



**Hindustan Urvarak & Rasayan Limited**

**Fertilizer Plants  
at  
Gorakhpur, Sindri & Barauni**

# Hindustan Urvarak & Rasayan Ltd.



**Establish & Operate State of Art  
Environment Friendly & Energy  
Efficient Natural Gas Based New  
Fertilizer Complex**

# **Advance Automation In HURL**

# INTRODUCTION



HURL is setting up Ammonia Urea Fertilizer Complex along with its associated offsite & utility facilities with PDIL as consultant, at the three locations:

1. **Gorakhpur, Uttar Pradesh, India**
2. **Barauni, Bihar, India.**
3. **Sindri, Jharkhand, India.**

The Ammonia & Urea Plants will each be having capacity of 2200 MTPD & 3850 MTPD.

The contract of **Gorakhpur** Plant has been awarded to the consortium of M/S TOYO, Japan and M/S TOYO, India with its completion target in 1<sup>st</sup> Quarter of 2021.

The contract of **Barauni** and **Sindri** Plant has been awarded to the consortium of M/S Technip, France, M/S Technip, India and M/S Larson & Turbo Hydrocarbon Engg (LTHE), India with their completion targets in 2<sup>nd</sup> Quarter of 2021.

# INTRODUCTION



## MAJOR FACILITIES



- **Ammonia Plant**
- **Urea Plant with Neem Oil Storage, Handling & Coating facilities**
- **Cooling Towers related to Ammonia & Urea plants**
- **Flare System**
- **Ammonia Storage and Its Dedicated Flare System**
- **Common Central Control room housing Ammonia/ Urea/Offsites facilities.**
- **Local Control rooms for CPP and Ammonia Storage**
- **Electrical Sub-station for Ammonia, Urea plants, Ammonia storages & cooling towers**
- **Laboratory building**
- **Effluent Treatment Plant for Ammonia/Urea plants**
- **Gas Turbine Generators and Heat Recovery Steam Generator**
- **Emergency Diesel Generator set including bulk oil storage tank with pumping facility.**
- **Semi Automatic Bagging Facility.**

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In order to build latest State of Art Environment Friendly & Energy Efficient Natural Gas Based New Fertilizer Complex **Targeting FERTILIZER BEST Global Energy Efficiency figure of 4.907 Gcal/MT of Urea**, following Advance Automation has been considered with Dedicated and Separate system for Urea/Ammonia/Offsite facility at HURL:

- Dedicated Redundant Electronic micro-processor based DCS System.
- SIL3 certified dedicated PLC (TMR/QMR/VMR/FMR) based Emergency Shutdown System for plants.
- SIL3 certified dedicated PLC (TMR/QMR/VMR/FMR) based System for Fire & Gas and Ammonia Storage Control/Shutdown (same make /model as of main plant ESDS).
- GTG/HRSG/BMS System For CPP.

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- **Emergency Diesel Generator System with Dedicated Diesel Tank.**
- **PIMS-Plant information management System.**
- **AIMS-Alarm Information Management System with automatic alarm generation report and auto SMS.**
- **Advance Process Control system for Process Optimization.**
- **ITCC based dedicated Control System for all Compressors.**
- **Mass Spectrometer Based Analyzer System.**
- **Operator Training Simulator for Urea and Ammonia Plants.**
- **Dedicated Historian for data Storage.**
- **Dedicated CCTV system with Large Video Display for plant monitoring.**
- **RTDBMS system for long term trends across the complex.**

