BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-21-Feb-24

CORRIGENDUM- 01

PROJECTs	**:**	**2 X 660 MW ENNORE TPS**
PACKAGE	**:**	**PRE-TREATMENT PLANT**
GeM Bid NO	**:**	**GEM/2024/B/4653632 Dated 17.02.2024**
SUBJECT	**:**	**TECHNICAL AMENDMENT # 1**

Type of Corrigendum			
Technical Corrigendum -	☑	Commercial Corrigendum -	☐

Bidders are requested to go through the following -

1. Please refer attached Technical Amendment#1.

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

Yours faithfully,

For and on behalf of BHEL

Sumeet Sahay

Digitally signed by Sumeet Sahay
DN: cn=Sumeet Sahay, o=BHEL, ou=Manager, email=sumeetsahay@bhel.in, c=IN
Date: 2024.02.21 14:32:38 +05'30'

Sumeet Sahay
Manager/BOP

The following modifications with respect to Technical Specification for **Pre Treatment Plant,** BHEL's Technical specification no **PE-TS-412-158-A002** shall apply.

Bidder to note that existing clauses/details as appearing in the specification stands deleted and clauses/details as mentioned in "Modified to or Read as" column shall be applicable and complied by the bidder.

MODIFIED CLAUSES/PAGE NUMBERS.

Sl No.	Vol. No.	Section/Description	Clause no	Page no	Existing clause/details	Modified to or Read as
1.0	IIB	SECTION– D	----------	399 to 448 of 567	The Pages from 399 to 448 of 567 were missed.	The same is enclosed.
2.0	IIB	SECTION– D	----------	449 of 567	The page number showing as 7 of 7 (at bottom of the page).	The same is corrected as Page 449 of 567 (Refer Enclosed Document).

DOC023.53.03231

ULTRATURB sc
basic/plus/seawater

User Manual

07/2017, Edition 7

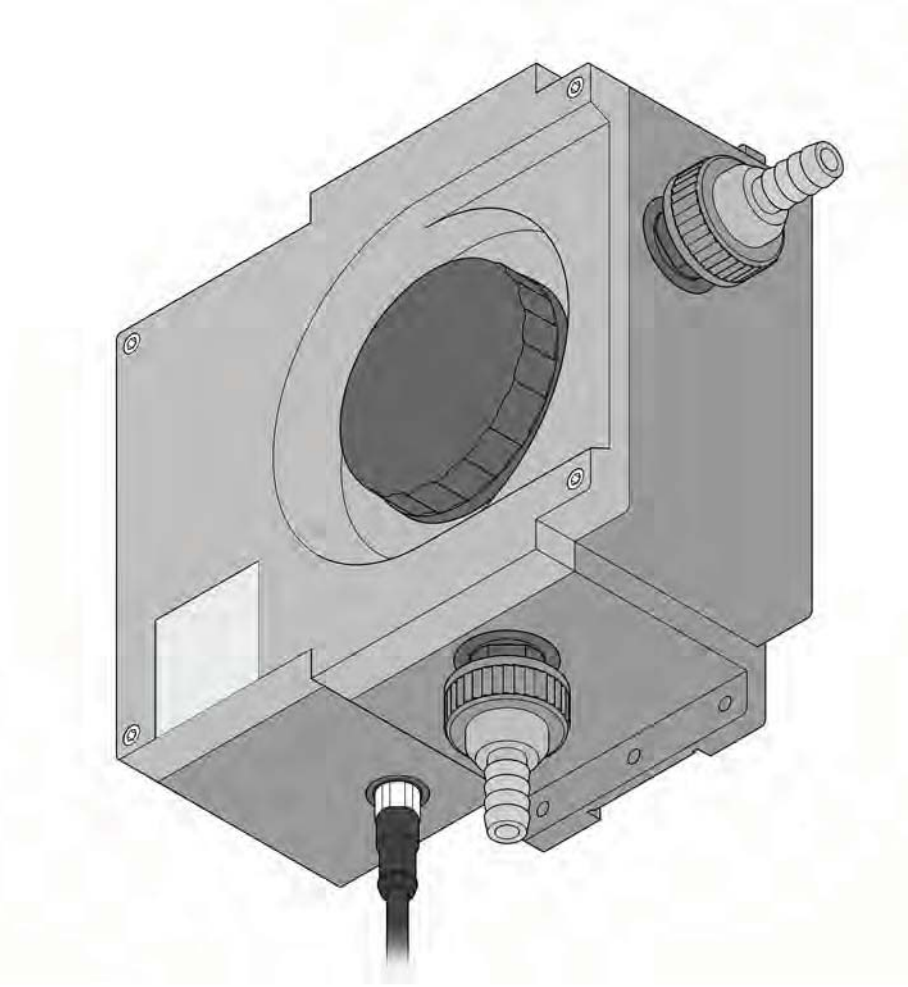


Table of contents

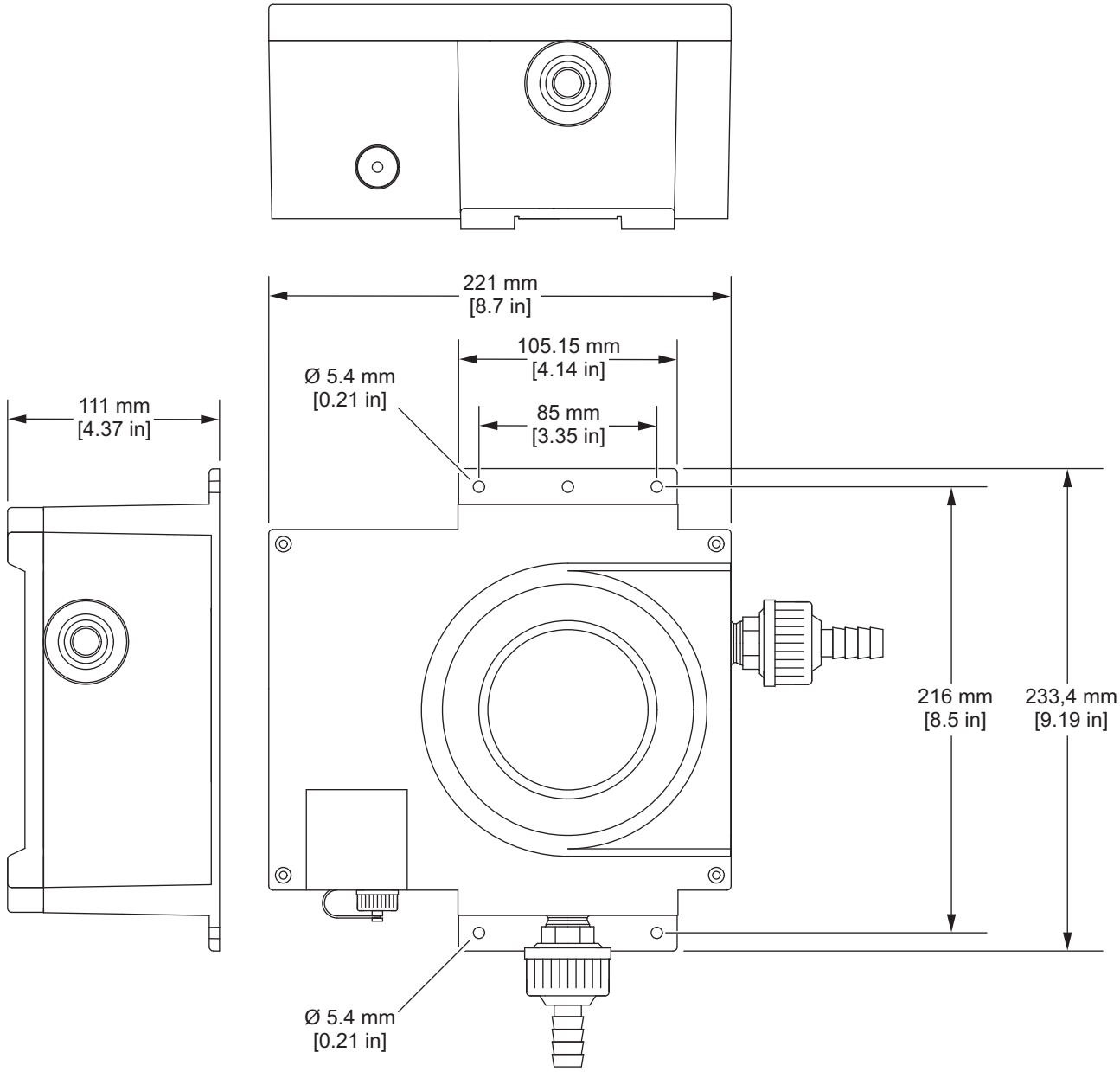
Section 1 Specifications

Components	Microprocessor-controlled turbidity bypass sensor ULTRATURB sc for very low to medium turbidities with comprehensive self-diagnostics
Measuring technique	90° infrared pulse scattered light technique in accordance with DIN EN ISO 7027
Measuring range	0.0001–1000 FNU (TE/F, NTU, FTU) can be programmed as required (0.0001–250 EBC = 2500 ppm SiO2)
Resolution	0.0001–0.9999 / 1.00–9.99 / 10.0–99.9 / 100–1000 FNU
Precision	±0.008 FNU or ±1 % of the measured value (0–10 FNU)
Reproducibility	±0.003 FNU or ±0.5 % of the measured value (0–2 FNU)
Technique variation coefficient	1 % in accordance with DIN 38402
Response time	1–60 s (can be programmed as required)
Air bubble compensation	Physical-mathematical
Calibration	Permanently set in the factory (Validation using formazine, StablCal, dry standard CVM)
Sample flow rate	Min. 0.2 L/min, max. 1 L/min, max. 6 bar (at 20 °C (at 68 °F))
Sample temperature	Max. 50 °C (Max. 122 °F)
Salt content of the probe (only for *seawater*)	Tested up to 65 g/L
Ambient temperature	+2 °C to +40 °C (+ 36 °F to +104 °F)
Sample connection	Tubing (ID 13 mm) or fixed connection (PVC system component pipework)
Automatic cleaning of the measuring chamber (only for *plus* and *seawater*)	Automatic wiper cleaning, time controlled and as required
Materials	Measuring window: quartz
	Measuring chamber: Noryl GFN2
	Wiper axle: stainless steel 1.4571
	Wiperarm (*seawater*): titanium alloy
	Wiper profile: silicone
Housing	Enclosure rating: IP 65 Plastic housing ASA
Inspection interval	Once a year, service contract on request with warranty extension of five years; please request a quote
Dimensions	(W × H × D) 250 × 240 × 110 mm
Mass	Approx. 1.5 kg
User maintenance	*basic*: 2 h / month, typical *plus* and *seawater*: 0.5 h / month, typical

Specifications are subject to change without notice.

1.1 Dimensions

Fig. 1 ULTRATURB sc dimensions



2.1 Safety information

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

To ensure that the protection provided by this equipment is not impaired, do not use or install this equipment in any manner other than that specified in this manual.

2.1.1 Use of hazard information

DANGER
Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a potentially hazardous situation that may result in minor or moderate injury.

Important note: *Information that requires special emphasis.*

Note: *Information that supplements points in the main text.*

2.1.2 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol, if noted on the instrument, will be included with a danger or caution statement in the manual.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user. ***Note:*** *For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment, producer-supplied electrical accessories and all auxiliary items for proper disposal.*
	This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists.

2.2 Applications

ULTRATURB sc bypass sensors are innovative precision turbidity measuring instruments developed using the latest technical findings.
ULTRATURB sc bypass sensos are developed primary for waste and drinking water applications. The very robust *seawater* version is developed especially for seawater applications with high salt concentrations (e.g. drinking water abstraction from seawater, fish farming or seawater aquariums).
Turbidities in the range of FNU (NTU) 0.0001–1000 are measured and displayed alphanumerically using a controller. This high resolution facilitates precision differentiation, even for ultra clear liquids.

A pulsed, long-life IR radiation source (LED) ensures that costs are minimised.

ULTRATURB sc turbidity sensors are designed in accordance with DIN EN ISO 7027 and are permanently calibrated before leaving the factory. All key data is set to practical standard values.

The instruments are immediately ready for use after connection to the power supply and the supply of sample water. The measuring range and all data outputs are modified to suit requirements using menus on the controller.

All optical and electronic assemblies are installed in housings that are physically very strong and proof against water jets.

ULTRATURB sc turbidity sensors are available in the classic *basic* version, the convenient *plus* version and the robust *seawater* version.

The measuring chambers of the ULTRATURB *plus* sc and of the ULTRATURB *seawater* sc also have automatic wiper cleaning that reliably prevents soiling of the optical systems as it starts to build up and significantly reduces the user maintenance. Cleaning is performed at an interval set to suit local requirements. The cleaning intervals are adjusted to suit the expected level of soiling during commissioning. The user can straightforwardly change the interval at a later date. The number of cleaning operations already performed can be checked on the SENSOR SETUP menu using the COUNTER command.

2.3 Measuring principle

The nephelometric scattered light technique is a method for the determination of the very low to medium turbidities in liquids that is comparable worldwide.

Using this method, the light scattered sideways by the turbidity particles is measured over an angle of 90°. The low acquisition limit for this method makes it possible to even reliably differentiate turbidity particles in distilled water. This technique is defined in DIN EN ISO 7027. ULTRATURB sc sensors are designed in accordance with the requirements in this standard.

2.4 Handling

The sensor contains high-quality optical and electronic assemblies. For this reason attention is to be paid to ensuring that the sensor is not subjected to any hard mechanical knocks. There are no components that can be maintained by the user inside the sensor or the display unit – except the manual cleaning of the measuring chamber and the replacement of the wiper profiles and the desiccant.

2.5 Items supplied

- ULTRATURB sc sensor
- Connecting cable (length as per order)
- User Manual
- Factory test certificate
- Accessory set LZP816
- Wiper set (for 4 changes) LZV275
  (only *plus* and *seawater* version)

2.6 Function check

After unpacking, all components should be checked for any transport damage and a short function check performed prior to installation.

For this purpose the sensor is connected to the display unit and the display unit plugged into the mains. Shortly after the display unit is plugged in, the display is activated and the instrument switches to the display of measurements. Here the measured value taken in air is meaningless.

Note: *It is only possible to check the operative zero point using very high purity water!*

If no messages appear in the lower part of the display, the function check is then complete.

DANGER
Installation may only be carried out by qualified experts in accordance with all local safety regulations.

3.1 Assembling

Select an appropriate installation location for the instrument to guarantee

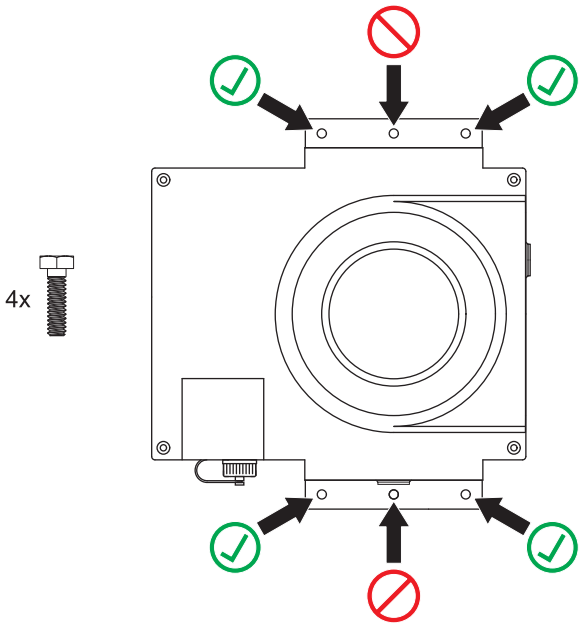
- safe installation
- safe operation
- problem-free maintenance

Plan how to lay cables and hoses and their path in advance. Lay the hoses, data cables and power cables without any bends. Only original replacement and accessory parts recommended by the manufacturer may be used.

Make sure the mount has a sufficient bearing capacity. The dowels must be selected and authorized according to the condition of the wall. The manufacturer shall accept no liability if the instrument is installed incorrectly.

Install the instrument in a horizontal position.

Fig. 2 Assembling



3.1.1 Connectors

Important Note: *The instrument can be damaged if the connectors and/or the union nuts are attached too tightly. Only hand-tighten the union nuts for the hose mounts. If necessary, hold the connectors with a tool (SW 22).*

The measuring instrument can be integrated into the measurement and analysis process using tubing (ID 13 mm) or a fixed connection (PVC system component pipework, compatible with 1" union nut).

Table 1: Connectors

External thread	Pipe thread in accordance with DIN ISO 228
large	G1A
small	G½A

3.1.1.1 Selection of diaphragm plate

With samples that tend to emit gases, bubbles may form in the measuring chamber. This causes extremely strongly fluctuating measurement values. In the event of strongly fluctuating measurement values, replace the diaphragm plate in the drain connector.

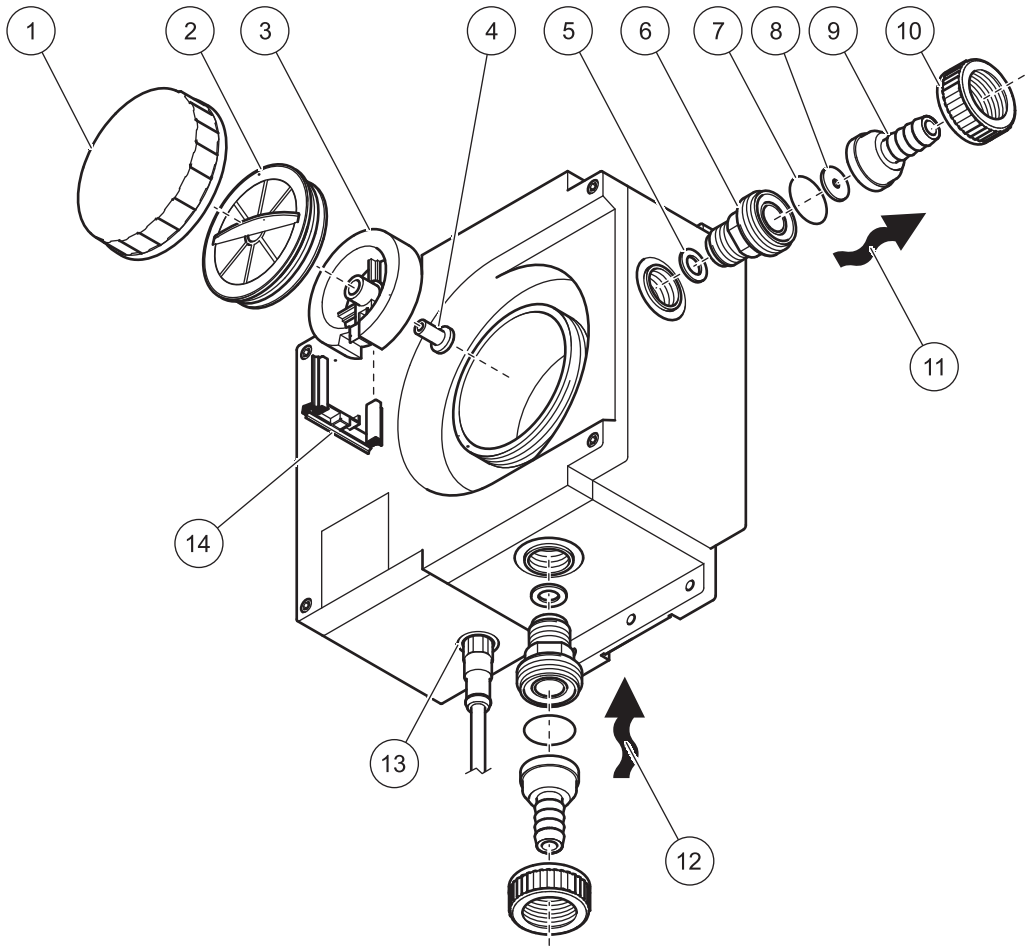
Note: *Observe the flow quantity and flow direction of the sample provided in the technical data.*

Table 2: Preselect the diaphragm plate

Flow quantity/pressure	Diaphragm plate
large	large hole
medium	medium hole
small	small hole

3.2 Instrument layout

Fig. 3 Instrument layout ULTRATURB sc



1. Screw top, HRR195	**8.** Diaphragm plate* (if necessary) HRS185: 1.2 mm HRS186: 2 mm HRS187: 3 mm
2. Measuring chamber sealing plug, HAD087	**9.** Tubing nipple* (Ø 13 mm), HXA072
3. Clutch wheel, BVK001	**10.** Union nut* 1“, ERM033
4. Plug socket, HRB151	**11.** Drain
5. Sealing ring (pre-assembled), EZD166	**12.** Feed
6. Union (pre-assembled), HXA087	**13.** Sensor cable socket
7. O-ring*, EZD114	**14.** Wiper holder (only *plus* version: casting compound brown, BHH211) (only *seawater* version: casting compound black/blue, BHH233)

* Included in the accessory set (connection) LZP816

3.3 Connecting sensor cable

CAUTION
Always lay cables and hoses so that they do not pose a tripping risk.

