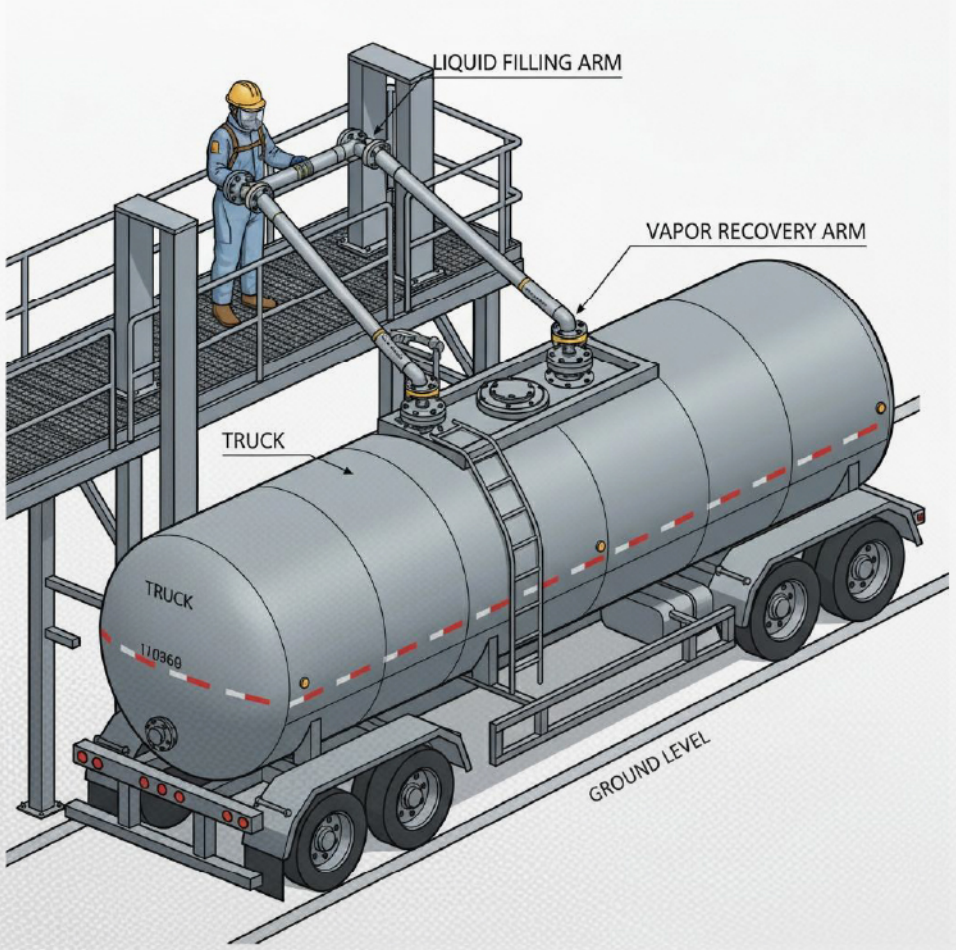
Vaporization System

Three steam-heated vaporizers (2 operational + 1 standby) with pressure regulation.

Flow Control Units

Four AFCU skids providing precise ammonia dosing to each SCR reactor.





Unloading Operations

01

Truck Connection

Loading arms connect to truck with emergency release couplings and safety interlocks.

02

Closed Transfer

Compressors create pressure differential differential while gas balancing prevents prevents atmospheric release.

03

Gas Recovery

Vapor recovery system captures remaining ammonia gas from empty trucks. trucks.

Unloading Compressors

Two Blackmer LB362C vertical reciprocating, air-cooled compressors. Single stage/double packing design with 40.41 m³/h displacement at 545 RPM. 20 HP motors with Ex'd, IIA/IIB enclosure, IP55 protection.



Max. Design Pressure : 350 PSI
Max. Design Temp : 70 deg. C
Material : Carbon Steel
Inlet connection :2” ANSI, 300#
Outlet connection : 3” ANSI, 300#

Storage Tank Specifications



233.2

Tank Capacity

Cubic meters gross capacity per storage tank, designed for 14 -14- day ammonia supply at maximum load conditions.