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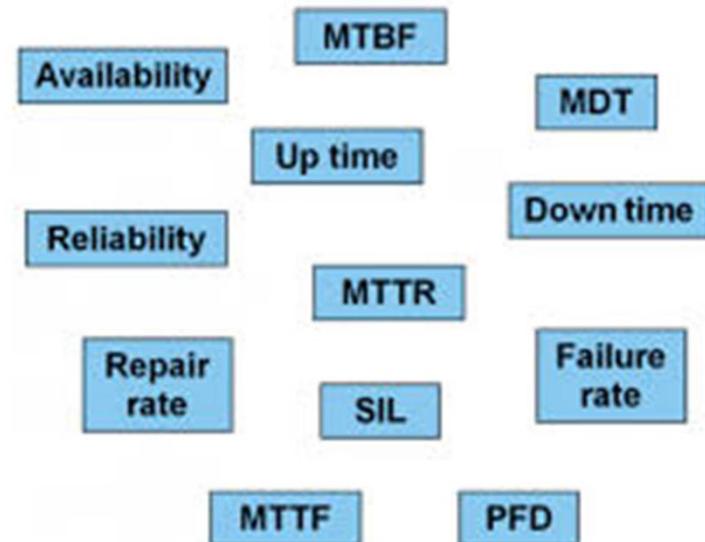
- **Continuous Emission Monitoring System through dedicated Analyzers with their Hook with CPCB.**
- **Dedicated Clean Agent System for all control rooms.**
- **Latest EPABX systems covering the whole complex.**
- **Dedicated Machine Monitoring System with System-1 Monitor Enterprise and Rule packs for monitoring and Diagnostics of critical machines.**
- **POS/ MOS facility for ease of operation and maintenance.**
- **Dedicated On-Off valves for Process Isolation.**
- **Fire Alarm System to monitor all buildings.**
- **Gas Detectors, Dedicated Deluge System for fire monitoring and control.**

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## What ADDITIONAL differences are being made at HURL?????

- All Instruments irrespective of their location/SIL study considered are minimum SIL capable/certified with details as below:-
  - All Partial Stroke Testing (PST) shall be implemented by SIL3 mechanism.
  - All Transmitters - SIL2
  - All Smart Positioners, SIL 2
  - All Solenoids – SIL 3
  - All Gas Detectors – SIL2
  - All Relays – SIL 3
  - All Barriers – SIL 3

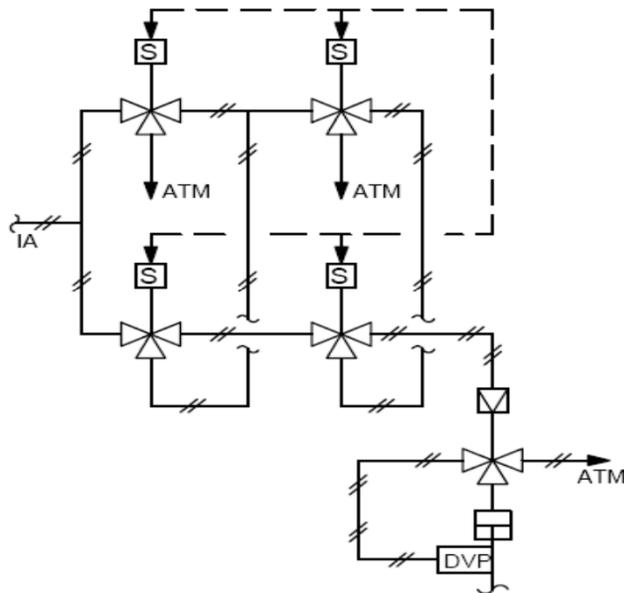


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- All Trip solenoids considered are dual redundant, IS certified with SS316L as its MOC . Critical operational loops are separately identified and provided with 2oo3 SOV philosophy with plunger feedback in control system.
- Partial stroke testing (PST) considered for all ESD valves with Remote testing facility.



SOLENOID VALVE WITH 2OO3 VOTING,  
ONLINE COIL CHANGE-OVER FACILITY  
& PARTIAL STROKE TESTING

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- Where ever valve position feedback is used in tripping, it is designed on 2003 philosophy.



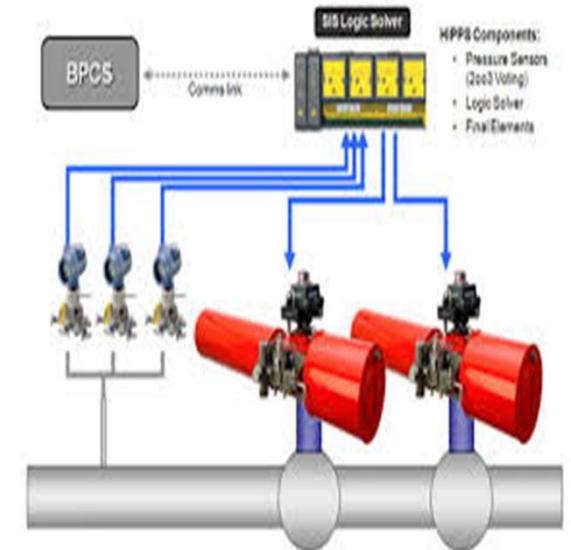
- Redundant Mass Spectrometers configuration connected to APC is considered for plant optimization and increased analyzer availability .