1. Unscrew the protective caps from the controller socket and the cable plug and retain them.
2. Pay attention to the guide in the plug and slide the plug into the socket.
3. Tighten the nut by hand.

Note: *Extension cables are available in various lengths (refer to Section 7, Replacement parts and accessories, page 29).*
Maximum cable length 100 m (328 ft).

Fig. 4 Connection of the sensor plug to the controller

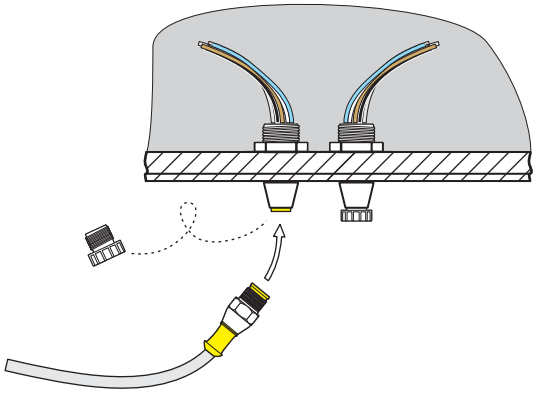
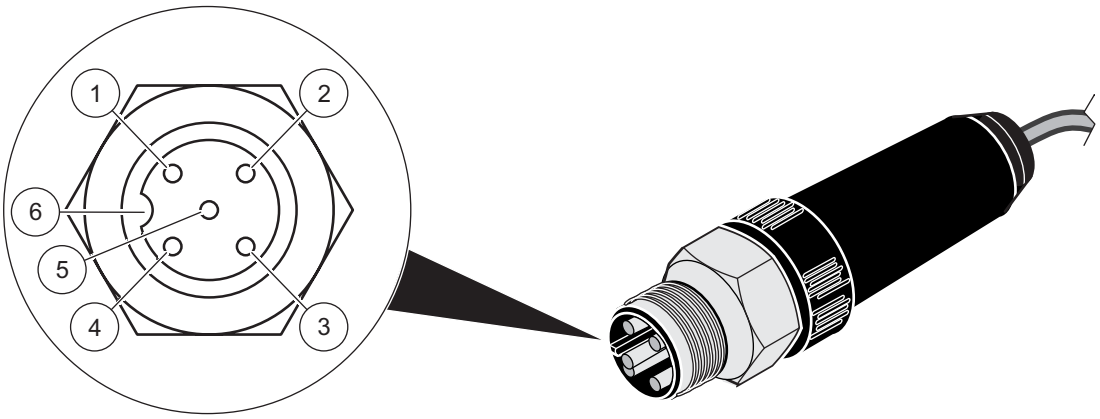


Fig. 5 Sensor connector pin assignment



Number	Description	Cable colour
1	+12 VDC	brown
2	Ground	black
3	Data (+)	blue
4	Data (–)	white
5	Screen	Screen (grey)
6	Notch	–

Section 4 Operation

4.1 Operating the sc controller

The sensor can be operated with all sc controllers. Prior to using the sensor, familiarise yourself with the principle of operation of your controller. Learn how to navigate in the menus and run appropriate functions.

4.2 Sensor setup

When you connect the sensor for the first time, the serial number of the sensor is displayed as the sensor name. You can change the sensor name as follows:

1. Open the MAIN MENU.
2. Choose SENSOR SETUP and accept.
3. Choose the related sensor and accept.
4. Choose CONFIGURE and accept.
5. Choose EDITED NAME and accept.
6. Edit the name and accept to return to the SENSOR SETUP menu.

In the same way complete your system configuration using the following commands:

- MEAS UNITS
- CLEAN. INTERVAL
- RESPONSE TIME
- LOGGER INTERVAL
- RESOLUTION
- SET DEFAULTS

4.3 Sensor data logger

A data memory and event memory per sensor are available via the sc controller. While measured data are saved in the data memory at stipulated intervals, the event memory collects numerous events such as configuration changes, alarms and warning conditions. Both the data memory and the event memory can be read out in CSV format. For information on how you can download the data, please see the controller manual.

4.4 Menu structure

4.4.1 SENSOR DIAG

ERROR LIST	
	Possible error messages: WIPER POS, LED C., GAIN TOO HIGH
WARNING LIST	
	Possible warnings: PROFILE COUNTER, MOIST, USER CAL INTERVAL

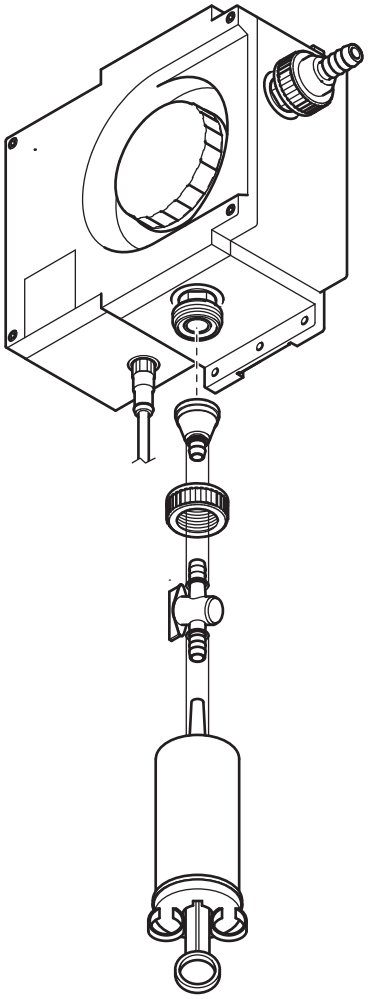
Note: *In Section 7, page 29 you will find, along with a list of all error messages and warnings, also a description of all the actions necessary.*

4.4.2 SENSOR SETUP

WIPE				*Initiates a wiping action*
VERIFY			Verification using CVM module	*Verification with dry standard*
CALIBRATE				
	STANDARD	Selection as per CAL. CONFIG OUTPUT MODE	Calibration with standard solution	*Procedure during calibration, menu based*
	OFFSET	Selection as per CAL. CONFIG OUTPUT MODE	Zero point setting	*Zero point setting, menu based*
	CAL. FAKTORS	FAC. STANDARD		*0.50 to 2.00*
		OFFSET		*-0.100 to +0.100 TRBFNU*
	CAL. CONFIG	OUTPUT MODE	HOLD ACTIVE TRANSFER CHOICE	*Behaviour of the outputs during calibration or zero point setting*
		CAL. INTERVAL		*Adjustable from 0 to 365 days*
	SET CAL DEFLT			Reset to the default calibration
CONFIGURE				
	EDITED NAME		SET DEFAULTS Instrument number	*Up to 16-character name possible*
	MEAS UNITS	mg/L, FNU, NTU, TE/F, EBC	SET DEFAULTS FNU	
	CLEAN. INTERVAL		SET DEFAULTS 12 h	*10 min, 20 min, 30 min, 2 h, 6 h, 12 h, 10:00*
	RESPONSE TIME		SET DEFAULTS 15 s	*0 to 60 s*
	LOGGER INTERVAL		SET DEFAULTS 10 min	*1-30 min*
	RESOLUTION		SET DEFAULTS 0.xxx	*0.xxx or 0.xxxx (<1 FNU)*
	SET DEFAULTS	Confirmation prompt		*Reset to default configuration for all menu commands listed above.*

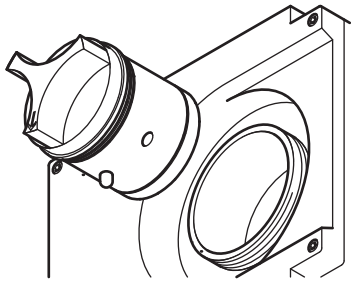
TEST/MAINT				
	PROBE INFO	ULTRATURBsc	Instrument name	
		EDITED NAME		
		SERIAL NUMBER		
		RANGE	0.001 ... 1000 FNU	
		MODEL NUMBER	Item no. sensor	
		SOFTWARE VERS	Sensor software	
		DRIVER VERS		
	CAL. DATA	CAL. DATE	Date of the last calibration	
		FACTOR	Default setting 1.00	
		OFFSET	Default setting 0.000 TRBFNU	
	COUNTER	TOTAL TIME		
		PROFILE		
		MOTOR		
	MAINT. PROC.	CLN. MEAS CHAMB	OUTPUT MODE information	*Procedure during cleaning*
		REPLACE PROFILE	OUTPUT MODE information	*Procedure during wiper change*
		WIPE	RESOLUTION	*Initiates a wiping action*
		SIGNALS	AVER.:	*Average value*
			S. VAL.:	*Individual measured value*
			M:	*Measured level*
			R:	*Reference level*
			Q:	*Quotient M/R*
			MOIST	*Relative humidity in %*
		OUTPUT MODE	ACTIVE HOLD TRANSFER CHOICE	*Behaviour of the instrument outputs in the MAINT. PROC. menu*

4.5 Calibration with standard solution



1. Open the MAIN MENU.
2. Choose SENSOR SETUP and accept.
3. Choose the related sensor and accept.
4. Choose CALIBRATE and accept.
5. Choose STANDARD and accept.
6. Shut-off the feed and accept TURN OFF SAMPLE INLET.
7. Drain the measuring chamber using the lower feed union. Accept DRAIN MEAS. CHAMBER.
8. Connect the calibration syringe to the feed union (see Figure) and add the calibration standard. Accept POUR STD INTO MEAS. CHAMBER.
9. Accept PRESS ENTER WHEN STABLE x.xxx TRBFNU.
10. Enter the concentration of the standard solution. Accept CALIBRATE (x.xxx TRBFNU).
11. Remove the calibration syringe and accept REMOVE CALIBRATION SYRINGE.
12. Re-connect the feed and accept CONNECT SAMPLE INLET.
13. Open the feed and accept CAL READY OPEN INLET.
14. Accept OUTPUT ACTIVE.

4.6 Verify using dry standard CVM



1. Open the MAIN MENU.
2. Choose SENSOR SETUP and accept.
3. Choose the related sensor and accept.
4. Choose VERIFY and accept.
5. Choose STANDARD and accept.
6. Shut-off the feed and accept TURN OFF SAMPLE INLET.
7. Drain the measuring chamber via the lower feed union and accept DRAIN MEAS. CHAMBER.
8. Open the screw top and remove the sealing plug and wiper holder.
9. Carefully dry the measuring chamber.
10. Clean the CVM module with a cloth (included in the accessory setof the CVM modul).
11. Guide the CVM module into the measuring chamber.
    The arrow mark must point downwards!
    Ensure that the spring-loaded ball engages by turning slightly in the sample feed opening on the measuring chamber, see Figure).
    Accept INSERT CVM DRY STANDARD.
12. Accept x.xxx TRBFNU.
13. Remove the CVM module and accept REMOVE CVM MODULE .
14. Re-fit the sealing plug and wiper holder and accept REPLACE WIPER HOLDER AND CAP.
15. Screw back on the screw top and accept TIGHTEN CAP.
16. Re-connect the feed and accept CONNECT SAMPLE INLET.
17. Open the feed and accept VER. READY OPEN INLET.
18. Accept OUTPUT ACTIVE.

4.7 Zero point setting

1. Open the MAIN MENU.
2. Choose SENSOR SETUP and accept.
3. Choose the related sensor and accept.
4. Choose CALIBRATE and accept.
5. Choose OFFSET and accept.
6. Shut off the feed and drain the measuring chamber. Connect a membrane filter (LZV325) to the measuring chamber feed. Open the feed and accept POUR 0 STD INTO MEAS. CHAMBER.
7. Accept PRESS ENTER WHEN STABLE x.xxx TRBFNU.
8. Set the zero point and accept CALIBRATE (x.xxx TRBFNU).
9. Accept CAL READY OUTPUT ACTIVE.

It has been possible to reduce the scope of the maintenance to be performed by the user to only a few actions. Clearly summarised in a table and described in detail in the following sections, these actions can be quickly and straightforwardly performed by qualified personnel.

5.1 Maintenance schedule

Maintenance task	Interval
Clean measuring chamber:	**Dependent on the substances contained in the water**
Replace wiper profile (only *plus* and *seawater* version)	**After 1200 cycles**
Replace desiccant	**Every 2 years**
Monitor test equipment (CVM dry standard)	**Every 2 years (factory test with certification)**
Check zero point	**Dependent on the substances contained in the water**
Check gradient	**At least once a year**

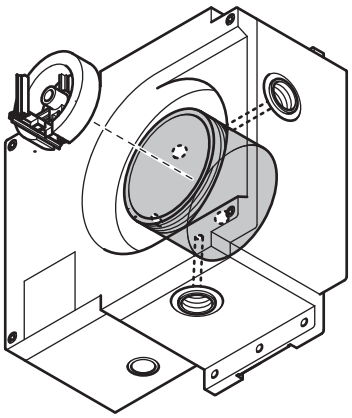
5.2 Cleaning measuring chamber

The cleanliness of the measuring chamber is crucial for correct measured results. This cylindrical optical measuring chamber has a rotating wiper with three wiper profiles (only on *plus* and *seawater* version); these prevent normal soiling of the optical system as it starts to build up. With very stubborn deposits, manual cleaning with a suitable cleaning agent (e.g. citric acid) is recommended.

CAUTION
Observe safety regulations and wear safety clothing!

- Safety glasses
- Gloves
- Overalls

1. Open the MAIN MENU.
2. Choose SENSOR SETUP and accept.
3. Choose the related sensor and accept.
4. Choose TEST/MAINT and accept.
5. Choose MAINT. PROC and accept.
6. Choose CLN. MEAS CHAMB and accept.
7. Shut-off the feed and accept TURN OFF SAMPLE INLET.
8. Drain the measuring chamber via the lower feed union and accept DRAIN MEAS. CHAMBER.

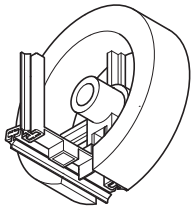


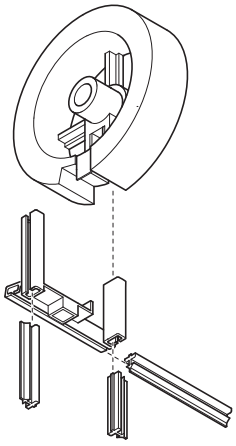
9. Remove the screw top and the sealing plug for the measuring chamber and accept OPEN MEAS. CHAMBER.
10. Remove the wiper holder and accept REMOVE WIPER HOLDER (only for *plus* and for *seawater* version).
11. Clean the measuring chamber and accept CLN. MEAS CHAMB.
12. Re-fit the wiper holder and accept REPLACE WIPER HOLDER (only for *plus* and *seawater* version).
13. Seal the measuring chamber again with sealing plug and screw top and accept CLOSE MEAS. CHAMBER.
14. Open the sample feed and accept TURN OFF SAMPLE INLET.
    An automatic wipe is performed.

5.3 Replacing wiper profiles (only *plus* and *seawater* version)

The life of the wiper profiles is, on the one hand, dependent on the number of cleaning actions performed, and on the other hand is also dependent on the type of deposits to be removed. Thus the life of the wiper profiles varies from case to case.

The wiper profiles supplied with the instrument are sufficient to the cover requirements for an average year.





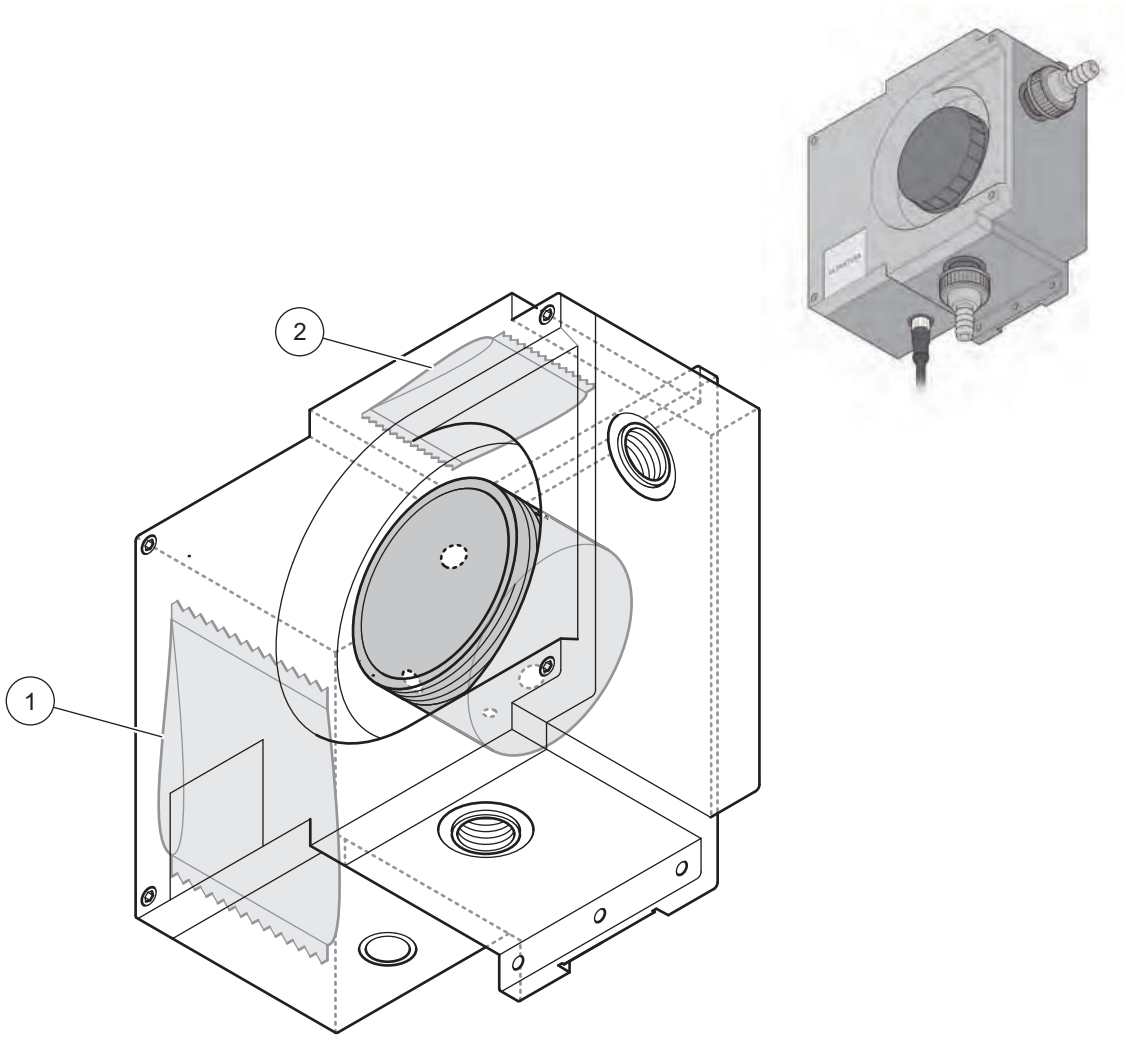
1. Open the MAIN MENU.
2. Choose SENSOR SETUP and accept.
3. Choose the related sensor and accept.
4. Choose TEST/MAINT and accept.
5. Choose MAINT. PROC and accept.
6. Choose REPLACE PROFILE and accept.
7. Shut-off the feed and accept TURN OFF SAMPLE INLET.
8. Drain the measuring chamber via the lower feed union and accept DRAIN MEAS. CHAMBER.
9. Remove the screw top and the sealing plug for the measuring chamber and accept OPEN MEAS. CHAMBER.
10. Remove the wiper holder and accept REMOVE WIPER HOLDER.
11. Clean the measuring chamber and accept CLN. MEAS CHAMB.
12. Renew the wiper profiles and accept REPLACE PROFILE.
13. Re-fit the wiper holder and accept REPLACE WIPER HOLDER.
14. Seal the measuring chamber again with sealing plug and screw top and accept CLOSE MEAS. CHAMBER.
15. Open the sample feed and accept TURN OFF SAMPLE INLET.
    An automatic wipe is performed.