23

Design Pressure

Bar maximum allowable working pressure with stressrelieved fabrication and comprehensive safety systems.

85%

Fill Factor

Maximum safe filling percentage to accommodate thermal expansion and maintain vapor space for pressure equilibrium.

126

Liquid Capacity

Metric tons of anhydrous ammonia ammonia storage capacity per tank tank at 3.3°C operating temperature.

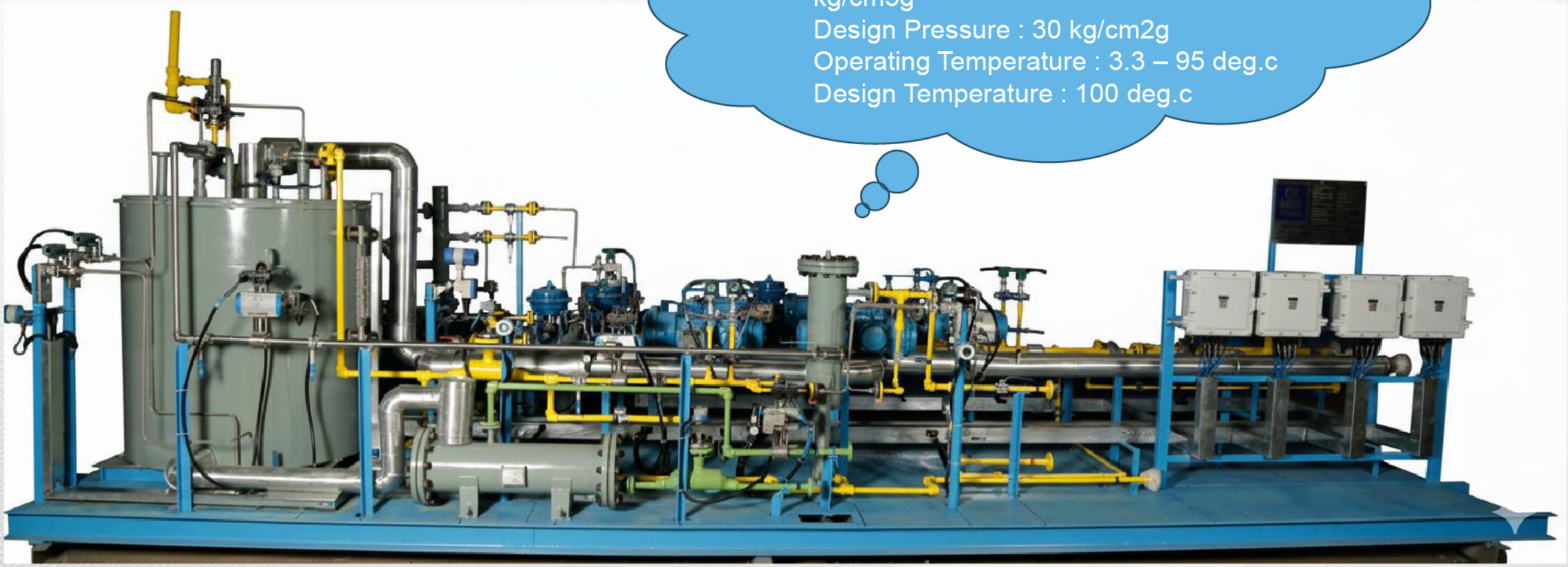
Design temperature

-33°C to + 55°

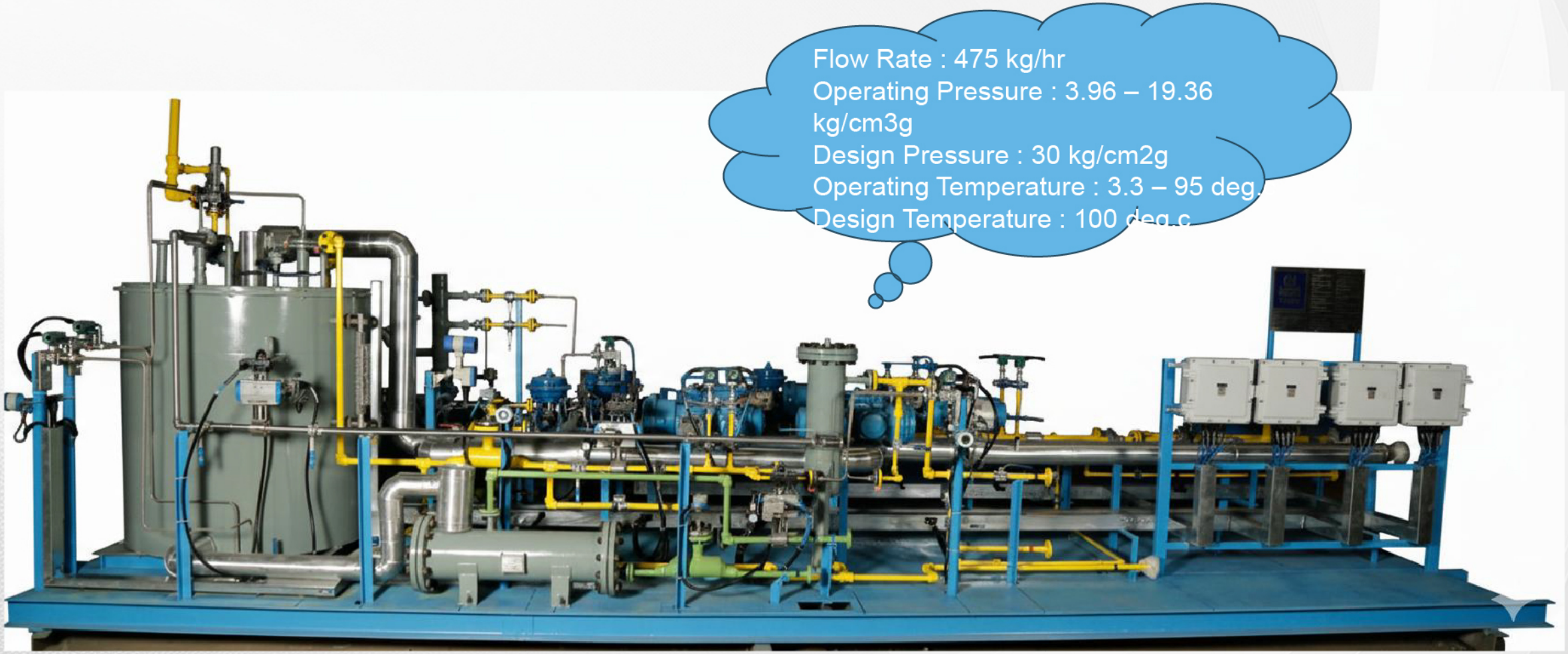
Each storage tank incorporates multiple safety systems including dual safety relief valves, emergency relief valves, relief valves, excess flow valves on all connections, comprehensive instrumentation for pressure, temperature, and temperature, and level monitoring, and integrated sprinkler cooling systems for emergency temperature control.

Vaporizer System *9000L X 2500B X 3200H*

Flow Rate : 475 kg/hr
Operating Pressure : 3.96 – 19.36 kg/cm3g
Design Pressure : 30 kg/cm2g
Operating Temperature : 3.3 – 95 deg.c
Design Temperature : 100 deg.c



