

## VISIT REPORT ON INSTRUMENTATION CONTROL & AUTOMATION SYSTEM

**Project:** “Development of Sewerage Treatment Plants on Hybrid Annuity PPP basis at Kanpur, UP”.  
**Subject:** Site visit report of 30 MLD STP and associated IPS at Pankha, 15 MLD STP at Unnao & 130 MLD STP at Jajmau

Joint inspection visits by PE and Instrumentation Engineer along with UPJN team was made at 30 MLD STP at Pankha on 22.05.2025, 15 MLD STP at Unnao on 21.05.2025 and 130 MLD STP at Jajmau on 20.05.2025, to access the progress and performance of instrumentation and PLC & SCADA Systems at site.

As per the Concessionaire Agreement, *one of the key requirements forming part of Operation and Maintenance requirement of STPs and LS/PS, is REAL TIME ONLINE MONITORING of various data & details by authorities & officials in ULB, NMCG and in other stake holder departments of the project.*

However, till date the above key requirement has not yet been fulfilled at any of the above project sites.

The reasons of non-fulfilment of the above key requirement are lack of man-power deployment, unavailability of skilled personal to perform the activities, understanding the seriousness of the requirements by the concessionaire, etc., and many more. The concessionaire shall understand that the automation system will aid in ease of operation and maintenance of the entire sewage system with minimal efforts. Therefore, the concessionaire shall understand the utility and gravity of expediting the Instrumentation Control and Automation activities.

Further, the following observations were conveyed to the concessionaire in regards to Instrumentation, PLC and SCADA system activities at various sites:

### **130 MLD STP JAJMAU: -**

- During the visit no instrumentation activities were being carried out at the plant. It was informed due to lack of man-power the instrumentation cable laying activities and PLC cable terminations are not being carried out. It has been observed that only 2 persons were engaged for laying of cables. The concessionaire has been instructed several times by PE and UPJN to deploy sufficient man-power to expedite the instrumentation works, but still there is no action by the concessionaire.
- As evident from the pictures below, the cables are being laid in the haphazard manner without following the engineering practices.



The concessionaire has not prepared sand bed prior to laying the cables also there was no trace of protection bricks/pre-fabricated cable protection slabs at site. The cable trench depth has also not been maintained as per the approved drawings and engineering practices.

The PLC system integrator team shall be mobilized at site so as to expedite and complete the cable termination activities.

- The inlet sewage quality parameter analyser is not functional, specially the TSS and pH values are not being displayed. The cable terminations are also pending. The periodic calibration of the analytical instruments have not been performed and the calibration of the analysers is due since 05.05.2024.



- The periodic cleaning of the submerged sensors of analytical instruments and remote type instruments is not being carried out. The concessionaire shall maintain a schedule of periodic cleaning and calibration records of each and every instrument.
- The mechanical screens are being operated manually and are also not working efficiently.
- The PLC panel has been installed in the control room; however, the orientation of the PLC panel needs to be changed so as to accommodate the operator consoles in front of the PLC panel.



- At some locations RIO panels have been installed in the LT Switchgear rooms, it is important to isolate these panels from the electrical panels to avoid malfunctioning due to heat dissipation from the electrical panels. The concessionaire has agreed to provide isolation and air conditioning system for RIO panels not equipped with the integrated air conditioning system.