5.4 Replacing desiccant

The ULTRATURB sc turbidity sensor is continuously subject to a wet environment. To provide protection against the moisture, there are 2 generously sized desiccant bags close to the optical and electronic components. To maintain this protection, the manufacturer recommends replacement or regeneration every 2 years.

To replace the desiccant, open the housing and replace the two desiccant bags, 4 units (see Figure 6, item 1) and 0.5 units (see Figure 6, item 2) as per the figure.

Figure 6 Replacing desiccant



1. Desiccant bag with 4 units, LZX304	**2.** Desiccant bag with 0.5 units, LZX303

5.5 Monitoring test equipment

As part of a quality assurance system for test equipment monitoring, it is necessary to check the instrument calibration; this can be performed using a formazine standard series in accordance with DIN EN ISO 7027.

You can either make up the formazine solution yourself as per the instructions that follow 5.5.1 Preparing formazine solution in accordance with DIN EN ISO 7027 or procure it from the manufacturer (LCW 813 or Stabl Cal).

1. To check the instrument calibration, first thoroughly rinse out the measuring chamber using distilled water.
2. Prepare a turbidity series using formazine reference solutions as per DIN EN ISO 7027; the measuring series should correspond to the measuring range selected. For example, in the measuring range FNU 0–5.0 chose reference solutions with FNU 0.5–1.0–2.0–3.0–4.0.

Note: *If there are any variations in the measurements, it is recommendable to measure a new standard preparation prior to changing the instrument calibration! Experience has shown that the variation in the formazine preparation can be greater than the possible drift in the ULTRATURB instrument.*

When checking the instruments as per EN 450901 or GLP we therefore recommend recording the date in an instrument log and checking for any long-term drift. Checks on the operation of the ULTRATURB can in practice also be made by means of parallel measurements with turbidity photometers designed in accordance with DIN and ISO.

5.5.1 Preparing formazine solution in accordance with DIN EN ISO 7027

Chemicals

Chemicals of "analysis" purity are used. The chemicals must be stored in hard glass bottles.

Water

- Place a membrane filter, pore size 0.1 µm (for bacteriological experiments), for 1 hour in 100 mL of distilled water.
- Filter 250 mL water through this filter and discard the water.
- Then filter 500 mL of distilled water twice through the same filter and use this water for making up the standard solution.

Formazine ($C_2H_4N_2$) parent solution

CAUTION
Hydrazine sulphate is toxic and possibly carcinogenic

- Dissolve 10.0 g of hexamethylentetramine ($C_6H_{12}N_4$) in water and top up to 100 mL (solution A).
- Dissolve 1 g of hydrazine sulphate ($N_2H_6SO_4$) in water and top up to 100 mL (solution B).
- Mix 5 mL of solution A with 5 mL of solution B.
- After 24 hours at 25° C (±3 °C) (77 °F (± 5.4 °F)) top up this solution with water to 100 mL.

The turbidity of this parent solution is 400, stated in Formazine Attenuation Units (FAU) or Formazine Nephelometric Units (FNU). This solution can be stored in a dark place at 25 °C (±3 °C) (77 °F (± 5.4 °F)) for around 4 weeks.

Formazine reference solution

Dilute the parent solution with the aid of pipettes and measuring flasks to produce reference solutions in the required range. These solutions can only be stored for a very limited period.

6.1 Error messages

Possible sensor errors are displayed by the controller.

Table 3: Error messages

Error displayed	Cause	Rectification
NONE	Correct operation	
WIPER POS.	Wiper not is correct starting position	Initiate wiper function, call service
LED C.	LED faulty	Call service
GAIN TOO HIGH	Incorrect adjustment Incorrect calibration standard Measuring chamber soiled LED faulty	Clean measuring chamber, perform calibration, call service

6.2 Warnings

Possible warning messages are displayed by the controller.

Table 4: Warnings

Error displayed	Cause	Rectification
NONE	Correct operation	
PROFILE COUNTER	Counter elapsed	Change wiper profiles
MOIST	Moisture > 10 % relative humidity	Replace desiccant
CAL. INTERVAL	Counter elapsed	Perform calibration

7.1 Sensor options

Description	Cat. no.
ULTRATURB *basic* sc turbidity bypass sensor without cable	LPV415.99.01001
ULTRATURB *basic* sc turbidity bypass sensor with 0.35 m (1.1 ft.) cable	LPV415.99.11001
ULTRATURB *basic* sc turbidity bypass sensor with 1 m (3.3 ft.) cable	LPV415.99.81001
ULTRATURB *basic* sc turbidity bypass sensor with 5 m (16.40 ft.) cable	LPV415.99.21001
ULTRATURB *basic* sc turbidity bypass sensor with 10 m (32.81 ft.) cable	LPV415.99.31001
ULTRATURB *basic* sc turbidity bypass sensor with 15 m (49.21 ft.) cable	LPV415.99.41001
ULTRATURB *basic* sc turbidity bypass sensor with 20 m (65.62 ft.) cable	LPV415.99.51001
ULTRATURB *basic* sc turbidity bypass sensor with 30 m (98.43 ft.) cable	LPV415.99.61001
ULTRATURB *basic* sc turbidity bypass sensor with 50 m (164.04 ft.) cable	LPV415.99.71001
ULTRATURB *plus* sc turbidity bypass sensor without cable	LPV415.99.00001
ULTRATURB *plus* sc turbidity bypass sensor with 0.35 m (1.1 ft.) cable	LPV415.99.10001
ULTRATURB *plus* sc turbidity bypass sensor with 1 m (3.3 ft.) cable	LPV415.99.80001
ULTRATURB *plus* sc turbidity bypass sensor with 5 m (16.40 ft.) cable	LPV415.99.20001
ULTRATURB *plus* sc turbidity bypass sensor with 10 m (32.81 ft.) cable	LPV415.99.30001
ULTRATURB *plus* sc turbidity bypass sensor with 15 m (49.21 ft.) cable	LPV415.99.40001
ULTRATURB *plus* sc turbidity bypass sensor with 20 m (65.62 ft.) cable	LPV415.99.50001
ULTRATURB *plus* sc turbidity bypass sensor with 30 m (98.43 ft.) cable	LPV415.99.60001
ULTRATURB *plus* sc turbidity bypass sensor with 50 m (164.04 ft.) cable	LPV415.99.70001
ULTRATURB *seawater* sc turbidity bypass sensor without cable	LPV415.99.02001
ULTRATURB *seawater* sc turbidity bypass sensor with 0.35 m (1.1 ft.) cable	LPV415.99.12001
ULTRATURB *seawater* sc turbidity bypass sensor with 1 m (3.3 ft.) cable	LPV415.99.82001
ULTRATURB *seawater* sc turbidity bypass sensor with 5 m (16.40 ft.) cable	LPV415.99.22001
ULTRATURB *seawater* sc turbidity bypass sensor with 10 m (32.81 ft.) cable	LPV415.99.32001
ULTRATURB *seawater* sc turbidity bypass sensor with 15 m (49.21 ft.) cable	LPV415.99.42001
ULTRATURB *seawater* sc turbidity bypass sensor with 20 m (65.62 ft.) cable	LPV415.99.52001
ULTRATURB *seawater* sc turbidity bypass sensor with 30 m (98.43 ft.) cable	LPV415.99.62001
ULTRATURB *seawater* sc turbidity bypass sensor with 50 m (164.04 ft.) cable	LPV415.99.72001

7.2 Replacement parts

Description	Cat. no.
Set of wiper profiles (for 4 changes)	LZV275
Desiccant bag 0.5 U	LZX303
Desiccant bag 4 U	LZX304
Accessory set (connection)	LZP816

7.3 Accessories

Description	Cat. no.
Extention cable 1 m (3.3 ft.)	6122400
Extention cable 5 m (16.40 ft.)	LZX848
Extention cable 10 m (32.81 ft.)	LZX849
Extention cable 15 m (49.21 ft.)	LZX850
Extention cable 20 m (65.62 ft.)	LZX851
Extention cable 30 m (98.43 ft.)	LZX852
Formazine turbidity standard	LCW813
Turbidity calibration set for liquid standard	LZV451
Set of filters for zero point calibration (0.2 mm membrane filter incl. connecting material)	LZV325
0.2 µm membrane filter (without accessories)	EXF014
CVM Certified Verification Module (dry standard) approx. 0.6 FNU	LZV414.00.00000
CVM Certified Verification Module (dry standard) approx. 1.5 FNU	LZV414.00.10000
CVM Certified Verification Module (dry standard) approx. 6 FNU	LZV414.00.20000
CVM Certified Verification Module (dry standard) approx. 15 FNU	LZV414.00.30000
CVM Certified Verification Module (dry standard) approx. 25 FNU	LZV414.00.40000

Hach Company warrants its products to the original purchaser against any defects that are due to faulty material or workmanship for a period of one year from date of shipment unless otherwise noted in the product manual.

In the event that a defect is discovered during the warranty period, Hach Company agrees that, at its option, it will repair or replace the defective product or refund the purchase price excluding original shipping and handling charges. Any product repaired or replaced under this warranty will be warranted only for the remainder of the original product warranty period.

This warranty does not apply to consumable products such as chemical reagents; or consumable components of a product, such as, but not limited to, lamps and tubing.

Contact Hach Company or your distributor to initiate warranty support. Products may not be returned without authorization from Hach Company.

Limitations

This warranty does not cover:

- Damage caused by acts of God, natural disaster, labor unrest, acts of war (declared or undeclared), terrorism, civil strife or acts of any governmental jurisdiction
- Damage caused by misuse, neglect, accident or improper application or installation
- Damage caused by any repair or attempted repair not authorized by Hach Company
- Any product not used in accordance with the instructions furnished by Hach Company
- Freight charges to return merchandise to Hach Company
- Freight charges on expedited or express shipment of warranted parts or product
- Travel fees associated with on-site warranty repair

This warranty contains the sole express warranty made by Hach Company in connection with its products. All implied warranties, including without limitation, the warranties of merchantability and fitness for a particular purpose, are expressly disclaimed.

Some states within the United States do not allow the disclaimer of implied warranties and if this is true in your state the above limitation may not apply to you. This warranty gives you specific rights, and you may also have other rights that vary from state to state.

This warranty constitutes the final, complete, and exclusive statement of warranty terms and no person is authorized to make any other warranties or representations on behalf of Hach Company.

Limitation of Remedies

The remedies of repair, replacement or refund of purchase price as stated above are the exclusive remedies for the breach of this warranty. On the basis of strict liability or under any other legal theory, in no event shall Hach Company be liable for any incidental or consequential damages of any kind for breach of warranty or negligence.

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Appendix A ModBUS Register Information

Table 5: Sensor ModBUS Registers

Group Name	Register #	Data Type	Length	R/W	Description
measurement	40001	Float	2	R	diplayed measurement value
unit	40003	Unsigned Integer	1	R/W	unit
parameter	40004	Unsigned Integer	1	R/W	parameter
reserved	40005	Unsigned Integer	1	R/W	reserved
correction	40006	Float	2	R/W	correction
offset	40008	Float	2	R/W	offset
reserved	40010	Unsigned Integer	1	R/W	reserved
cleaning_interval	40011	Unsigned Integer	1	R/W	cleaning interval
led_current	40012	Unsigned Integer	1	R/W	LED current
wiper state	40013	Unsigned Integer	1	R/W	wiper state
resp time	40014	Unsigned Integer	1	R/W	response time
drv_struct_ver	40015	Unsigned Integer	1	R	driver structure version
drv_firmw_ver	40016	Unsigned Integer	1	R	driver firmware version
drv_cont_ver	40017	Unsigned Integer	1	R	driver content version
location	40018	String	8	R/W	location
profile	40026	Integer	2	R	profile counter
motor_cycles	40028	Integer	2	R	motor cycles
operating_hours	40030	Integer	2	R	operating hours
service_counter	40032	Integer	2	R	service counter
profile reset val	40034	Integer	2	R/W	profile reset val
service reset val	40036	Integer	2	R/W	service reset val
des_measurement	40038	Float	2	R/W	desired measurement value
meas_single_value	40040	Float	2	R	measurement single value
M	40042	Float	2	R	m
R	40044	Float	2	R	r
ouotient	40046	Float	2	R	quotient
humidity_main	40048	Float	2	R	humidity - main
cal_date	40050	Time	2	R	calibration time and date
user_cal_date	40052	Time	2	R	user calibration time and date
fac_meas_0	40054	Float	2	R	factor meas. 0
fac_meas_1	40056	Float	2	R	factor meas. 1
fac_meas_2	40058	Float	2	R	factor meas. 2
fac_meas_3	40060	Float	2	R	factor meas. 3
fac_ref_0	40062	Float	2	R	factor ref 0
fac_ref_1	40064	Float	2	R	factor ref 1
fac_quo_q	40066	Float	2	R	factor quotient q
dist_q	40068	Float	2	R	distortion light q
fac_quo_m	40070	Float	2	R	factor quotient m
dist_m	40072	Float	2	R	distortion light m
prg_vers	40074	String	4	R	program version
ser_no	40078	Integer	2	R	serial number
process	40080	Unsigned Integer	1	R/W	process register
menu	40081	Unsigned Integer	1	R	menu state

Table 5: Sensor ModBUS Registers (continued)

Group Name	Register #	Data Type	Length	R/W	Description
user_cal_int	40082	Integer	1	R/W	user cal int
cal_out_cfg	40083	Integer	1	R/W	cal. Output mode
meas_mode	40084	Integer	1	R/W	measure mode
meas_val_format	40085	Integer	2	R	measurement format
meas_prec	40087	Integer	1	R/W	measurement precesion
logger_int	40088	Integer	1	R/W	logger interval
service output	40089	Integer	1	R/W	service output mode

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

REV	DATE	ALTERED:	REV	DATE	ALTERED:
		CHECKED:			CHECKED:

STATUS : CONTRACT

JOB NO.: 412

2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI.

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION (TANGEDCO)

CONSULTANT: DESEIN PVT LTD, NEW DELHI.

BHARAT HEAVY ELECTRICALS LIMITED

PROJECTS ENGINEERING MANAGEMENT,NEW DELHI

OTOKLIN GLOBAL BUSINESS LTD.
E-410, CRYSTAL PLAZA,OPP. INFINITI MALL
LOKHANDWALA LINK ROAD, ANDHERI WEST,
MUMBAI 400 053. Tel No.022-26732135

DEPT.	CODE	SCALE	WEIGHT(KG)	REF DRG.	ITEM
--	A	-	-	-	-

INSTRUMENT SCHEDULE FOR PT PLANT

	NAME	SIGN	DATE
PREP	FAISAL N	FN	05-03-19
CHKD	MUAZZAM I	MI	05-03-19
APPD	ASLAM A	AA	05-03-19

BHEL LOA NO: PW/PE/PG/EN1/P-310/17 DTD. 18.01.2018

DEPT.							CARD CODE	BHEL DRAWING NO.	REV
SIGN			N.A.				-	PE-V0-412-158-A049	02
DATE								OTOKLIN-DRG/DOC-NO.. OGBL/OC-983/IS/PTP/18/332	

NO. OF SHEETS 2 EXCLUDING COVER PAGE

INSTRUMENT SCHEDULE

CLIENT: BHARAT HEAVY ELECTRICALS LIMITED

PROJECT: 2 X 660 MW ENNORE SEZ STPP

PACKAGE: PRE TREATMENT PLANT

BHEL DOC NO-PE-V0-412-158-A049		REV NO	2
OTOKLIN DOC NO- OGBL/OC-983/IS/PTP/18/332		REF P&ID DRAWING NO	PE-V0-412-158-A001