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- LVS (large Video screen) considered for CCTV monitoring.
- All servers and engineering stations are Industrial Server grade PC (Raid-5 configuration).
- All plant ESD are SIL-3, TUV certified based on TMR/QMR/VMR/FMR technology for very high degree of reliability, .
- All interlock and control transmitters considered separate right from field junction box to DCS/ESDS I/O Modules.
- Parameters, which are directly or indirectly tripping the plant or may cause production loss are based upon 2 out of 3 transmitter trip voting interlock in ESDS.
- 3", 300# Diaphragm seal Instruments are considered for all condensing, congealing and corrosive services.



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- All trip parameters are provided with separate Process Override (POS) and Maintenance Override Switch (MOS) switches for ease of process and maintenance function.
- Dedicated Fire and Gas (FGS) SIL3 certified QMR/TMR/VMR/FMR PLC for FGS functionality considered for monitoring all plant Fire & Gas detectors, deluge valves and fire water pump house monitoring.
- 5-Path Ultrasonic flowmeter for custody transfer and performance guarantee.
- Clamp-on type Ultrasonic flowmeter for Cooling water applications.
- Ultrasonic insertion type 1 path for Flare applications.
- All Junction boxes for IS signals are considered with SS304 MOC.
- All soft parts are considered with Silicone/EPDM MOC.



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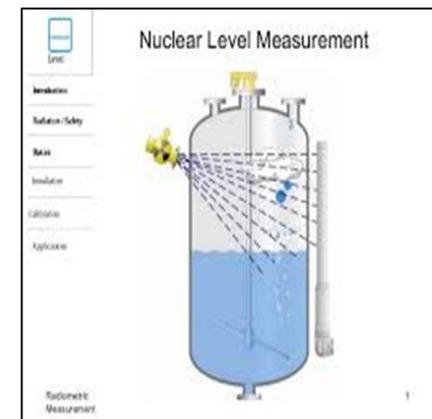
- Separate graphics indicating the healthiness of all 2003 interlock status are asked with deviation alarms for alerting operators.
- Dual monitors are considered for all Operator consoles.
- Dual personality ES with OS.
- Ammonia Storage, CPP parameters can be viewed from CCR.
- All vibration logic are designed on 2004, Axial and Overspeed logic on 2003 philosophy.
- All fittings in the complex are standardized to inches to reduce inventory.
- All power supply, MCB, power feed modules and diode O-rings are monitored in control system for their healthiness.



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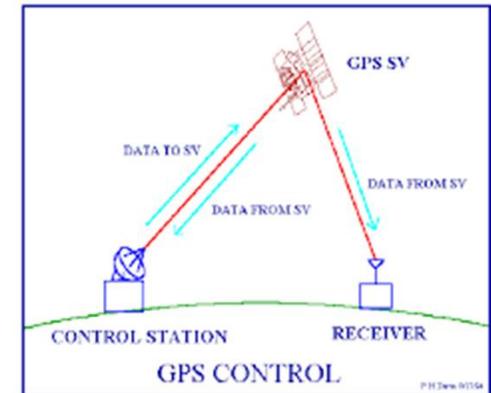
- Network securities is considered in all control rooms as per IEC 62443 for protection of the system from both internal and external threat.
- Nucleonic Gauge detectors are considered with cooling water arrangement to ensure healthiness and long availability.
- The spare contact of the relay of final DO command going to MCC for all critical drives are wired back to System.
- All DO signals from BN system are wired to plant ESD on 2oo3 philosophy.
- All control valves are provided position feedback signals.
- Auto Start for all critical drives are designed on 1oo2 philosophy.
- No switches are considered in project and interlocks are designed on transmitters.



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- Ceramic capped Bentley Probes are considered for ammonia services.
- All Valve actuators shall be designed with 1.5 times factor of safety.
- GPS based time synchronization has been considered for the complete complex to ensure all systems show same timing.
- All steam valves are provided with FC9 body to ensure reliability.
- First Out feature is considered for all systems for ease of trip analysis.
- Cuvettes are considered for process gas analyzers where ever possible.
- Semi Automatic Bagging facility is considered for control of Demurrage.



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- No tripping parameters are interfaced through serial communication and soft links.
- All control and trip transmitters are hooked up with separate Process Tapings.
- For all motors current indication in DCS for rating more than 5 KW.





**Any Questions**

# Thank you