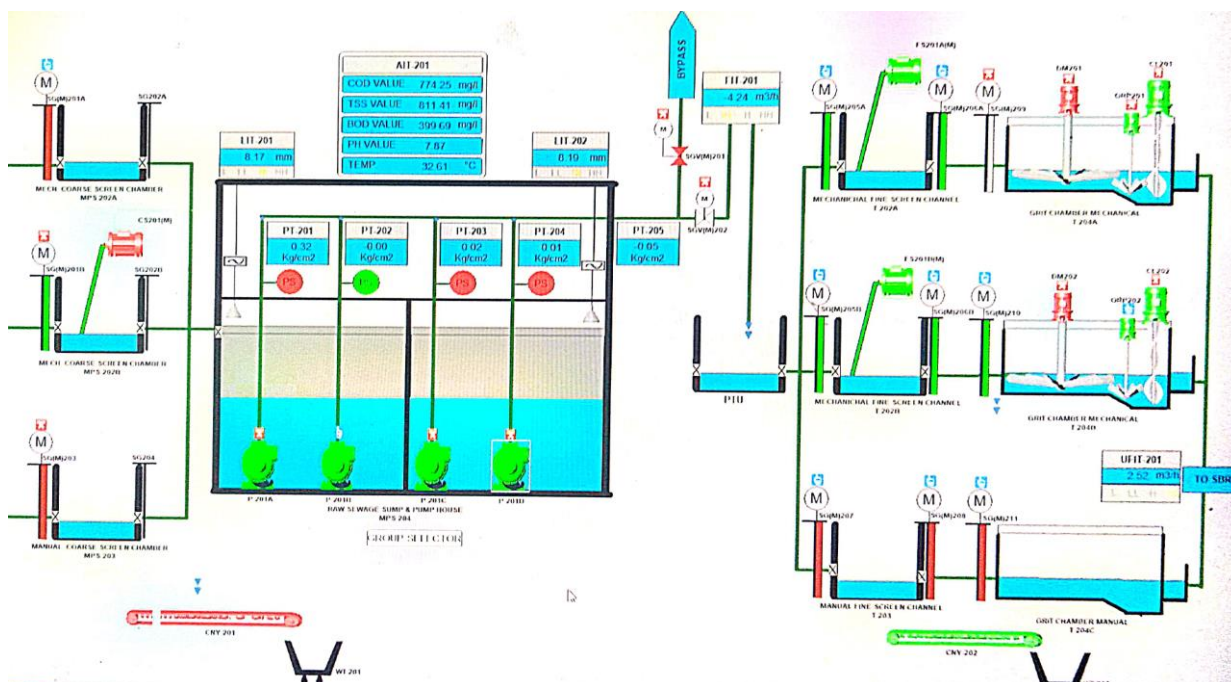


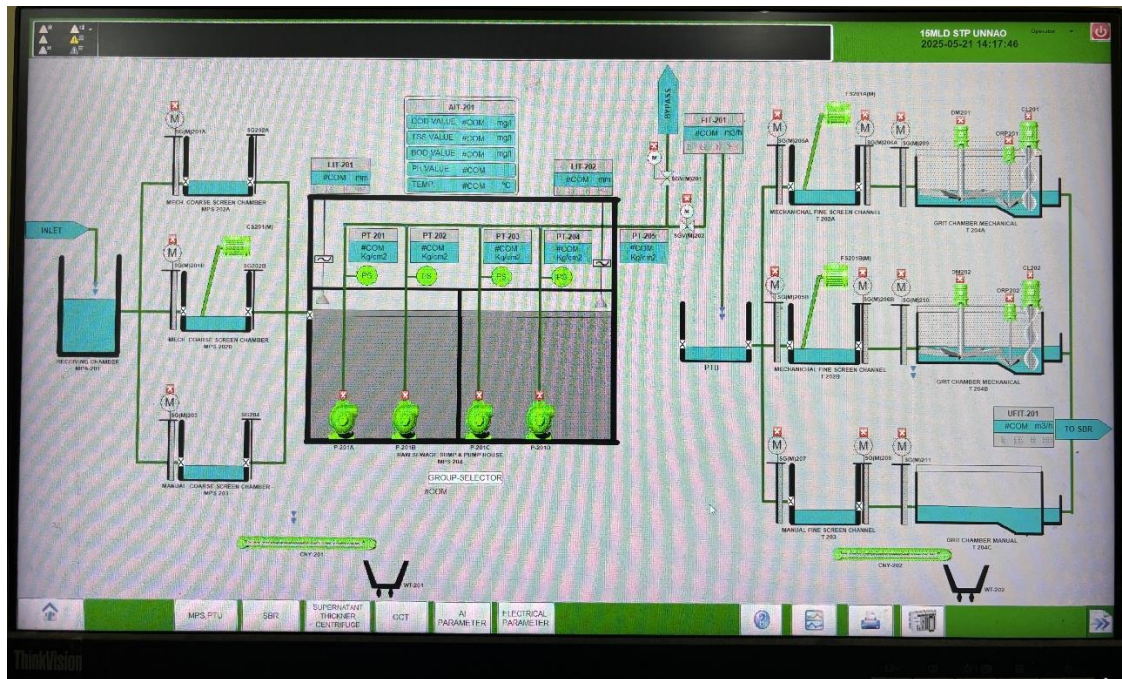


- It has been informed that, some of the vendor equipment PLC and control panels have not yet been supplied like Gas Generation and Engine system, Chlorination system, etc., the concessionaire has been instructed to expedite the supply and commissioning of these vendors equipment so that an overall timely trial-run, commissioning of PLC SCADA system could be performed.
- Other general instructions have also been given to the concessionaire like, providing cable route markers, providing Tag plates on the canopies of the out-door mounted instruments and Analyzers, providing Unit wise Tag Plates on RIO panels, dressing of cables providing cable trays for all the outdoor instruments and analyzers, etc.