SL. NO.	TAG NO	DESCRIPTION	MEDIUM	TYPE/MODEL OF INSTRUMENT	TYPE OF SIGNAL (R2)	Process Temperature (R1)	Design Process Parameter (R2)	Operating Process parameter (R2)	RANGE	ENGG.UNIT	PROCESS CONNECTION	ELECTRICAL CONNECTION	LINE SIZE
A.LEVEL INDICATOR													
1	90GBN91CL501	NaOCl Dosing tank	NaOCl + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.3 M	0-1.3 M	0-1.3 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
2	90GBN61CL501	FECL3 DOSING TANK	FECL3 + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
3	90GBN62CL501	FECL3 DOSING TANK	FECL3 + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
4	90GBN63CL501	FECL3 DOSING TANK	FECL3 + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
5	90GBN71CL501	LIME DOSING TANK	LIME + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
6	90GBN72CL501	LIME DOSING TANK	LIME + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
7	90GBN81CL501	PE DOSING TANK	PE + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
8	90GBN82CL501	PE DOSING TANK	PE + WATER	GLASS TUBE TYPE	NA	35-50 degC	0-1.73 M	0-1.73 M	0-1.73 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
9	90GBN60CL501	OVERHEAD CLARIIFED WATER TANK	WATER	GLASS TUBE TYPE	NA	35-50 degC	0-2.3 M	0-2.3 M	0-2.3 M	MTR.	FLANGE MOUNTED	N.A.	N.A.
10	90GBD10CL501	CLARIFIED WATER STORAGE TANK	WATER	STAFF GAUGE TYPE	NA	35-50 degC	0-4.3 M	0-4.3 M	0-4.3 M	MTR.	SCREWED	N.A.	N.A.
11	90GBD10CL502	CLARIFIED WATER STORAGE TANK	WATER	STAFF GAUGE TYPE	NA	35-50 degC	0-4.3 M	0-4.3 M	0-4.3 M	MTR.	SCREWED	N.A.	N.A.
12	90GBS50CL502	SLUDGE SUMP	SLUDGE	STAFF GAUGE TYPE	NA	35-50 degC	0-4.5 M	0-4.5 M	0-4.5 M	MTR.	SCREWED	N.A.	N.A.
13	90GBS50CL503	SLUDGE SUMP	SLUDGE	STAFF GAUGE TYPE	NA	35-50 degC	0-4.5 M	0-4.5 M	0-4.5 M	MTR.	SCREWED	N.A.	N.A.
14	90GBS50CL501	SLUDGE TRANSFER SUMP	SLUDGE	STAFF GAUGE TYPE	NA	35-50 degC	0-4.5 M	0-4.5 M	0-4.5 M	MTR.	SCREWED	N.A.	N.A.
B. LEVEL TRANSMITTER													
1	90GBN91CL001	NaOCl Dosing tank	NaOCl + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.3 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
2	90GBN61CL001	FECL3 DOSING TANK	FECL3 + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
3	90GBN62CL001	FECL3 DOSING TANK	FECL3 + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
4	90GBN63CL001	FECL3 DOSING TANK	FECL3 + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
5	90GBN71CL001	LIME DOSING TANK	LIME + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
6	90GBN72CL001	LIME DOSING TANK	LIME + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
7	90GBN81CL001	PE DOSING TANK	PE + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
8	90GBN82CL001	PE DOSING TANK	PE + WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-1.73 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
9	90GBN60CL001	OVERHEAD CLARIIFED WATER TANK	WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-2.3 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
10	90GBS50CL003	SLUDGE SUMP	SLUDGE	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-4.5 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
11	90GBS50CL004	SLUDGE SUMP	SLUDGE	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-4.5 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
12	90GBD10CL001	CLARIFIED WATER STORAGE TANK	WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-4.3 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
13	90GBD10CL002	CLARIFIED WATER STORAGE TANK	WATER	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-4.3 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
14	90GBS50CL001	SLUDGE TRANSFER SUMP	SLUDGE	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-4.5 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
15	90GBS50CL002	SLUDGE TRANSFER SUMP	SLUDGE	ULTRASONIC TYPE	4-20 mA HART	35-50 degC	upto 10 meters	0-4.5 M	0.3 - 10	MTR.	4" 150# FLANGE MOUNTED	M20 X1 .5	N.A.
C. PRESSURE TRANSMITTER													
1	90GBS45CP001	SLUDGE TRANSFER SUMP	SLUDGE	DUAL INDUCTANCE TYPE	4-20 mA HART	35-50 degC	upto 3 kg/cm3	1.2 kg/cm2	0-3	KG/CM2	1/2 " NPT (F)	1/2 " NPT	400
2	90GBS45CP002	SLUDGE TRANSFER SUMP	SLUDGE	DUAL INDUCTANCE TYPE	4-20 mA HART	35-50 degC	upto 3 kg/cm3	1.2 kg/cm2	0-3	KG/CM2	1/2 " NPT (F)	1/2 " NPT	400
3	90GBN85CP001	PE DOSING TANK	PE + WATER	DUAL INDUCTANCE TYPE	4-20 mA HART	35-50 degC	upto 3 kg/cm3	1.0 kg/cm2	0-3	KG/CM2	1/2 " NPT (F)	1/2 " NPT	25
4	90GBN65CP001	FECL3 DOSING TANK	FECL3 + WATER	DUAL INDUCTANCE TYPE	4-20 mA HART	35-50 degC	upto 3 kg/cm3	1.0 kg/cm2	0-3	KG/CM2	1/2 " NPT (F)	1/2 " NPT	40
5	90GBN75CP001	LIME DOSING TANK	LIME + WATER	DUAL INDUCTANCE TYPE	4-20 mA HART	35-50 degC	upto 3 kg/cm3	1.0 kg/cm2	0-3	KG/CM2	1/2 " NPT (F)	1/2 " NPT	40
6	90GBN95CP001	NaOCl Dosing tank	NaOCl + WATER	DUAL INDUCTANCE TYPE	4-20 mA HART	35-50 degC	upto 3 kg/cm3	1.0 kg/cm2	0-3	KG/CM2	1/2 " NPT (F)	1/2 " NPT	25
D. PRESSURE GUAGE													
1	90GBD01CP501	RAW WATER LINE	WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	800NB
2	90GBS41CP501	SLUDGE TRANSFER PUMP	SLUDGE	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.2 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	400NB
3	90GBS42CP501	SLUDGE TRANSFER PUMP	SLUDGE	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.2 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	400NB
4	90GBS43CP501	SLUDGE TRANSFER PUMP	SLUDGE	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.2 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	400NB
5	90GBS45CP501	SLUDGE TRANSFER PUMP COMMON HEADER LINE	SLUDGE	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.2 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	400NB
6	90GBN83CP501	PE DOSING PUMP	PE + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	25NB
7	90GBN83CP502	PE DOSING PUMP	PE + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	25NB
8	90GBN85CP501	PE DOSING PUMP	PE + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	25NB
9	90GBN64CP501	FECL3 DOSING PUMP	FECL3 + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	40NB

SL. NO.	TAG NO	DESCRIPTION	MEDIUM	TYPE/MODEL OF INSTRUMENT	TYPE OF SIGNAL (R2)	Process Temperature (R1)	Design Process Parameter (R2)	Operating Process parameter (R2)	RANGE	ENGG.UNIT	PROCESS CONNECTION	ELECTRICAL CONNECTION	LINE SIZE
10	90GBN64CP502	FECL3 DOSING PUMP	FECL3 + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	40NB
11	90GBN65CP501	FECL3 DOSING PUMP	FECL3 + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	40NB
12	90GBN73CP501	LIME DOSING PUMP	LIME + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	40NB
13	90GBN73CP502	LIME DOSING PUMP	LIME + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	40NB
14	90GBN75CP501	LIME DOSING PUMP	LIME + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	40NB
15	90GBN92CP501	NAOCL DOSING PUMP	NaOCl + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	25NB
16	90GBN92CP502	NAOCL DOSING PUMP	NaOCl + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 2.5kg/cm3	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	25NB
17	90GBN95CP501	NAOCL DOSING PUMP	NaOCl + WATER	BOURDON TYPE	ANALOG	35-50 degC	upto 1 kg/cm2	1.0 kg/cm2	0-2.5	KG/CM2	1/2 " NPT (M)	NA	25NB
18	90GBS31CP501	AIR BLOWER LINE	AIR	BOURDON TYPE	ANALOG	35-50 degC	upto 1 kg/cm2	0.4 kg/cm2	0-1	KG/CM2	1/2 " NPT (M)	NA	80NB
19	90GBS32CP501	AIR BLOWER LINE	AIR	BOURDON TYPE	ANALOG	35-50 degC	upto 1 kg/cm2	0.4 kg/cm2	0-1	KG/CM2	1/2 " NPT (M)	NA	80NB
F. PRESSURE SWITCH													
1	90GBS40CP101	AIR BLOWER LINE	AIR	DIAPHRAGM SEAL TYPE	2 SPDT 5A@24 VDC	35-50 degC	upto 1 kg/cm2	0.4 kg/cm2	0-1	KG/CM2	1/2" NPT(M)	4 PIN CONNECTOR TYPE	80NB
2	90GBS41CP101	SLUDGE TRANSFER PUMP	SLUDGE	DIAPHRAGM SEAL TYPE	2 SPDT 5A@24 VDC	35-50 degC	upto 1 kg/cm2	1.2 kg/cm2	0-2.5	KG/CM2	1/2" NPT(M)	4 PIN CONNECTOR TYPE	400NB
3	90GBS42CP101	SLUDGE TRANSFER PUMP	SLUDGE	DIAPHRAGM SEAL TYPE	2 SPDT 5A@24 VDC	35-50 degC	upto 1 kg/cm2	1.2 kg/cm2	0-2.5	KG/CM2	1/2" NPT(M)	4 PIN CONNECTOR TYPE	400NB
4	90GBS43CP101	SLUDGE TRANSFER PUMP	SLUDGE	DIAPHRAGM SEAL TYPE	2 SPDT 5A@24 VDC	35-50 degC	upto 1 kg/cm2	1.2 kg/cm2	0-2.5	KG/CM2	1/2" NPT(M)	4 PIN CONNECTOR TYPE	400NB
G. FLOW TRANSMITTER													
1	90GBD01CF001	RAW WATER LINE	WATER	FLOW TRANSMITTER (EMF TYPE)	4-20 mA HART	35-50 degC	upto 2600m3/hr	2378 m3/hr	0-2600	M3/HR	FLANGE MOUNTED	1/2" NPT	800NB
2	90GBD02CF001	PARSHAL FLUME	WATER	FLOW TRANSMITTER (ULTRASONIC TYPE)	4-20 mA HART	35-50 degC	upto 2600 m3/hr	2378 m3/hr	0-2600	M3/HR	1.5 " NPT	1/2" NPT	1000 x 1330
3	90GBD03CF001	PARSHAL FLUME CLARIFLOCCULATOR 1	WATER	FLOW TRANSMITTER (ULTRASONIC TYPE)	4-20 mA HART	35-50 degC	upto 1400 m3/hr	1189 m3/hr	0-1400	M3/HR	1.5 " NPT	1/2" NPT	800 x 810
4	90GBD03CF002	PARSHAL FLUME CLARIFLOCCULATOR 2	WATER	FLOW TRANSMITTER (ULTRASONIC TYPE)	4-20 mA HART	35-50 degC	upto 1400 m3/hr	1189 m3/hr	0-1400	M3/HR	1.5 " NPT	1/2" NPT	800 x 810
5	90GBS45CF001	SLUDGE TRANSFER PUMP	SLUDGE	FLOW TRANSMITTER (EMF TYPE)	4-20 mA HART	35-50 degC	upto 600 m3/hr	500 m3/hr	0-600	M3/HR	FLANGE MOUNTED	1/2" NPT	400NB
6	90GBD10CF001	PARHAL FLUME BEFORE CLARIFIED STORAGE TANK	WATER	FLOW TRANSMITTER (ULTRASONIC TYPE)	4-20 mA HART	35-50 degC	upto 1400 m3/hr	1189 m3/hr	0-1400	M3/HR	1.5 " NPT	1/2" NPT	800 x1610
H. ANALYZER													
1	90GBD01CQ001	RAW WATER LINE	ALKALI	TURBIDITYANALYZER	4-20 mA HART	35-50 degC	upto 1000 NTU	upto 500 NTU	0-1000	NTU	PANEL MOUNTED	1/2" NPT(F)	800NB
I. LIMIT SWITCH (R1)													
1	NA	RAW WATER LINE	WATER	NO/NC TYPE	DIGITAL	35-50 degC	NA		NA	NA	MOUNTIING BRACKET	1/2" NPT	800NB
2	NA	RAW WATER LINE	WATER	NO/NC TYPE	DIGITAL	35-50 degC			NA	NA	MOUNTIING BRACKET	1/2" NPT	800NB
3	NA	RAW WATER LINE	WATER	NO/NC TYPE	DIGITAL	35-50 degC			NA	NA	MOUNTIING BRACKET	1/2" NPT	800NB
4	NA	RAW WATER LINE	WATER	NO/NC TYPE	DIGITAL	35-50 degC			NA	NA	MOUNTIING BRACKET	1/2" NPT	800NB
5	NA	RAW WATER BYPASS LINE	WATER	NO/NC TYPE	DIGITAL	35-50 degC			NA	NA	MOUNTIING BRACKET	1/2" NPT	800NB
6	NA	SLUDGE TRANSFER PUMP LINE	SLUDGE	NO/NC TYPE	DIGITAL	35-50 degC			NA	NA	MOUNTIING BRACKET	1/2" NPT	400 NB
7	NA	SLUDGE TRANSFER PUMP LINE	SLUDGE	NO/NC TYPE	DIGITAL	35-50 degC			NA	NA	MOUNTIING BRACKET	1/2" NPT	400 NB

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

REV	DATE	ALTERED:	REV	DATE	ALTERED:
		CHECKED:			CHECKED:

STATUS : CONTRACT

JOB NO.: 412

2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI.

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION (TANGEDCO)

CONSULTANT: DESEIN PVT LTD, NEW DELHI.

BHARAT HEAVY ELECTRICALS LIMITED

PROJECTS ENGINEERING MANAGEMENT,NEW DELHI

OTOKLIN GLOBAL BUSINESS LTD.
E-410, CRYSTAL PLAZA,OPP. INFINITI MALL
LOKHANDWALA LINK ROAD, ANDHERI WEST,
MUMBAI 400 053. Tel No.022-26732135

DEPT.	CODE	SCALE	WEIGHT(KG)	REF DRG.	ITEM
--	A	-	-	-	-

QAP / CHECK LIST FOR ALL INSTRUMENTS

OF PRE TREATMENT PLANT

	NAME	SIGN	DATE
PREP	ALOYSIUS	AF	16-07-18
CHKD	MUAZZAM I	MI	16-07-18
APPD	ASLAM A	AA	16-07-18

BHEL LOA NO: PW/PE/PG/EN1/P-310/17 DTD. 18.01.2018

DEPT.							CARD CODE	BHEL DRAWING NO.	REV
SIGN			N.A.				-	PE-V0-412-158-A054	0
DATE								OTOKLIN-DRG/DOC-NO.. OGBL/OC-983/QAP/ICL/PTP/18/354	

NO. OF SHEETS 1 EXCLUDING COVER PAGE

OTOKLIN GLOBAL BUSINESS LIMITED	OTOKLIN GLOBAL BUSINESS LIMITED R-02 Remi Bizcourt, Off Veera Desai Road, Andheri West, Mumbai 400 053, India	MANUFACTURING QUALITY PLAN				PROJECT: 2X660 MW ENNORE SEZ STPP AT ASH DYKE OF NCTPS PACKAGE: PRETREATMENT PLANT CONTRACT NO.: 412 MAIN-SUPPLIER: BHEL SUB- CONTRACTOR:- OTOKLIN						
		ITEM: INSTRUMENT SUB-SYSTEM: PRETREATMENT PLANT		QP NO.: PE-V0-412-158-A054 REV.NO.: 00 DATE: 16-07-2018 PAGE: 1 OF 1								

S.NO	COMPONENT & OPERATIONS	CHARACTERISTICS CHECKED	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	N	
1	2	3	4	5	6	7	8	9	D	10			11
	INSRUMENTS												
1.1	Pressure Gauges	a. Make, Model , Range & Type.	Major	Visual	1 per type	Data Sheet	Data Sheet	MFG. TC	✓	P	W	R	
1.2	Pressure Transmitters												
1.3	Level Guages	b. Overall dimension/ process connection	Major	Meas.	1 per type	Data Sheet	Data Sheet	MFG. TC	✓	P	W	R	
1.4	Flow Transmitter	c. Calibration, & Accuracy	Major	Document Review	1 per type	Data Sheet	Data Sheet	MFG. TC	✓	P	W	R	
1.5	Pressure switch												
1.6	Level Transmitter	d. Degree of protection	Major	Document Review	1 per type	Data Sheet	Data Sheet	MFG. TC	✓	P	W	R	
1.7	Turbidity Analyzer	e. Over range test (As applicable)	Major	Meas.	1 per type	Data Sheet	Data Sheet	MFG. TC	✓	P	W	R	

MANUFACTURER / SUBCONTRACTOR	CONTRACTOR	LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER — P - Performing the Test C: SUPPLIER/NOMINATED INSPECTION AGENCY — W - Witnessing the Test N: THE OWNER — R - Review the Test	FOR THE	DOC. NO.: REV..... CAT.....
SIGNATURE				

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

REV	DATE	ALTERED:	REV	DATE	ALTERED:
		CHECKED:			CHECKED:

STATUS : CONTRACT

JOB NO.: 412

2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI.

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION (TANGEDCO)

CONSULTANT: DESEIN PVT LTD, NEW DELHI.

BHARAT HEAVY ELECTRICALS LIMITED
PROJECTS ENGINEERING MANAGEMENT,NEW DELHI

OTOKLIN GLOBAL BUSINESS LTD.
E-410, CRYSTAL PLAZA,OPP. INFINITI MALL
LOKHANDWALA LINK ROAD, ANDHERI WEST,
MUMBAI 400 053. Tel No.022-26732135

DEPT.	CODE	SCALE	WEIGHT(KG)	REF DRG.	ITEM
--	A	-	-	-	-

IO LIST OF PRE TREATMENT PLANT

BHEL LOA NO: PW/PE/PG/EN1/P-310/17

	NAME	SIGN	DATE
PREP	BILAL S	BS	06-11-19
CHKD	MUAZZAM I	MI	06-11-19
APPD	ASLAM A	AA	06-11-19

DEPT.							CARD CODE	BHEL DRAWING NO.	REV
SIGN			N.A.				-	PE-VO-412-158-A056	01
DATE								OTOKLIN-DRG/DOC-NO.. OGBL/OC-983/IOLIST/PTP/18/370	