Vaporizer System *9000L X 2500B X 3200H*

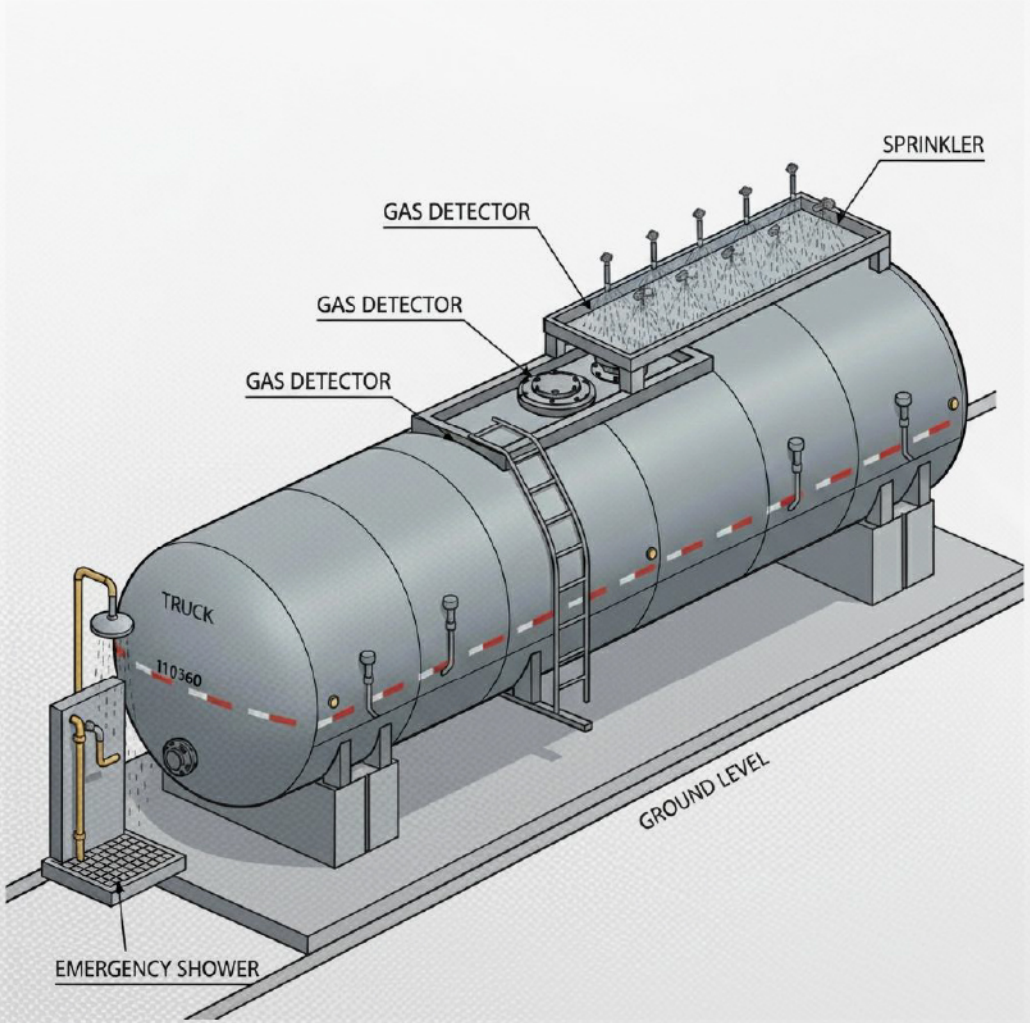


Accumulator for Pressure Control *2500L X 2400B X 3951H*



Accumulator skid
Operating Pressure : 19.39 kg/cm3g
Design Pressure : 22.52 kg/cm2g
Operating Temperature : 27 deg.c
Design Temperature : 75 deg.c
Water Capacity : 3088 litre
Empty Weight : 8000 kg
Hydrostatic Pressure : 29.3 kg/cm2g

Safety Systems & Monitoring



Gas Detection

Multiple NH_3 sensors with 25 ppm (yellow) and 50 ppm (red) alarm thresholds throughout facility.

Sprinkler Systems

Water spray systems for tank cooling and ammonia gas absorption in leak scenarios. scenarios.

Emergency Showers

Seven safety shower stations for full body and eye washing at critical locations.

Emergency Controls

Push buttons, signal lamps, and automatic valve closures for rapid response.

PetroNOx Air

For the Air We Share

Formerly Yara Environmental Technologies Pvt Ltd