### **15 MLD Unnao STP: -**

- Even after installation of PLC and SCADA system the plant is being operated in manual mode.



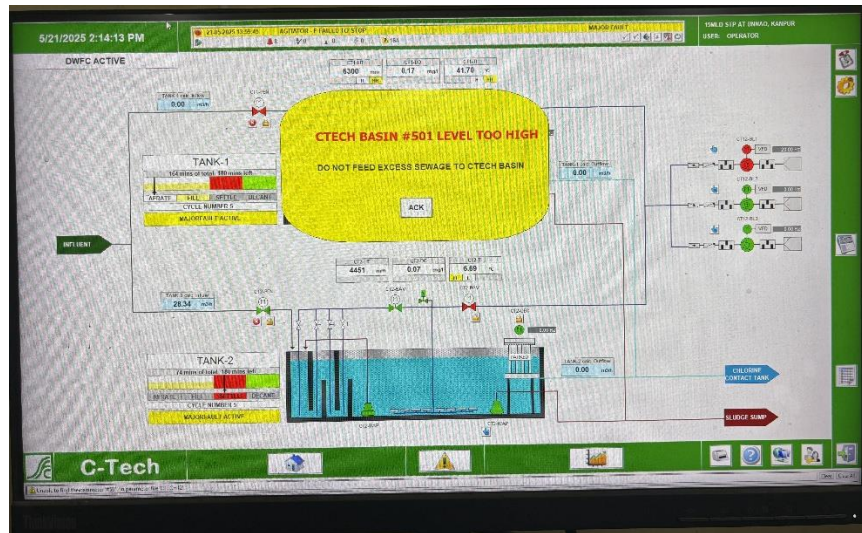


As evident from the screenshot all the valves, pumps and drives have been put in Local Mode (RED "X" symbol over the motorized valves and pumps) and operated locally by the local push button stations. The reason for manual operation was given that the plant is being run at partial load of about 4 to 6 MLD of its rated capacity, which can't be accepted. The plant automation system is not affected by the capacity of the plant and any minor adjustments can be done by altering the set points as per the requirements.

The alarms are not being acknowledged and the system is being bypassed without rectifying the defects and operated manually.

- It has been observed and confirmed by the concessionaire that the all the systems are affected when there is some update available in the server or any fault condition in the server. During investigation it has been observed that the PLC has been communicated to the SCADA system via server. The concessionaire has been instructed to provide parallel communication between PLC and SCADA system and the server to avoid such failures in future.
- The mechanical screens are being operated manually and timer based and are also not working efficiently. The DLIT has not yet been put in operation.
- The Hydrostatic level transmitter in the SBR – 1 tank is damaged and has not been replaced since long, hence, the decanter for SBR – 1 is operated manually, which is not advisable. The level transmitter shows HIGH level indication all times and thus providing erotic signal to the SBR operations.





- The dynamic screens are not in-line with the field values and need to be calibrated as per the actual field value inputs.
- The DO analyzers have been installed in the delivery line of the RAS pumps in the SBR defeating the purpose of real-time continuous monitoring of DO levels as per the concessionaire agreement.