NO. OF SHEETS 7 EXCLUDING COVER PAGE

PT SYSTEM - IO LIST REV 02

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_ NUMBER	REV_CODE	JB TERM-1	JB TERM-2
1	90GBD01AA001	Raw WTR Inlet to AERATOR "ACTUATOR OPEN FB"	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
2		Raw WTR Inlet to AERATOR "ACTUATOR CLOSE FB"	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
3		Raw WTR Inlet to AERATOR " ACTUATOR DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
4		Raw WTR Inlet to AERATOR " ACTUATOR IN REMOTE	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
5		Raw WTR Inlet to AERATOR "ACTUATOR OPEN CMD"	NA	NA	DO	DO[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
6		Raw WTR Inlet to AERATOR"ACTUATOR CLOSE CMD"	NA	NA	DO	DO[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
7	90GBD01AA502	Raw WTR Inlet to AERATOR "ACTUATOR LIMIT SWITCH OPEN	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
8		Raw WTR Inlet to AERATOR"ACTUATOR LIMIT SWITCH CLOSE	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
9	90GBD01AA503	Raw WTR Inlet to AERATOR "ACTUATOR LIMIT SWITCH OPEN	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
10		Raw WTR Inlet to AERATOR"ACTUATOR LIMIT SWITCH CLOSE	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
11	90GBD01AA002	Raw WTR Inlet to AERATOR "ACTUATOR OPEN FB"	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
12		Raw WTR Inlet to AERATOR "ACTUATOR CLOSE FB"	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
13		Raw WTR Inlet to AERATOR " ACTUATOR DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
14		Raw WTR Inlet to AERATOR " ACTUATOR IN REMOTE	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
15		Raw WTR Inlet to AERATOR "ACTUATOR OPEN CMD"	NA	NA	DO	DO[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
16		Raw WTR Inlet to AERATOR"ACTUATOR CLOSE CMD"	NA	NA	DO	DO[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
17	90GBD01AA504	Raw WTR Inlet to AERATOR "ACTUATOR LIMIT SWITCH OPEN	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
18		Raw WTR Inlet to AERATOR"ACTUATOR LIMIT SWITCH CLOSE	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
19	90GBD01AA505	Raw WTR Inlet to AERATOR "ACTUATOR LIMIT SWITCH OPEN	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
20		Raw WTR Inlet to AERATOR"ACTUATOR LIMIT SWITCH CLOSE	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
21	90GBD01AA509	RAW Water Bypass Line	NA	NA	DI	DI[DRY]	NA	O	RAW WTR INLET		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
22	90GBN71CL001	LIME DOSING TANK LEVEL 1	NA	JB-1	AI	AI[4-20]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
23	90GAA01AM004	LIME DOSING TANK-A AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
24		LIME DOSING TANK-A AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
25		LIME DOSING TANK-A AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
26		LIME DOSING TANK-A AGI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
27		LIME DOSING TANK-A AGI " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
28		LIME DOSING TANK-A AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
29		LIME DOSING TANK-A AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
30		LIME DOSING TANK-A AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
31	90GAA01AM005	LIME DOSING TANK-B AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
32		LIME DOSING TANK-B AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
33		LIME DOSING TANK-B AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
34		LIME DOSING TANK-B AGI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
35		LIME DOSING TANK-B AGI " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
36		LIME DOSING TANK-B AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
37		LIME DOSING TANK-B AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
38		LIME DOSING TANK-B AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
39	90GBN72CL001	LIME DOSING TANK LEVEL2	NA	JB-1	AI	AI[4-20]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
40	90GBN73AP001	LIME DOSING PUMP-A "ON FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
41		LIME DOSING PUMP-A "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
42		LIME DOSING PUMP-A " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
43		LIME DOSING PUMP-AI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
44		LIME DOSING PUMP-A EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
45		LIME DOSING PUMP-A "START CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
46		LIME DOSING PUMP-A "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
47		LIME DOSING PUMP-A TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
48	90GBN73AP002	LIME DOSING PUMP-B "ON FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
49		LIME DOSING PUMP-B "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
50		LIME DOSING PUMP-B " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
51		LIME DOSING PUMP-B " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
52		LIME DOSING PUMP-B " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
53		LIME DOSING PUMP-B "START CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
54		LIME DOSING PUMP-B "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
55		LIME DOSING PUMP-B TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
56	90GBN75CP001	LIME DOSING PUMP DISCHARGE HEADER PRESSURE	NA	JB-1	AI	AI[4-20]	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DUAL INDUCTANCE TYPE	0-3kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
57	90GBN61CL001	FeCl3 DOSING TANK LEVEL 1	NA	JB-1	AI	AI[4-20]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
58	GTA61AM001	FeCl3 DOSING TANK-A AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
59		FeCl3 DOSING TNK-A AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
60		FeCl3 DOSING TNK-A AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
61		FeCl3 DOSING TNK-A AGI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
62		FeCl3 DOSING TNK-A AGI "EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
63		FeCl3 DOSING TNK-A AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_NUMBER	REV_CODE	JB TERM-1	JB TERM-2
64		FeCl3 DOSING TNK-A AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
65		FeCl3 DOSING TNK-A AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
66		FeCl3 DOSING TANK-B AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
67		FeCl3 DOSING TNK-B AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
68		FeCl3 DOSING TNK-B AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
69	GTA62AM001	FeCl3 DOSING TNK-B AGI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
70		FeCl3 DOSING TNK-B AGI "EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
71		FeCl3 DOSING TNK-B AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
72		FeCl3 DOSING TNK-B AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
73		FeCl3 DOSING TNK-B AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
74		FeCl3 DOSING TANK-C AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
75		FeCl3 DOSING TNK-C AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
76		FeCl3 DOSING TNK-C AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
77	GTA63AM001	FeCl3 DOSING TNK-C AGI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
78		FeCl3 DOSING TNK-C AGI "EPB-OPERATED	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
79		FeCl3 DOSING TNK-C AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
80		FeCl3 DOSING TNK-C "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
81		FeCl3 DOSING TNK-C AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
82	90GBN62CL001	FeCl3 DOSING TANK LEVEL 2	NA	JB-1	AI	AI[4-20]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
83		FeCl3 DOSING PUMP-A "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
84		FeCl3 DOSING PUMP-A "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
85		FeCl3 DOSING PUMP-A " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
86	GTA64AP001	FeCl3 DOSING PUMP-A " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
87		FeCl3 DOSING PUMP-A "EPB-OPERATED	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
88		FeCl3 DOSING PUMP-A "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
89		FeCl3 DOSING PUMP-A "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
90		FeCl3 DOSING PUMP-A TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
91		FeCl3 DOSING PUMP-B "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
92		FeCl3 DOSING PUMP-B "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
93		FeCl3 DOSING PUMP-B " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
94	GTA64AP002	FeCl3 DOSING PUMP-B " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
95		FeCl3 DOSING PUMP-B "EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
96		FeCl3 DOSING PUMP-B "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
97		FeCl3 DOSING PUMP-B "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
98		FeCl3 DOSING PUMP-B TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
99	90GBN63CL001	FeCl3 DOSING TANK LEVEL 3	NA	JB-1	AI	AI[4-20]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
100	90GBN65CP001	FeCl3 DOSING PUMP DISCHARGE HEADER PRESSURE	NA	JB-1	AI	AI[4-20]	NA	O	FeCl3 DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DUAL INDUCTANCE TYPE	0-3.0kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
101	90GBN81CL001	PE DOSINGTANK LEVEL 1	NA	JB-1	AI	AI[4-20]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
102		PE PREPEARTION TNK -A AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
103		PE PREPEARTION TNK-A AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
104		PE PREPEARTION TNK-A AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
105	90GBN81AM001	PE PREPEARTION TNK-A AGI " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
106		PE PREPEARTION TNK-A AGI " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
107		PE PREPEARTION TNK-A AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
108		PE PREPEARTION TNK-A AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
109		PE PREPEARTION TNK-A AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
110		PE PREPEARTION TNK -B AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
111		PE PREPEARTION TNK-B AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
112		PE PREPEARTION TNK-B AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
113	90GBN82AM001	PE PREPEARTION TNK-B AGI " MCC AVAILABLE "	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
114		PE PREPEARTION TNK-B AGI " EPB-OPERATED	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
115		PE PREPEARTION TNK-B AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
116		PE PREPEARTION TNK-B AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_NUMBER	REV_CODE	JB TERM-1	JB TERM-2
117		PE PREPEARTION TNK-B AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
118	90GBN82CL001	PE DOSINGTANK LEVEL 2	NA	JB-1	AI	AI[4-20]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
119		PE DOSING PUMP-A "ON FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
120		PE DOSING PUMP-A "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
121		PE DOSING PUMP-A " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
122		PE DOSING PUMP-A " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
123	90GBN83AP001	PE DOSING PUMP-A " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
124		PE DOSING PUMP-A "START CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
125		PE DOSING PUMP-A "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
126		PE DOSING PUMP-A TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
127		PE DOSING PUMP-B "ON FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
128		PE DOSING PUMP-B "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
129		PE DOSING PUMP-B " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
130		PE DOSING PUMP-B " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
131	90GBN83AP002	PE DOSING PUMP-B " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
132		PE DOSING PUMP-B "START CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
133		PE DOSING PUMP-B "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
134		PE DOSING PUMP-B TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
135	90GBN85CP001	PE DOSING PUMP DISCHARGE HEADER PRESSURE	NA	JB-1	AI	AI[4-20]	NA	O	PE DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DUAL INDUCTANCE TYPE	0-3 kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
136		FLASH MIXER AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
137		FLASH MIXER AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
138		FLASH MIXER AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
139		FLASH MIXER AGI " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
140	90GBD02AM001	FLASH MIXER AGI " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
141		FLASH MIXER AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
142		FLASH MIXER AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
143		FLASH MIXER AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
144		FLOCCULATION TANK AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
145		FLOCCULATION TANK AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
146		FLOCCULATION TANK AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
147	90GAA01BB005	FLOCCULATION TANK AGI " MCC AVAILABLE	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
148		FLOCCULATION TANK AGI " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_NUMBER	REV_CODE	JB TERM-1	JB TERM-2
149		FLOCCULATION TANK AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
150		FLOCCULATION TANK AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
151		FLOCCULATION TANK AGI " TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
152		FLOCCULATION TANK AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
153		FLOCCULATION TANK AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
154		FLOCCULATION TANK AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
155	90GAA01BB006	FLOCCULATION TANK AGI " MCC AVAILABLE "	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
156		FLOCCULATION TANK AGI " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
157		FLOCCULATION TANK AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
158		FLOCCULATION TANK AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
159		FLOCCULATION TANK AGI " TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
160		END CARRIAGE DRIVE"ON FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
161		END CARRIAGE DRIVE "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
162		END CARRIAGE DRIVE " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
163	90GAA01BB005	END CARRIAGE DRIVE " MCC AVAILABLE "	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
164		END CARRIAGE " EPB-OPERATED	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
165		END CARRIAGE DRIVE "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
166		END CARRIAGE DRIVE "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
167		END CARRIAGE DRIVE " TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
168		END CARRIAGE DRIVE"ON FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
169		END CARRIAGE DRIVE "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
170		END CARRIAGE DRIVE " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
171	90GAA01BB006	END CARRIAGE DRIVE " MCC AVAILABLE "	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
172		END CARRIAGE " EPB-OPERATED	NA	NA	DI	DI[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
173		END CARRIAGE DRIVE "START CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
174		END CARRIAGE DRIVE "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
175		END CARRIAGE DRIVE " TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	FLOCCULATION AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
176		AIR BLR-B1-A "ON FB"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
177		AIR BLR-B1-A "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
178		AIR BLR-B1-A " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
179	90GBS31AN001	AIR BLR-B1-A " MCC AVAILABLE	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
180		AIR BLR-B1-A " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
181		AIR BLR-B1-A "START CMD"	NA	NA	DO	DO[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
182		AIR BLR-B1-A "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
183		AIR BLR-B1-A " TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
184		AIR BLR-B1-B "ON FB"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
185		AIR BLR-B1-B "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
186		AIR BLR-B1-B " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
187	90GBS32AN001	AIR BLR-B1-B " MCC AVAILABLE	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
188		AIR BLR-B1-B " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
189		AIR BLR-B1-B "START CMD"	NA	NA	DO	DO[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
190		AIR BLR-B1-B "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
191		AIR BLR-B1-B " TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
192	90GBS40CP101	AIR BLOWER DISCHARGE PRESSURE	NA	NA	DI	DI[DRY]	NA	O	AIR BLOWER SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DIAPHRAGM SEAL TYPE	0-1 kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
193	90GBS50CL001	SLUDGE TRANSFER SUMP	NA	JB-2	AI	AI[4-20]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
194	90GBS50CL002	SLUDGE TRANSFER SUMP	NA	JB-2	AI	AI[4-20]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
195		SLUDGE TRANSFER PUMP -A "ON FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
196		SLUDGE TRANSFER PUMP -A "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
197		SLUDGE TRANSFER PUMP -A " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
198		SLUDGE TRANSFER PUMP -A " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
199	90GBS41AP001	SLUDGE TRANSFER PUMP -A " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
200		SLUDGE TRANSFER PUMP -A "START CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
201		SLUDGE TRANSFER PUMP -A "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_NUMBER	REV_CODE	JB TERM-1	JB TERM-2
202		SLUDGE TRANSFER PUMP -A "CURRENT F/B"	NA	NA	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
203		SLUDGE TRANSFER PUMP -A" TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
204		SLUDGE TRANSFER PUMP -B "ON FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
205		SLUDGE TRANSFER PUMP -B "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
206		SLUDGE TRANSFER PUMP -B " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
207		SLUDGE TRANSFER PUMP -B " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
208	90GB542AP001	SLUDGE TRANSFER PUMP -B " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
209		SLUDGE TRANSFER PUMP -B "START CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
210		SLUDGE TRANSFER PUMP -B "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
211		SLUDGE TRANSFER PUMP -B "CURRENT F/B	NA	NA	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-05							
212		SLUDGE TRANSFER PUMP -B" TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
213		SLUDGE TRANSFER PUMP -C "ON FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
214		SLUDGE TRANSFER PUMP -C "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
215		SLUDGE TRANSFER PUMP -C " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
216		SLUDGE TRANSFER PUMP -C " MCC AVAILABLE"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
217	90GB543AP001	SLUDGE TRANSFER PUMP -C " EPB OPERATED"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
218		SLUDGE TRANSFER PUMP C "START CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
219		SLUDGE TRANSFER PUMP -C "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
220		SLUDGE TRANSFER PUMP -C CURRENT F/B	NA	NA	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
221		SLUDGE TRANSFER PUMP -C" TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
222		SLUDGE TRANSFER PUMP -A DISCHARGE VALVE "ACTUATOR OPEN FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
223		SLUDGE TRANSFER PUMP -A DISCHARGE VALVE "ACTUATOR CLOSE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
224	90GB541AA001	SLUDGE TRANSFER PUMP -A DISCHARGE VALVE " ACTUATOR DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
225		SLUDGE TRANSFER PUMP -A DISCHARGE VALVE " ACTUATOR IN REMOTE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
226		SLUDGE TRANSFER PUMP -A DISCHARGE VALVE "ACTUATOR OPEN CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
227		SLUDGE TRANSFER PUMP -A DISCHARGE VALVE " ACTUATOR CLOSE CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
228		SLUDGE TRANSFER PUMP -B DISCHARGE VALVE "ACTUATOR OPEN FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
229		SLUDGE TRANSFER PUMP -B DISCHARGE VALVE "ACTUATOR CLOSE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
230	90GB542AA001	SLUDGE TRANSFER PUMP -B DISCHARGE VALVE " ACTUATOR DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
231		SLUDGE TRANSFER PUMP -B DISCHARGE VALVE " ACTUATOR IN REMOTE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
232		SLUDGE TRANSFER PUMP -B DISCHARGE VALVE "ACTUATOR OPEN CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
233		SLUDGE TRANSFER PUMP -B DISCHARGE VALVE "ACTUATOR CLOSE CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
234		SLUDGE TRANSFER PUMP -C DISCHARGE VALVE "ACTUATOR OPEN FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
235		SLUDGE TRANSFER PUMP -C DISCHARGE VALVE "ACTUATOR CLOSE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
236		SLUDGE TRANSFER PUMP -C DISCHARGE VALVE " ACTUATOR DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
237	90GB543AA001	SLUDGE TRANSFER PUMP -C DISCHARGE VALVE " ACTUATOR IN REMOTE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
238		SLUDGE TRANSFER PUMP -C DISCHARGE VALVE "ACTUATOR OPEN CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
239		SLUDGE TRANSFER PUMP -C DISCHARGE VALVE " ACTUATOR CLOSE CMD"	NA	NA	DO	DO[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
240	90GAA01AA651	SLUDGE TRANSFER PUMP DISCHARGE VALVE " LIMIT SWITCH OPEN	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
241		SLUDGE TRANSFER PUMP DISCHARGE VALVE " LIMIT SWITCH CLOSE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
242	90GAA01AA652	SLUDGE TRANSFER PUMP DISCHARGE VALVE "LIMIT SWITCH OPEN	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
243		SLUDGE TRANSFER PUMP DISCHARGE VALVE " ACTUATOR CLOSE CMD"LIMIT SWITCH CLOSE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
244	90GB541CP101	SLUDGE TRANSFER PUMP-A DISCHARGE HEADER PRESSURE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DIAPHRAGM SEAL TYPE	0-2.5KG/CM2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
245	90GB542CP101	SLUDGE TRANSFER PUMP -B DISCHARGE HEADER PRESSURE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DIAPHRAGM SEAL TYPE	0-2.5KG/CM2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
246	90GB543CP101	SLUDGE TRANSFER PUMP -C DISCHARGE HEADER PRESSURE	NA	NA	DI	DI[DRY]	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DIAPHRAGM SEAL TYPE	0-2.5KG/CM2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
247	90GB545CP001	SLUDGE TRANSFER PUMP COMMON DISCHARGE HEADER PRESSURE	NA	JB-2	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DUAL INDUCTANCE TYPE	0-3 kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
248	90GB545CP002	SLUDGE TRANSFER PUMP COMMON DISCHARGE HEADER PRESSURE	NA	JB-2	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DUAL INDUCTANCE TYPE	0-3 kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
249	90GBN60CL001	OVER HEAD CLARIFIED WATER TANK	NA	JB-1	AI	AI(4-20)	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
250	90GBD10CL001	CLARIFIED WATER STORAGE TANK COMP-I	NA	JB-1	AI	AI(4-20)	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
251	90GBD10CL002	CLARIFIED WATER STORAGE TANK COMP-II	NA	JB-1	AI	AI(4-20)	NA	O	LIME DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
252	90GB550CL003	SLUDGE SUMP COMP-I	NA	JB-1	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
253	90GB550CL004	SLUDGE SUMP COMP-II	NA	JB-1	AI	AI(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
254	90GBD01CF001	RAW WATER INLET	NA	JB-2	AI	AI(4-20)	NA	O	CLARIFLOCCULATOR AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		FLOW TRANSMITTER	EMF	0-2600m3/hr	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
255	90GBD02CF001	PARSHALL FLUME	NA	JB-2	AI	AI(4-20)	NA	O	CLARIFLOCCULATOR AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		FLOW TRANSMITTER	ULTRASONIC	0-2600m3/hr	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							
256	90GBD03CF001	OUTLET CHANNEL CLARIFLOCCULATOR-1	NA	JB-2	AI	AI(4-20)	NA	O	CLARIFLOCCULATOR AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		FLOW TRANSMITTER	ULTRASONIC	0-1400m3/hr	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04							

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_NUMBER	REV_CODE	JB TERM-1	JB TERM-2
257	90GBD03CF002	OUTLET CHANNEL CLARIFLOCCULATOR-2	NA	JB-2	AI	A(4-20)	NA	O	CLARIFLOCCULATOR AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		FLOW TRANSMITTER	ULTRASONIC	0-1400m3/hr	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
258	90GB545CF001	SLUDGE TRANSFER PUMP DISCHARGE	NA	JB-2	AI	A(4-20)	NA	O	SLUDGE AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		FLOW TRANSMITTER	EMF	0-600m3/hr	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
259	90GBD10CF001	COMMON OUTLET CHANNEL CLARIFLOCCULATOR	NA	JB-2	AI	A(4-20)	NA	O	CLARIFLOCCULATOR AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		FLOW TRANSMITTER	ULTRASONIC	0-1400m3/hr	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
260	90GBD01CQ001	RAW WATER LINE	NA	JB-2	AI	A(4-20)	NA	O	CLARIFLOCCULATOR AREA		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		TURBIDITY ANALYZER		0-1000NTU	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
261	90GBN91CL001	NAOCL DOSING TANK LEVEL 1	NA	JB-1	AI	A(4-20)	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		LEVEL	ULTRASONIC	0.3-10M	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
262		NAOCL DOSING TANK-A AGI "ON FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
263		NAOCL DOSING TANK-A AGI "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
264		NAOCL DOSING TANK-A AGI " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
265		NAOCL DOSING TANK-A AGI " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
266	90GBN91AM001	NAOCL DOSING TANK-A AGI " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
267		NAOCL DOSING TANK-A AGI "START CMD"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
268		NAOCL DOSING TANK-A AGI "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
269		NAOCL DOSING TANK-A AGI TRIP ANNUNCIATION	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
270		NAOCL DOSING PUMP-A "ON FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
271		NAOCL DOSING PUMP-A "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
272		NAOCL DOSING PUMP-A " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
273		NAOCL DOSING PUMP-Ai " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
274	90GBN92AP001	NAOCL DOSING PUMP-A EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
275		NAOCL DOSING PUMP-A "START CMD"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
276		NAOCL DOSING PUMP-A "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
277		NAOCL DOSING PUMP-A "TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
278		NAOCL DOSING PUMP-B "ON FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
279		NAOCL DOSING PUMP-B "OFF FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
280		NAOCL DOSING PUMP-B " MCC DISTURBANCE FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
281	90GBN92AP002	NAOCL DOSING PUMP-B " MCC AVAILABLE FB"	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
282		NAOCL DOSING PUMP-B " EPB OPERATED	NA	NA	DI	DI[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			MCC	DDCMIS		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
283		NAOCL DOSING PUMP-B "START CMD"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
284		NAOCL DOSING PUMP-B "STOP CMD"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			DDCMIS	MCC		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
285		NAOCL DOSING PUMP-B "TRIP ANNUNCIATION"	NA	NA	DO	DO[DRY]	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			PLC	CONTROL DESK		NA	NA		OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
286	90GBN95CP001	NAOCL DOSING PUMP DISCHARGE HEADER PRESSURE	NA	JB-1	AI	A(4-20)	NA	O	NAOCL DOS SYS		PT PLANT	NA	PT PLANT BLOCK			FIELD	DDCMIS		PRESSURE	DUAL INDUCTANCE TYPE	0-3kg/cm2	OTOKLIN	PE-V0-412-158-A001 (P&ID)REV-04						
287	90BRV81EH201	UPS -1 RECTIFIER-1	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
288	90BRV81EH202	UPS -1 RECTIFIER-2	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
289	90BRV81EH203	UPS -1 INVERTER-1	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
290	90BRV81EH204	UPS -1 INVERTER-2	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
291	90BRV81EH205	UPS -1 BATTERY-1 LOW	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
292	90BRV81EH206	UPS -1 BATTERY-2 LOW	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
293	90BRV81EH207	UPS -1 LOAD ON STATIC BYPASS	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
294	90BRV81EH208	UPS -1 STATIC BYPASS FAILED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
295	90BRV81EH209	UPS -1 INVERTER OFF OR FAILED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
296	90BRV81EH210	UPS -1 FAN TRIPPED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
297	90BRV81EH211	UPS ACDB-1 INCOMER TRIPPED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
298	90BRV82EH211	UPS ACDB-2 INCOMER TRIPPED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
299	BRV41EH001	UPS-1 OUTPUT CURRENT		NA	AI	4-20mA				UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
300	BRV41EH002	UPS-1 OUTPUT VOLTAGE		NA	AI	4-20mA				UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
301	BRV41EH003	UPS-1 OUTPUT FREQ		NA	AI	4-20mA				UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
302	90BRV82EH201	UPS -2 RECTIFIER-1	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
303	90BRV82EH202	UPS -2 RECTIFIER-2	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
304	90BRV82EH203	UPS -2 INVERTER-1	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
305	90BRV82EH204	UPS -2 INVERTER-2	TRIPPED	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
306	90BRV82EH205	UPS -2 BATTERY-1 LOW	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
307	90BRV82EH206	UPS -2 BATTERY-2 LOW	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
308	90BRV82EH207	UPS -2 LOAD ON STATIC BYPASS	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
309	90BRV82EH208	UPS -2 STATIC BYPASS FAILED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
310	90BRV82EH209	UPS -2 INVERTER OFF OR FAILED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
311	90BRV82EH210	UPS -2 FAN TRIPPED	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
312	-	COOLING FAN FAIL	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
313	-	230 V AC/24 V DC CONVERTOR FAIL	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
314	-	24 V DC UNDER VOLTAGE	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												

S.No	KKS_CODE	DESCRIPTION	STATUS	JB	RECORD_TYPE	IO_TYPE	NO_NC	O_I_C	AREA	EQUP_GR	PACKAGE	DDCMIS NAME	PROCESS_BLOCK_STREAM	FG	RIO	SOURCE	DESTINATION	ALM	PARAMETER	INST_TYPE	PROCESS_RANGE	INST_SCOPE	REF_DOC_NO	SPECIAL_REMARKS	REV_REMARK	REV_NUMBER	REV_CODE	JB TERM-1	JB TERM-2
315	-	24 V DC OVER VOLTAGE	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
316	-	LOSS OF UPS POWER SUPPLY FEEDER	TRUE	NA	DI	PF	NO			UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
317	BRV42EH001	UPS-2 OUTPUT CURRENT		NA	AI	4-20mA				UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
318	BRV42EH002	UPS-2 OUTPUT VOLTAGE		NA	AI	4-20mA				UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												
319	BRV42EH003	UPS-2 OUTPUT FREQ		NA	AI	4-20mA				UPS	PT PLANT	NA	PT PLANT BLOCK			UPS PNL	DDCMIS												

Notes :
1) Spare capacity/requirements shall be inline with technical specification, Vol. V, cl. No. 4.03.11
2) I/O redundancy shall be considered as per specification, Vol. V, Chapter 4
3) Reference document - Drive Control Philosophy, PE-DM-412-145-I002

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Bidders to note the following Additional Terms and Conditions for subject tender-

1. Tender Type	**Open Tender (Domestic-Indian)**	
2. Package	**PRE TREATMENT PLANT**	
3. Project	**2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI**	
4. End Customer	**TANGEDCO**	
5. Executing Agency	**BHEL-PSSR**	
6. Nature of Package (Divisible/Non-Divisible)	**Non-Divisible**	
7. Technical Scope	As per Technical specification No: PE-TS-412-158-A002	
8. Schedule of Pre-Bid Discussion	Based on Bidder's request, Pre-Bid meeting shall be arranged.	
9. PVC	APPLICABLE Please refer PVC Annexure enclosed in GeM bid	
10. CIF APPLICABLE	NO	
11. QUANTITY VARIATION	AS PER GCC BOP (+/-10%)	
12. REVERSE AUCTION	**YES – BID TO RA** **H1 ELIMINATION**	
13. CUSTOMER APPROVAL REQUIRED	**YES**	
14. Eligibility of Local Supplier as per Make in India Guideline	**Only Class I Supplier (with local content 60% and above)**	
15. HSE Guideline	**Not Applicable** **Same may please be downloaded from BHEL PEM Website - https://pem.bhel.com/Current_Tender.aspx**	
16. Prequalification Requirement	Financial PQR-NO	Technical PQR- YES
17. Delivery terms for Supply portion	FOR Despatch Station	
18. Bid Security/ Earnest Money Deposit (EMD)	**EMD is applicable. EMD amount shall be Rs. 6 Lakh.** EMD is to be submitted by the all bidders along with their bids (except Micro and Small Enterprises (MSEs) or Startups as recognized by Department for Promotion of Industry and Internal Trade (DPIIT)). **Modes of deposit** The EMD may be accepted only in the following forms:	

	i) Electronic Fund Transfer credited in BHEL account (before tender opening) BHEL-PEM account details are as follows: Bank name, State Bank of India Account No: 39922687394 IFSC: SBIN0017313 BRANCH-CAG II NEW DELHI ii) Banker's cheque/ Pay order/ Demand draft, in favour of BHEL-PEM, Noida (along with the offer). iii) Fixed Deposit Receipt (FDR) iv) Bank Guarantee from any of the Scheduled Banks (refer Annexure A along with GeM Bid/NIT for BG Format) v) Insurance Surety Bonds. **Validity period of EMD** The EMD shall remain valid for a period of 45 (forty-five) days beyond the final bid validity period. EMD shall not carry any interest **Forfeiture of EMD** I. A bidder's EMD will be forfeited if the bidder withdraws or amends its/his tender or impairs or derogates from the tender in any respect within the period of validity of the tender or if the successful bidder fails to furnish the required performance security within the specified period mentioned in the Tender. II. EMD by the tenderer to be withheld in case any action on the bidder is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors (abridged version of guidelines is available on www.bhel.com)" and forfeited/ released based on the action as determined under these guidelines. **Return of EMD** I. Bid securities of the unsuccessful bidders shall be returned to them after expiry of the final bid validity period and latest by the 30th day after the award of the contract. However, Bid securities of unsuccessful bidders during first stage i.e. technical-commercial evaluation etc. shall be returned within 30 days of declaration of result of first stage i.e. technical-commercial evaluation. II. Bid security shall be refunded to the successful bidder on conclusion of the order/ receipt of a performance security.
19. Performance Security (PS)	I. Initially 10% of the contract value (total order value in case of GeM POs excluding PVC/total Ex-works price in case of outside GeM POs excluding PVC). However, 5% of the contract value (as above) will be released after

	completion of Main Supply based on certification by Project Group/Purchaser OR II. 5% of the contract value (total order value in case of GeM POs excluding PVC/total Ex-works price in case of outside GeM POs excluding PVC). Additional 5% of the contract value will be retained from first bill & subsequent bill(s) of the same contract. The retention amount will be released after completion of Main Supply based on certification by Project Group/Purchaser **Validity of PS** Initial validity of performance security shall be 26 months from LOA date (Considering delivery period of 6 months + 18 months guarantee period + 2 months claim period is already mentioned in GTC cl no. 7.ii GeM 3.0). Further, extension if any shall be as per GeM Terms. **Modes of deposit** Performance security may be furnished in the following forms: a) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL. b) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL. c) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL). d) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL). e) Insurance Surety Bond. (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith) Performance Security is to be furnished within 14 days from the date of PO/LOA and it should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the supplier, including warranty obligations. **Remarks for PS** a) The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier. b) Performance security should be refunded to the contractor without interest, after he duly performs and completes the contract in all respects but not later than 60(sixty) days of completion of all such obligations including the warranty under the contract.

	The Performance Security shall not carry any interest.
20. Breach of contract, Remedies and Termination	In case of Breach of Contract, BHEL shall recover 10% of the contract value from the Vendor using following instruments: (i) encashment of security instruments like EMD, Performance Security with with executing agency (PS-Regions/PEM as applicable) against the said contract (ii) balance amount (if value of security instruments is less than 10% of the contract value) from other financial remedies i.e. available bills of the Vendor, retention amount etc. with executing agency (PS-Regions/PEM as applicable) (iii) balance amount from security instruments like EMD, Performance Security and other financial remedies i.e. available bills of the Vendor, retention amount etc. with other units of BHEL (iv) if recovery is not possible then legal remedies shall be pursued The balance scope shall be got done independently without Risk & Cost of the failed supplier/ contractor. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract.
21. Integrity Pact Applicability -	YES
22. **Bidders can to download detailed technical specification number- PE-TS-412-158-A002 at www.pem.bhel.com and www.bhel.com**	
23. Bidders are requested to refer clause no 26.0 (Make in India) of GCC-BOP. "For this procurement, the local content to categorize a supplier as Class I local supplier/ Class II local supplier/ Non Local supplier and purchase preference to Class I local supplier is as defined in Public Procurement (Preference to Make India), Order 2017 dated 16.09.2020 issued by DPIT. In case of subsequent order issued by nodal ministry changing the definition of local content for item in NIT, the same shall be applicable even if issued after issue of this NIT but before opening of part-II bids against this NIT." This package is not divisible in nature. The margin of purchase preference shall be as per order dtd. 16.09.2020. **For this tender, offer from only class-1 local suppliers (meeting minimum 60% local content requirement) shall be considered.** Bidders are required to provide the following along with the part-1 bid: • Provide a certificate (in line with attached draft) giving the percentage of local content. • Provide the details of the location(s) at which the local value addition shall be made.	
24. Please furnish land border certificate as per enclosed format dully signed and stamped by Director or Company Secretary or authorised person by Board of the Company.	
25. In line with cl. No. 12 of (ITB) BOP-GCC, following Independent External Monitors (IEMs) have been appointed by BHEL. Shri Otem Dai, IAS (Retd.) (iem1@bhel.in) Shri Bishwamitra Pandey, IRAS (Retd.) (iem2@bhel.in)	

Shri Mukesh Mittal, IRS (Retd.) (iem3@bhel.in)

26. Delivery Schedule shall be as follows-

- Main Supply (along with commissioning spares) – 6 months from the date of LOA
- Mandatory Spares - 3 months from approval of BBU of mandatory spares by BHEL
- Supervision of E&C -Personnel for supervision of E&C shall be deputed within 10 days of intimation.
- Trial Run and Performance Guarantee test-Personnel for Trial Run and Performance Guarantee test shall be deputed within 10 days of intimation.

Note: Above delivery conditions are to be complied by bidder strictly
Delivery on GeM portal shall be selected as 999 days. Same shall be indicative to suffice the GeM portal requirement.

27. **Payment Terms –**

Main Supply -

i) Payment of 80% of basic price of materials supplied, as per approved billing schedule, along with 100% freight, taxes and duties (as applicable), shall be paid against receipt of material (receipted LR) at site on pro-rata basis.

ii). 5% of basic price of materials supplied will be released on pro-rata basis after submission of Material Receipt Certificate (MRC) from project site engineer of Purchaser. Collection of Material Receipt Certificate from Site and its submission for claiming the payment shall be the responsibility of the Seller/ Contractor

iii). 5 % of basic price along with taxes (as applicable) shall be released on pro-rata commissioning of individual sub-system, on submission of protocol, duly signed by BHEL site official(s) and customer (so that vendor will be liable to supply all items)

vi) 10% of basic price of materials supplied shall be released against (2.5% against each activity) the completion of: (a) Trial run of the system/ package; (b) Successful completion of the PG test/ demonstration test of the system/ package, as applicable; (c) Submission of final documents, e.g. As built drawings, O&M manual etc. as applicable and (d) Liquidation of Punch Point.

Mandatory Spares
As per clause no. 9.1.1 of GCTC of GCC BOP

Supervision of E&C
As per clause no. 9.4 of GCTC of GCC BOP

Trial Run and Performance Guarantee test
As per clause no. 9.4 of GCTC of GCC BOP

Provision of offline payment in GeM shall be utilized.

28. Evaluation Criteria - **Total Package Price (including freight and taxes)**

Bidder has to quote the total package price of complete scope, as per technical specification, in GeM. Price break up of total package price shall be provided by bidder in price format uploaded in GeM.

In case of discrepancy between total package price and price break up, total price quoted on GeM shall prevail and break up shall be corrected accordingly.

29. **In case of single qualified bid, price bid of single qualified bidder shall be opened.**
30. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following order of precedence: i. Amendments to Purchase Order/ Work Order/ Framework Agreement ii. Purchase Order/ Work Order/ Framework Agreement iii. Letter of intent (LOI)/ Letter of Award (LOA) iv. Clarifications agreed between Buyer and Seller as regards to the tender or the bidding conditions v. The final set of deviations acceptable to purchaser with loading as specified in relevant section. vi. Corrigenda to NIT, with those of later date having precedence over those of earlier date vii. Enquiry letter along with Buyer specific ATC and annexures except documents listed in point no (vii) to (ix) below viii. Technical specifications ix. Special Conditions of Contract (SCC) x. GeM GTC latest version applicable as on enquiry date.

Bidders to note the following Additional Terms and Conditions for subject tender-

1. Insurance Deductibles and Excess:

   For Marine Cover: Rs 20,000/-

   For Storage /Erection and Testing Cover:

   a. Normal Period: 5 % of the claim amount subject to a minimum of Rs. 2.25 Lakh.
   b. Testing Period: 5% of the claim amount subject to minimum of Rs. 6.0 Lakh.

   Act of God Perils: - 10% of the claim amount subject to minimum of testing period excess.

   Fire / Explosion Claims: 20% of the claim amount subject to minimum of testing period excess

   Extended Maintenance Cover/ Defect Liability Cover: As applicable for testing period excess.

   Third Party Liability: The policy excesses (normal/testing periods) shall apply for third party liability property damage claims also. For third party liability claims arising out of acts of GOD perils. The excess applicable to AOG claims shall apply.

   "The above-mentioned insurance deductibles/excess are tentative in nature and may change after award of contract which will be applicable within quoted price".

2. Vendors shall submit billing documents for payment directly to BHEL. Payment will be released within days as mentioned below after submission of complete documents:

   i. 90 days for non MSME as per MSMED Act
   ii. 45 days for vendors qualified and registered as Micro and Small Enterprises MSEs as per MSMED Act
   iii. 60 days for vendors qualified as Medium Enterprises as per MSMED Act.

   Notes:

1. Vendors are required to issue Tax Invoice inclusive of PVC value (if applicable) wherever indices are available. In case PVC indices not available, vendors to submit PVC invoices on availability of applicable indices.
2. Any negative PVC, if not adjusted in earlier payments, will be adjusted at the time of remaining payments.

3. Bidder to note that this is an **Open Tender enquiry** & PBO/RA participation shall be subject to following condition:

   a. Qualifying Technical & Financial Pre-Qualification Requirement.
   b. Techno-commercial acceptance of offer by BHEL-PEM.
   c. Approval of bidder by End Customer: - Same shall be taken up with end customer based on the latest credentials/reference list furnished by bidder in the format. Accordingly, bidders are requested to submit credential along with their technical bid.

   The bidders who are not registered with BHEL-PEM may apply for registration in BHEL-PEM through Registration Portal available at www.pem.bhel.com -->vendor section-->online supplier registration. All credentials and/or documents duly signed & stamped related to registration has to be uploaded on the website & submit the application for registration. One set of hard copy filled-up SRF downloaded from Online Registration Portal duly signed & stamped has to be submitted.

4. The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the firms debarred across BHEL, shall be rejected. The list of firms debarred across BHEL is available on BHEL web site www.bhel.com.

   1.0 Integrity commitment, performance of the contract and punitive action thereof:

   1.1. Commitment by BHEL: BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

   1.2. Commitment by Bidder/ Supplier/ Contractor:

   1.2.1. The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

   1.2.2. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

   1.2.3. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

   If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in malpractices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www. bhel.com and/or under applicable legal provisions".

5. Bidders to ensure that Third party/customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document/certificate issuing authority such as name & designation of Issuing Authority and its organization contact number and e - mail Id etc. In case the same found not available, Purchaser has right to reject such document from evaluation.

6. Bidders to comply Govt. of India, Ministry of Power, order no-25-111612018-PG dated 02/07/2020 regarding mandatory testing of all the imported items/equipment's/components.

7. This item/Package falls under the list of items defined in Para 3 of Ministry guideline ref no.F.20/2/214-PPD(Pt.) dated.20-09-2016 (in respect of procurement of items related to public safety, health, critical security operations and equipment's, etc) & hence no relaxation of PQR for start-up/MSME vendors is envisaged for the items/Package"

8. Bidders may visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions. No additional claim shall be entertained by BHEL in future, on account of non-acquaintance of above.

9. The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines

10. A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The bidder found to have a conflict of interest shall be disqualified. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:
    a) they have controlling partner (s) in common;' or
    b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; or
    c) they have the same legal representative/agent for purposes of this bid; or
    d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or
    e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid, or
    f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:
        1. The principal manufacturer directly or through one Indian agent on his behalf; and
        2. Indian/foreign agent on behalf of only one principal,'

        or
    g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid, or
    h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business. "

11. Bidder to quote non-zero freight %.

12. "Self-declarations/ auditor's/ accountant's certificates submitted by the manufacturer/ supplier may be verified randomly by the committee constituted as per MoP Order 28-07- 2020. In case of false documents/misrepresentation of the facts requisite action against such manufacturer/ supplier will be taken based on the recommendation of the Committee."

13. **Bidder to agree with all the clauses except (clause no-6.0 to 9.0, 13.0, 15.0 & 25.0 of ITB of GCC-BOP, 11.0 & 27.0 of GCTC of GCC-BOP) of GCC BOP (available on www.pem.bhel.com) & SCC Rev-01 of the project.**

14. All other correspondence thereof shall be addressed to the undersigned by name & designation and sent at the following address:

Sanjeev Kumar/Dy. Engineer– BOP **M/s Bharat Heavy Electricals Ltd.,** **Project Engineering Management,** **Power Project Engineering Institute,** **HRD & ESI Complex,** **Plot No 25, Sector-16 A, Noida-201301** **E-MAIL: sanjeev_k@bhel.in** **Ph. No. 9958175655**	**Sumeet Sahay/MGR-BOP** **M/s Bharat Heavy Electricals Ltd.,** **Project Engineering Management,** **Power Project Engineering Institute,** **HRD & ESI Complex,** **Plot No 25, Sector-16 A, Noida-201301** **E-MAIL: sumeetsahay@bhel.in** **Ph. No. 09999498202**

BHEL-PEM-MAUX
PRE-QUALIFICATION CRITERIA

बीएचईएल	**PACKAGE: PRETREATMENT PLANT**	PE-PQ-999-158-A001	
		DATE	29/04/2016
	PRE-QUALIFICATION REQUIREMENT	REV NO	00

1.0	Supplier should have capabilities for design/ manufacture and having in-house/ out-sourced facility for testing of Pre-treatment Plant. Pre-treatment Plant minimum output capacity of each clarifier / clarifloculator of 750 m3/hr with associated mechanical & dosing system capable of producing outlet quality with suspended solid / turbidity less than equal to 15 PPM/NTU.
2.0	The supplier has to submit either of following supporting documents meeting above mentioned pre-qualifying requirement a. Copy of minimum one (1) performance certificate in English from end user along with copy of related Purchase Order (PO) or letter of intent (LOI) or letter of award (LOA) or work order (WO) specifying that the system/package is running successfully for one (1) year from date of commissioning meeting the minimum pre-qualifying requirement. OR b. Minimum two PO/ LOI /LOA/ WO placed with a minimum gap of one (1) year from same purchaser meeting the minimum pre-qualifying requirement. OR c. Minimum one PO/ LOI /LOA/ WO after commissioning of first order from same purchaser meeting the minimum pre-qualifying requirement. OR d. In case, vendor has executed contract (s) for BHEL-PEM, internal assessment by BHEL-PEM shall be followed for evaluation for satisfactory performance. For this, vendor to submit the request along-with relevant documents. OR e. Minimum three customer's/ third party's inspection reports/ test certificates/commissioning certificates meeting the minimum pre-qualifying requirement.
3.0	Minimum two (2) nos. Purchase orders, shall be submitted which should not be more than twenty (20) years old as on date of bid submission, for establishing continuity in business.

In case supplier is not OEM the offer shall be evaluated as per point no 1 of general PQR enclosed as Annexure-A

ANNEXURE - A

General Points of PQR

1. Offers of the JV companies/ Joint Bidders/ bidders having collaboration/ licensing agreement/ MOU/ Indian subsidiaries shall be evaluated as follows:

    a. If bidder happens to be an Indian subsidiaries of foreign OEM, then the credentials of the foreign OEM can also be considered for meeting PQR.
    b. If bidder happens to be the Joint Venture Company, then the credentials of any of JV partners can be also considered for meeting PQR.
    c. If bidder happens to bid jointly with their partner, then credentials of both the partners will be considered for meeting PQR as per distribution of the work. In all such cases, lead bidder as specified in bid documents shall be responsible for overall execution of the contract and all guarantee/ warranty.
    d. If bidder happens to be the having valid collaboration agreement/ MOU/ licensing agreement with some other company, then the credentials of collaborator/ MOU partner/ licensing company can also be considered for meeting PQR.

    Note: If bidder(s) qualifies on the basis of credentials of his principal/ JV partner/ Collaborator/ joint bidder etc., then the principal/ JV partner/ Collaborator/ MOU partner/ joint bidder shall be responsible for overall design vetting and warranty/ guarantee of the package. The scope matrix clearly defining their respective roles including design vetting, manufacturing of critical component, E&C etc. etc. and warranty/ guarantee shall be submitted along with the offer.

2. Bidder to note that the arrangement of bidding (joint bid partners/ collaborator/ MOU partner/ licensing company etc.) once offered to BHEL as a part of bidding documents cannot be changed till the execution of the project.

3. Consideration of offer shall be subject to customer's approval of bidders, if applicable.

4. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.

5. Any other project specific requirement shall be as per Annexure-I and bidder shall submit relevant supporting documents.

6. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder/collaborators to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.

7. After satisfactory fulfillment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

PRICE FORMAT

NAME OF PROJECT:	**2X660 MW ENNORE SEZ STPP, CHENNAI**	**Vendor Name**	
NAME OF PACKAGE:	**PRE TREATMENT PLANT**		
TECHNICAL SPECIFICATION:	**PE-TS-412-158-A002**		

SCOPE				**Supply**			**Service**		**Taxes**			
S. No.	**DESCRIPTION**	**UNIT**	**QTY**	**Total Ex-Works (excluding GST) (INR)**	**Freight in %**	**Total Freight**	**Unit Price (INR)**	**Total Price (INR)**	**GST type**	**GST rate in %**	**GST amount in Rs.**	**Total Price Including Freight & GST (INR)**
1.0	Total lump sum firm price for **SUPPLY PART, SERVICES PART [INCLUDING SUPERVISION OF ERECTION AND COMMISSIONING INCLUDING ASSEMBLY AT SITE FOR ONE FIFTY (150) MANDAYS] & MANDATORY SPARES** comprising of design (i.e. Preparation and submission of drawing/ documents including " As Built " drawings and O&M Manuals), engineering, manufacture, fabrication, assembly, inspection & testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles (as applicable), fill of Chemicals, lubricants & consumables, spares for erection, start up and commissioning as required, forwarding, proper packing, shipment and delivery at site, **Supervision of erection & commissioning including assembly at Site,** carrying out Trial Run and Performance Guarantee test at site, training of customer/ client O&M staff & final handing over to end customer in flawless condition for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.	Set	1									₹ -
2.0	**MAJOR BREAK-UP OF PRICES GIVEN IN 1.0 ABOVE.**											
2.1	Total lump sum firm price for **SUPPLY PART** comprising of manufacture, fabrication, assembly, inspection & testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles (as applicable), fill of lubricants & consumables (including chemicals), along with spares for erection ,start up and commissioning as required, forwarding, proper packing, shipment and delivery at site for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.	Set	1			₹ -	**NA**				₹ -	₹ -
2.2	Total lump sum firm price for **SERVICES PART** comprising of carrying out **Trial Run and Performance Guarantee test** at site , training of customer/ client O&M staff & final handing over to end customer in flawless condition for project and package specified complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.	Set	1	**NA**				₹ -			₹ -	₹ -
2.3	Total lump sum firm price for Mandatory spares comprising of manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, forwarding, proper packing, shipment, delivery at site & guarantee as per BHEL NIT & tender technical specification, amendment & agreements till placement of order. **(Price break up of mandatory spares is to be furnished as per Annexure- I)**.	Set	1	₹ -		₹ -	**NA**				₹ -	₹ -
2.4	Supervision of Erection and Commissioning including assembly at site (By Experienced/Capable Engineer). Lump sum supervision charges for **Three (3)** visits each of **Fiflty (50) mandays** to **Supervise in Erection and Commissioning including assembly at site** in totality [Total **One Fifty (150) mandays** in **Three (3)** visits excluding the travel time]. The prices for Visit shall be inclusive of charges of Air-Fair/Rail-Fair, Boarding/Lodging, local conveyance, medical, Insurance etc. **(Price break up is to be furnished as per Annexure- II).**	Set	1	**NA**			₹ -	₹ -			₹ -	₹ -

Annexure-I
(List Of Mandatory Spares)

NAME OF PROJECT:	**2X660 MW ENNORE SEZ COAL BASED STPP**
NAME OF PACKAGE:	**PRE-TREATMENT PLANT**

SI. NO.	PARTICULARS	QUANTITY	Total Ex-Works Price (INR)
1.0	**CIRL DIAPHRAGM VALVE**		
1.1	Complete valve	Two (2) Nos. each of different size of valve in the system	
1.2	Diaphragm	Five (5) Nos. each of different sizes valves	
1.3	Valve spindle	Two (2) Nos. each of different sizes valves	
2.0	**Other type valve (except Control Valve)**		
2.1	Complete valve	One (1) No. each of different size of valve in the system	
2.2	Sampling & needle valve	Four (4) Nos. each type & size	
3.0	**Pressure Gauge**	Two (2) Nos. for each Range/Type	
4.0	**Level Gauge**		
4.1	Glass Tube	Five (5) Nos. for each size	
4.2	Off-set value	Two (2) Nos. for each size	
5.0	**Level Switch (conductivity type)**		
5.1	Float & Rod Float & Rod	One (1) No. for each size	
5.2	Switch Assembly	One (1) No. for each size	
6.0	**Clariflocculator Bridge**		
6.1	Worm gearbox	One (1) No.	
6.2	Shaft for trailing wheel	One (1) No.	
6.3	Flocc. Drive head complete with bevel & pinion set.	One (1) No.	
6.4	Central bearing housing complete.	Two (2) Sets	
6.5	Current collectors.	One (1) Set	
6.6	Weir with stuffing box.	One (1) No.	
6.7	Bearing; Impeller with shaft & gear unit for each type and size of air blowers.	Two (2) Sets	
6.8	Floats for each size and type with links & levers	Two (2) Sets	
6.9	Bearings & brake linings for each type & rating of hoists.	Two (2) Sets	
6.10	Rope grid & complete length of wire rope for each type of hoists rating	One (1) No.	
6.11	Bearings; shaft sleeve; impeller; and mechanical seal for each type & duty parameters of pump sets.	One (1) set each	
6.12	Controller valve assembly complete.	Two (2) No.	
6.13	Periphery drive worm gearbox coupling.	Two (2) No.	
7.0	**415 V Motors**		
7.1	Terminal plates	10 Nos. each for small motors upto 30 kW & 4 Nos. each for more than 30 kW	
7.2	Heaters	2 sets	
7.3	Greasing arrangements	4 sets each type of motor	
7.4	Motor of each type and rating	10% of the installed quantity or minimum 1 number whichever be higher	
7.5	Bearings (DE and NDE) for each type and rating of motor	4 sets	
8.0	**BATTERY**		
8.1	Battery cell	10 nos.	
8.2	MT cell container of each type	10 nos.	
8.3	Level indicator	6 nos.	
8.4	Vent plugs	12 nos.	
8.5	Inter-cell connector	10 nos.	

Sl. NO.	PARTICULARS	QUANTITY	Total Ex-Works Price (INR)
8.6	Set of nuts, bolts and washer	12 nos.	
11.0	Each type of lamps, PBs, ILPBs, fuse, MCB, MCCB used in the equipment/system.	20% of Installed of each type.	
12.0	**Measuring Instruments**		
12.1	**Indicators, Recorders, Electrical Metering and Skid Mounted Instruments**		
12.1.1	Indicators, recorders and meters offered from each model for the project. These instruments shall be supplied with three sets of blank scales.	10 % of Installed of each type/Model or a minimum of one number for each model and type, whichever is more.	
12.1.2	For skid mounted instruments (As applicable)	10% of total number of instruments for each Type and model or a minimum of one number for each model and type, whichever is more.	
12.1.3	Temperature Transmitters and Electronic Transmitters (For Pressure, DP, Temp, Flow, Level), Temperature, Pressure, Flow & Level Switch, safety switches, Gauges, meters, Transducer or any other instrument etc.	10% of total number of Instruments/transducers offered for each model and type for the project or a minimum of one number, whichever is more.	
13.0	**Erection hardware**		
13.1	Instrument valves	Ten (10) percent of each type & Size installed	
13.2	Condensate pots of each type & Size installed	Ten (10) percent of total number of Installed or four numbers whichever is higher .	
13.3	Manifold	Ten (10) percent of each type & Size installed	
13.4	Fittings	Ten (10) percent of each type & Size installed	
14.0	**Control valves, Power Cylinder, Control Dampers, Actuators and Accessories**		
14.1	Following spares shall be provided for control valves, Power Cylinder, Control Dampers as applicable.		
14.1.1	One set of spare control valve stem packing for each control valve.		
14.1.2	Two moulded rubber diaphragms for each control valve.		
14.1.3	One sets of each of O-rings and rubber gaskets for each control valve.		
14.1.4	100 percent qty. of lubricants for gaskets for each control valve on one year consumption basis.		
14.1.5	2 sets of limit switches and 1 set of valve positioner for each control valve.		
14.1.6	20% of position transmitter (4-20mA) for total qty. of control valve.		
14.1.7	One (1) set of valve trims (such as plug, stem, seat ring /cage, guide bushing, stem lock pin, packing retaining ring, etc) for each control valve.		
14.1.8	One completes actuator of each type or min 10% for each type and size whichever is more.		
14.1.9	20% of Solenoid valves or min 2 no. of each type for total qty. of control valves.		

Sl. NO.	PARTICULARS	QUANTITY	Total Ex-Works Price (INR)
14.1.10	20% of I to P converters, Pressure regulators.		
15.0	10% or 1 no. (whichever is more) of each type of sensor/instrument, instrumentation/mechanical fittings etc for any other electronic system.		
Total			**₹ -**

Notes:

1) Mandatory spares listed above is bare minimum requirement. In case any additional mandatory spares requirement is covered elsewhere in the tender specification apart from specified above, same shall be deemed to have been covered in bidders scope of supply.
2) Unless stated otherwise, a "set" or "Lot" means items required for complete replacement in one equipment of each type/ size/ range.
3) In case of Bought Out items, itemised spares list may be vendor specific and may differ from the list of spares mentioned above. In such cases, the quoted price shall be considered for applicable items only without any change in the contract price.
4) In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities generally in line with the approach followed in the above list.
5) Any item which is quoted as “not applicable” in the above list and is found to be “applicable” at a later date shall be supplied by the Bidder without any commercial implications.

ANNEXURE-II

NAME OF PROJECT:	**2X660 MW ENNORE SEZ STPP, CHENNAI**
NAME OF PACKAGE:	**PRE TREATMENT PLANT**

S. No.	DESCRIPTION	UNIT	QTY	UNIT RATE (INR)	TOTAL RATE (INR)
	PRICE BREAK-UP OF SUPERVISION OF ERECTION AND COMMISSIONING GIVEN IN				
2.4	Total lump sum firm price inclusive of all prevailing taxes, duties and other levies for **Supervision of Erection and Commissioning including assembly at site** (By Experienced/Capable Engineer). Lump sum supervision charges for **Three (3) visits** each of **Fiflty (50) mandays** to **Supervise in Erection and Commissioning including assembly at site** in totality [Total **One Fifty (150) mandays** in **Three (3)** visits excluding the travel time]. The prices for Visit shall be inclusive of charges of Air-Fair/Rail-Fair, Boarding/Lodging, local conveyance, medical, Insurance etc.	Lot	1		**₹ -**
2.4.1	LUMP SUM CHARGES PER VISIT FOR ENGINEER (EXCEPT DAILY CHARGES)	Visit	3		₹ -
2.4.2	LUMP SUM DAILY CHARGES FOR ENGINEER	Days	150		₹ -

Note:
1. AMOUNT PAYABLE FOR ENGINEER PER VISIT TO SITE =VISIT CHARGES AS PER SL. NO. 2.4.1 ABOVE + (DAILY CHARGES AS PER SL.NO. 2.4.2 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE).

PRICE ADJUSTMENT FOR SUPPLY AND MANDATORY SPARES

(i) The Contract price shall be subject to price adjustment during performance of the Contract to reflect changes in the cost of labour and material components in accordance with the provisions described below:

(ii) The price adjustment provisions shall be applicable separately for price components relating to Supply of Equipment as per price break-up furnished in the Technical Specification.

(iii) Only following components of the Contract Price will be subject to Price adjustment:

(a) Ex-Works supply price of Plant and Equipment including commissioning spares, Mandatory spares.

(iv) Price adjustment amounts towards aforesaid components of Contract Price shall be paid in the respective currencies of Contract (INR).

(v) The indices for price adjustment shall be as elaborated hereunder.

(vi) The price adjustment formula for the components of the Contract Price, as mentioned at Sl.No. (iii) above, shall be as stipulated hereinafter.

(vii) **Ex-Works Price Component of Plant and Equipments including commissioning spares, Mandatory Spares.**

It is understood that the price component of the equipments for any shipment/despatch
comprises of a fixed portion (designated as 'F' and the value of which is specified hereunder) and a variable portion linked with the indices for various materials and labour (description and co-efficient as enumerated below).

The amount of price adjustment towards variable portion payable/recoverable on each shipment/despatch shall be computed as under:

EC = EC1 - EC0
EC1 will be computed as follows:

EC1= EC0 {F + a x A1/ A0 + Lb x L1/ L0}

Where

EC = Adjustment to Ex-Works supply Price Component expressed in the currency of The Contract (INR) payable to the contractor for each shipment/despatch.

EC1 = Adjusted Amount of Ex-Works supply Price Component expressed in the currency of the Contract (INR) payable to the Contractor for each shipment/despatch.

EC0 = Ex-Works supply Price for the plant and equipments in the currency of the Contract (INR), shipment/despatch wise.

- F shall be fixed portion of the Ex-Works Component of the Contract and shall be considered as 0.15.

- a shall be co-efficient of major materials/items involved in the Ex-Works Component of the Contract Price and shall be considered as 0.55.
- ‘A’ shall be published price indices of corresponding major materials/items.

Case 1: ‘A’, in case of all applicable supply part / component/ items etc. index for “Manufacture of Fabricated Metal Products, Except Machinery and equipment” shall be used as published by Ministry of Commerce & Industry, GOI base year 2011-12=100

- 'Lb" shall be co-efficient for labour component in the Ex-Works Component of the Contract Price which shall be considered as 0.3.

'L' shall be consumer price index number for industrial workers (All India average) as published by Labour Bureau, Shimla/RBI Base year 2016=100.

For the indices, subscript '0' refers to indices as on date of completion of delivery as per LOA.

Subscript '1' refers to indices as on date of shipment/despatch.

Note:

1) PVC shall be applicable only beyond original overall completion schedule as per LOA. PVC (Positive) shall be applicable only if the delay is not attributable to contractor/ vendor. However even if the delay is attributable to vendor/BHEL then also the negative price variation shall be passed on to BHEL.

2) The price variation shall be limited to (+) 10% of Ex-Works Supply Price including commissioning spares, Mandatory spares.

PRICE ADJUSTMENT FOR SERVIC PART (E&C/SUPERVISION OF E&C)

(i) The Contract price shall be subject to price adjustment during performance of the Contract to reflect changes in the cost of labour in accordance with the provisions described below:

(ii) The price adjustment provisions shall be applicable for price components relating to service part (E&C) as per price break-up furnished by the Contractor.

(iii) Only following components of the Contract Price will be subject to Price adjustment:

(a) Service part (E&C) component of Contract Price.

(vi) The indices for price adjustment shall be as elaborated hereunder.

(v) The price adjustment formula for the components of the Contract Price, as mentioned at Sl.No. (iii) above shall be as stipulated hereinafter.

a) Indian Rupee Portion of the Installation Services

ER = ER1 – ER0

ER1 will be computed as follows:

$ER1 = ER0\ (0.15 + L_b \times (L_1 / Lo))$

Where:

ER = Adjustment to Erection & Commissioning price component of contract price expressed in Indian Rupees payable to the contractor for each billing.

ER1 = Adjusted amount of Erection & Commissioning price component of contract price expressed in Indian Rupees payable to the Contractor.

ER0 = Value of the Erection & Commissioning work done in the billing period, which shall be calculated as under:

For the purpose of computing ER0, each Erection & commissioning bill (service part) during the E &C period up to the 'Completion of the Facilities' shall be calculated as described in this document.

L_b – Coefficient of labour (for all categories) content in the Indian Rupee portion of the erection & commissioning =0.85

L=Indian field labour index namely, all India consumer price index for industrial workers (All India Monthly Average) as published labour bureau, Shimla, Government of India.

For the indices, subscript '0' refers to indices as on date of completion of delivery as per LOA.

Subscript '1' refers to indices as applicable for the month of execution of the E&C work

Note:

1) PVC shall be applicable only beyond original overall completion schedule as per LOA. PVC (Positive) shall be applicable only if the delay is not attributable to contractor/ vendor. However even if the delay is attributable to vendor/BHEL then also the negative price variation shall be passed on to BHEL.

2) The price variation shall be limited to +10% of total E&C price (excluding taxes).

Project
Engineering
Management

Bharat Heavy Electricals Limited
(A Govt. Of India Undertaking)
POWER SECTOR, PROJECT ENGINEERING MANAGEMENT
Power Project Engg. Institute, Plot No. 25, Sector 16 - A,
HRDI & ESI Complex, NOIDA 201 301 (UP)

SPECIAL CONDITIONS OF CONTRACT (REV 02)
FOR 2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS,CHENNAI,JOB NO 412

These Conditions shall be read in conjunction with General Condition of Contract (GCC) enclosed along with the tender enquiry. In case of any conflict or inconsistency, the requirement of SCC shall prevail over the GCC.

1.0	Project Name	**2X660 MW ENNORE SEZ COAL BASED TPP.**
2.0	Ultimate Customer	Tamil Nadu Generation and Distribution Corporation(TANGEDCO)
4.0	Location of Plant	**VAYULUR VILLAGE,CHENNAI-120** **LATITUDE:13°17′ N TO 13°18′ N** **LONGITUDE 80 18 E TO 80 19 E** **Nearest Airport:** Chennai Airport -60KM **Nearest Railway Station:** Athipattu Pudunagar(approx. 5 Kms) **Nearest Road:** 5 KM ROAD From Pattamandiri To Site On Thiruvottiyur-Ponneri District Highway. **Nearest Sea Port :** Kamarajar Port Ltd (Formerly Ennore Port Limited).
3.0	Delivery Address (Ship To) 2	Construction Manager, BHARAT HEAVY ELECTRICALS LIMITED,SITE OFFICE NCTPP STAGE II & 2X660 MW ENNORE SEZ STPP ATHIPATTU,CHENNAI-120
5.0	Consignee Address (Bill To) 2	BHEL, POWER SECTOR - PROJECT ENGINEERING MANAGEMENT, POWER PROJECT ENGINEERING INSTITUTE, PLOT NO.25, SECTOR-16A, NOIDA-201301 STATE-UTTAR PRADESH
	Notes:	1. Consignee address (BILL To) in invoice & LR should be strictly as per Sl. No. 05. 2. Delivery Address (Ship to) in invoice and LR should be as per Sl no 04. 3. Invoice should clearly specify "Billing from" and "Shipping from" addresses. 4. Vendor to note that to effect "Sale in Transit", BHEL shall issue "Delivery Order" to the Transporter for transferring the ownership from BHEL to customer (TANGEDCO). 5. It is Vendor's responsibility to ensure availability of trucks well in advance for dispatch of material to meet contractual delivery requirement. 6. Delivery Order shall be carried by transporter along with other dispatch documents.
6.0	Buyer and Paying Authority 2	Packages for which PO is placed by BHEL-PEM. Buyer and Paying Authority shall be **BHEL-PEM,Noida**. Packages for which PO is placed by BHEL-PSSR & LOA is issued by BHEL-PEM - Buyer and Paying Authority shall be **BHEL-PSSR,Chennai**.
7.0	Mode of Dispatch	By Road/Rail/Sea on Door Delivery and freight Pre-Paid Basis.
8.0	Road Permit / E-waybill	To be arranged by Supplier, if required 2

9/11/17

Bharat Heavy Electricals Limited
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9.0	Transit Insurance	**In BHEL Scope.** Vendor shall inform the following details of dispatches to the Underwriter (refer details below) under intimation to BHEL-PEM and BHEL Site office: (1) Policy No. (2) Consignee Name. (3) Consignment Details (items with their weights and value (in INR)). (4) Project Name and P.O. No. (5) LR No. and date, Despatch origin and destination details, Inv. No.
	Policy No.	SCE - 500300/44/15/04/40000004 MARINE - 500300/21/15/02/00000005 Policy period : 15/04/2015 - 14/04/2018
	Name of the insurance company details:	Mr. Ashim Mukherjee (CRM) United India Insurance Co. Ltd –New Delhi(UIIC) (A company wholly owned by Govt. of India) D-24 & E-25, 2nd Floor, Himalaya House, 23, KG Marg, New Delhi, Pin - 110001. Mb. No. 09899720652, Telephone no.: 01123318077, 41521760 E-mail id: (akmukherjee@uiic.co.in, corpdelldel@uiic.co.in)
10.0	BHEL PEM GST Registration No.	BHEL-PEM: 09AAACB4146P2ZC 2
11.0	Ultimate Customer GST & PAN NO	TANGEDCO PROVISIONAL GST REGN NO. - 33AADCT4784E1ZC 2 PAN NO: AADCT4784E
12.0 2	Unloading, Storage and Movement of Material within Site	- By BHEL site office for Supply packages. (The Vendor shall furnish LR wise Gross Wt. and net weight of the consignment in attached format annex-II for the purpose of handling the consignment by BHEL site loading/unloading contractor). - By Vendor for Turnkey i.e. Supply and Erection & Commissioning Packages.
13.0	Provision of facilities at Site (Applicable for Turnkey Packages)	**Construction Power:** HT POWER SUPPLY (33KV/433 V OR 11KV/433V) shall be made available for erection work at the rates prevailing at the time of usage on chargeable basis as per HT tariff V (temporary construction supply) rates applicable as per TNERC tariff order. **Fuel and start up power required during testing, PG testing, retesting etc. shall be provided at free of cost.** **Construction Water:** Construction water shall be available at one point within the plant boundary on chargeable basis subject to availability.
14.0	Inspection Agency (Domestic & Imported supplies)	Later

9/11/17

Bharat Heavy Electricals Limited
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15.0	Dispatch Documents required (to be furnished by Vendor for payment) 2	**1. For materials originating from non-Indian Territory** (a). Three (3) original and Seven (7) copies of clean bill of lading or One (1) clean original Airway Bill & Four (4) copies, in case of air freight. (b). One (1) original and Six Copes (6) copies of signed Invoices (c). One (1) original and Seven (7) copies of Packing List (clearly showing number of packages, gross weight and net weight). (d). Six (6) copies of certificate of country of origin. (e). Eight (8) Copies of Customer/BHEL MDCC. (f). Six (6) copies of inspection certificate, if any, issued by the customer/his authorised representative. (g). Six (6) of certificate from the vendor to the effect that drawings and catalogues for customs clearance purpose have been kept with the packages for shipment. (h). Six (6) copies of certificate from the vendor to the effect that the contents in each case are not less than that entered in the invoices and guaranteed as new and as per the relevant technical specifications. (i) Shipping Specification – One (1) copy. (j). Quality Certificate – One (1) copy. (k). Approved Test Certificates, if any. - Six (6). (l). Guarantee Certificate – One (1) Original + One (1) copy. (m). Inspection Reports – One (1) Original + One (1) copy. (n). PVC Calculation and copy of all applicable indices, if PVC applicable. – Two (2) copies. **2. For Claiming Dispatch payments (for materials originating from Indian territory), Freight, MRC & Services Payments - refer GCC & GCC CORRIGENDA.**
16.0	Material Receipt Certificate (MRC)	**For Packages wherever E&C is in the scope of Vendor**, The vendor shall arrange Material Receipt Certificate from the project site, duly signed by Customer and BHEL-Site after receipt & physical verification of the material at site. **For Supply Packages**, Material Receipt Certificate shall be arranged by BHEL-PEM. Vendor to provide copy of receipted LRs to enable BHEL-PEM to obtain MRC from site.

9/11/17

Bharat Heavy Electricals Limited
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17.0	Taxes & Duties (For Domestic Bidder) 2	All bidders/vendors to note that this project is a Non-Mega power Project. However Essentiality certificate shall be issued by TANGEDCO (customer) for availing concessional custom duty under **Project Import Regulations.** Essentiality certificate shall be issued by TANGEDCO through BHEL for the items to be imported by the vendor for specified items, limited to CIF content mentioned in the offer/order, for availing concessional custom duty. The bidder has to indicate in their offer, the import contents (if any) i.e. list of items along with qty., currency of import, country of import & CIF value. The benefits availed in concessional custom duty must be passed onto BHEL in their offer. Availability of CIF for packages, if any, shall be intimated in NIT. Bidders has to note that in order to derive the total Landed Cost to BHEL, evaluation shall be done excluding GST quoted by bidders. However, same shall be re-confirmed during techno-commercial evaluation of bids
18.0	Taxes & Duties (For Order Directly to Foreign Bidders) 2	In case of Order on foreign Vendor, the dispatches shall be on C&F basis and Taxes & Duties in the country of dispatch (origin) shall be borne by Foreign Bidder & to be accounted in the prices quoted to BHEL/PEM/NOIDA. Evaluation shall be done as per provisions of GCC and its corrigendum, if any.

9/11/17

SPECIAL CONDITIONS OF CONTRACT (REV 02)
FOR 2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS,CHENNAI,JOB NO 412

19.0	Packing, Identification & marking [if not specified in NIT]	• The supplier shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling & transport by air, sea, rail and road. • All packing shall allow for easy removal and checking at site. Special precaution shall be taken to prevent rusting of steel and iron parts during transit by sea. Gas seals or other materials shall be adopted by the Contractor for protection against moisture during transit. • The number of each package in a shipment shall be shown in fraction, numerator showing number of the package and the denominator showing total number of packages in a lot / consignment. The packages number shall be generally prepared in the sequence in which they will be required for erection. • Each package delivered under the Contract shall be marked by and at the expense of the supplier and such marking must be distinct and in English language (all previous irrelevant markings being carefully obliterated). Such marking shall show the description and quantity of contents, the name and address of consignee, the gross weight and net weight of the package, the name of the Contractor with a distinctive number of mark sufficient for purposes of identification. All markings shall be carried out with such materials as to ensure quickness of drying, fastness and indelibility. Each equipment or parts of equipment shall, when shipped or railed or otherwise dispatched be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the Contractor, the number and date of contract and the name of the office placing the contract, nomenclature of the stores and include a schedule of parts for each complete equipment giving the part numbers with reference to the assembly drawing and the quantity of each part, drawings nos. and tag numbers. • Rotor bearings should not be used as a support while packing. • Besides wherever necessary, packing shall bear a special marking "TOP","BOTTOM", "DO NOT TURN OVER", "KEEP DRY", "HANDLE WITH CARE",etc. • All packing cases, containers (excluding marine container), packing and other similar materials shall be new. • Notwithstanding anything stated in this clause, the Contractor shall be entirely responsible for loss, damage or depreciation or deterioration to the materials & supplies due to faulty and/or insecure packing.

9/11/17

SPECIAL CONDITIONS OF CONTRACT (REV 02)
FOR 2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS,CHENNAI,JOB NO 412

		• One copy of respective standard manufacturer's erection instruction/operation instruction manual shall be kept in each package/container for immediate reference. • Each and every package box shall be marked with the following, as a minimum: (i). Name and address of Consignee : (ii). Project reference : (iii). Contract No.: (iv). Packing No.: (1/10, 2/10, 3/10 ..... when there are 10 packages For one consignment) (v). Net Weight/Gross Weight : (vi). Port of Loading : (vii). Destination Port : Chennai (viii). Packing Mark : [symbols indicating "TOP" and other special markings as per clause 10.10.(4) & 10.10.(6) above] (ix). Type of Equipment : "E" (for Equipment supply) "T" (for Tools & Tackles) "S" (for Mandatory Spares) Two copies of packing list should be kept in case/package No. 1 of each consignment of the goods and four copies in each case (three inside the box and one copy in a special packet at the outer side of the Box).
20.0	Commissioning spares	The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details (to match the description given in the packing slip) to facilitate their proper identification. Three copies of packing list is to be kept inside the box and one copy in a special packet at the outer side of the Box.
21.0	Mandatory Spares	The mandatory spares shall be properly packed separately in separate box indicating mandatory spares in bold letters and each spare shall be properly tagged giving details i.e item number of the equipment in line with the ultimate customer contract & number per item (to match the description given in the packing slip) to facilitate their proper identification by ultimate customer M/s TANGEDCO. Three copies of packing list along with Manufacturing drawing no. Reference, Catalogue reference etc. is to be kept inside the box and one copy in a special packet at the outer side of the Box.

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22.0	Submission of Final Drawing / Documents along with O&M Manual, Type Test Certificates (if any)	As per GCC/ Technical specification/ Kickoff meeting.

	Prepared By	Checked By	Reviewed By	Approved By
Name:	AKASH VERMA	SHREEDHAR SINGH	SHREEDHAR SINGH	PERMINDER SINGH
Designation:	Sr. Engr./ PG-IV	Sr MGR / PG-IV	Sr MGR / PG-IV	DH / PG-IV
Signature:				
Date:	9/11/17	9/11/17	9/11/17	15/11/17

VENDOR'S CREDENTIALS

PROJECT:

PACKAGE:

VENDOR NAME:

CREDENTIAL BOOKLET

TABLE OF CONTENTS

BANK GUARANTEE FOR EMD

Bank Guarantee No:_____

Date:_____

To,

Name & Addresses of The Beneficiary

Dear Sirs,

Beneficiary: Noida Account no. - 39922687394 IFSC Code- SBIN0017313 Branch- CAG II New Delhi (BHEL PEM Noida) (hereinafter referred to as Beneficiary / Government) Date: ……. [Insert date of issue of BG](To be insert by issuing bank) ……. Bank Guarantee No.: …… [Insert guarantee number]……(To be insert by issuing bank)..... Bank Guarantee Amount: …….(*BG Amount)*……. Bid / RA No.: *…….(GeM Bid No.)……* EMD Applicant / Bidder: ……..*NAME AND ADDRESS OF THE VENDOR / CONTRACTOR / SUPPLIER*…… Guarantor: ……. [Insert name and address of the issuing Bank] ……..(To be insert by issuing bank)…….

Whereas Applicant / Bidder is willing to submit its bid against above referred Bid / RA by the Beneficiary on behalf of President of India/Governor of State/Chairman, CMD, Secretary, Commissioner etc. of Central/State PSUs/Departments for the supply of Goods and / or Services and as per Bid / RA conditions, Applicant is required to submit a Bank Guarantee as EMD.

At the request of the Applicant, we as Guarantor under this Guarantee, hereby irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer without any demur, merely on your first demand any sum or sums of INR ..... *(BG AMOUNT IN FIGURES AND WORDS)*.....(in words Indian Rupees.....) without any reservation, protest, and recourse and without the beneficiary needing to prove or demonstrate reasons for its such demand.

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 INR _____*(BG AMOUNT IN FIGURES AND WORDS)*_____ _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor/Contractor/Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment hereunder and the Tenderer shall have no claim against us for making such payment.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Tenderer and notwithstanding any security or other guarantee that the Employer may have in relation to the Tenderer's liabilities.

This Guarantee shall be irrevocable and shall remain in force up to and including……(*BG AMOUNT IN FIGURES AND WORDS)*…….. and shall be extended from time to time for such period as may be desired by the Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Tenderer but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms hereof. However, unless a demand or claim under this Guarantee is made on us in writing on or before the ……*(DATE OF EXPIRY OF CLAIM PERIOD)*…….. we shall be discharged from all liabilities under this Guarantee.

We, …… Bank lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… *(BG AMOUNT IN FIGURES AND WORDS)*……..
b) This Guarantee shall be valid up to ……
c) Unless the Bank is served a written claim or demand on or before ____(*DATE OF EXPIRY OF CLAIM PERIOD)*_____ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of

(Name of the Bank)

Date……..

Place of Issue……..

To be given on Letter head of Bidder

Ref: ……. Date: …….

To,

Bharat Heavy Electricals Limited

PEM, PPEI Building,

Plot No 25, Sector -16A

Noida (U.P)-201301

Reference:

Order no-F6/18/2019-PPD dated 23.07.2020 issued by Ministry of Finance.

Tender Enquiry No-……

Offer No-……..

Name of Package: …….

Dear Sir,

I have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India. I hereby certify that Company name, is not from such a country and is eligible to be considered.

Thanking You,

Yours faithfully,

(Company director seal and signature)

To be given on Letter head of Bidder

Ref: ……. Date: …….

To,

Bharat Heavy Electricals Limited

PEM, PPEI Building,

Plot No 25, Sector -16A

Noida (U.P)-201301

Reference: Tender Enquiry No-……

Name of Package: ……..

Dear Sir,

We hereby certify that items of ……..(Package name) for……(Project Name) offered by M/s ……(bidder's name) having its works/office at …… has local content of ……..%.

Further, it is also certified that the local content percentage (%) certified above is in line with definition of local content given in point no 2 of Public Procurement (Preference to Make in India), Order 2017-revision, having ref. no. P-45021/2/2017-PP(BE-II) dated 04.06.2020 & 16.09.2020 an M/s…….. qualifies as Class-I/Class-II (strike out whichever is not applicable) local supplier.

Details of the location(s) at which the local value addition-

Yours very truly

…….. (Signing Authority Name & Sign)

…… (Firm Name)

Company Stamp

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

And

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for _____(hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process , terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above , the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee , whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 - Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.

6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.

6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 -Independent External Monitor(s)

8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.

8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.

8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.

8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.

8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.

8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.

8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.

8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.

8.13 The word `Monitor' would include both singular and plural.

Section 9 - Pact Duration

9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.

10.2 Changes and supplements as well as termination notices need to be made in writing.

10.3 If the Bidder(s)/ Contractor (s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.

10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.

10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

Sumeet Sahay
Digitally signed by Sumeet Sahay
DN: cn=Sumeet Sahay, o=Bharat Heavy Electricals Ltd, ou=PS-PEM, email=sumeetsahay@bhel.in, c=IN
Date: 2022.04.28 14:57:08 +05'30'

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For & On behalf of the Principal For & On behalf of the Bidder/ Contractor

(Office Seal) (Office Seal)

Place----------------------

Date-----------------------

SHARAD CHANDRA
Digitally signed by SHARAD CHANDRA
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=POWER SECTOR-PROJECT ENGINEERING MANAGEMENT (PS-PEM), postalCode=201301, st=UTTAR PRADESH, 2.5.4.20=089a16018da25cac45670e8f7d15d00fb0f21f752b7d5defc65e3d0da37894fd, pseudonym=B02B948864F2CD291CB1001210178DCE309E308A, serialNumber=411989C049653E2228B6E49EC3DEC952D1A2B152E3422C98EC08B22D902EEF83, cn=SHARAD CHANDRA
Date: 2022.04.28 14:59:11 +05'30'

Witness: ________________ Witness: ________________________

(Name & Address) ____________ (Name & Address)_________________