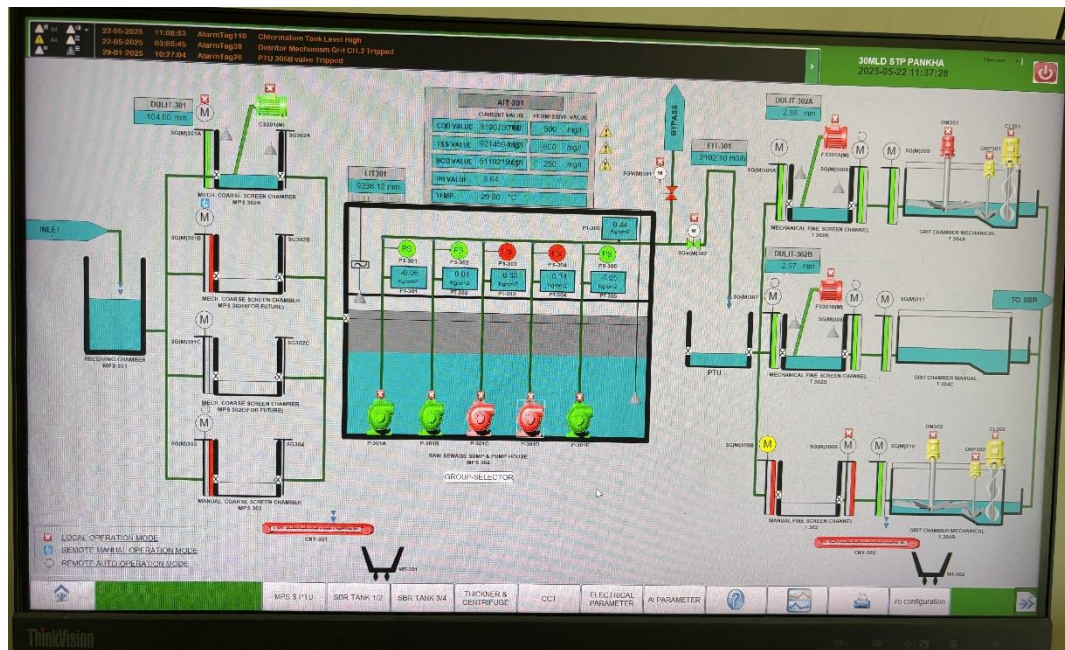
- The site calibration of all the plant Instruments and Analyzers has not been done yet, the concessionaire informed that they will arrange the same shortly.
- The chlorination system has not yet been commissioned and therefore the same has not yet been interfaced to the plant PLC SCADA system.
- Only one UPS has been observed in working and the other UPS is in fault condition and left unattended.
- The cable dressing in the control room has not been done properly and also water dripping around the server has been observed from the Air Conditioners as evident. The concessionaire has been instructed to rectify the same.



- The concessionaire has also been instructed to provide cable trays for managing and dressing the cables laid in the field for field instruments.
- The concessionaire has not provided any cable route markers for identification of cables in the plant. The concessionaire has been instructed to provide the cable route markers for all the buried cables in the plant.
- The status of communication of analytical data to the CPCB/SPCB shall be shown on the SCADA screen.
- The concessionaire has not interfaced the IPS PLC system data to the STP SCADA system in the control room.
- The concessionaire has not developed any format for daily, weekly, monthly reports that are to be generated through SCADA. The report formats have already been recommended for approval during the review of Operation and Control Philosophy for the plant.
- The concessionaire has not developed the formats of scheduled maintenance of plant instruments and equipment, making it difficult to assess the frequency fault conditions of plant equipment.
- The concessionaire has also not interfaced the O&M and troubleshooting manuals to SCADA system for ready reference rectification of defects.

### **30 MLD STP Pankha: -**

- As in case of Unnao, after installation of PLC and SCADA system the plant is being operated in manual mode except for SBR.



As evident from the screenshot all the valves, pumps and drives have been put in Local Mode (RED “X” symbol over the motorized valves and pumps) and operated locally by the local push button stations. The reason for manual operation was given that the plant is being run at partial load of about 20 to 25 MLD of its rated capacity, which can’t be accepted. The plant automation system is not affected by the capacity of the plant and any minor adjustments can be done by altering the set points as per the requirements.

The alarms are not being acknowledged and the system is being bypassed without rectifying the defects and operated manually.

- It has been observed and confirmed by the concessionaire that the all the systems are affected when there is some update available in the server or any fault condition in the server. During investigation it has been observed that the PLC has been communicated to the SCADA system via server. The concessionaire has been instructed to provide parallel communication between PLC and SCADA system and the server to avoid such failures in future.
- The air-conditioners in the control room are out of order and need immediate attention in order to protect the control system equipment.
- The mechanical screens are being operated manually and timer based and are also not working efficiently. The DLIT has not yet been put in operation.
- The dynamic screens are not in-line with the field values and need to be calibrated as per the actual field value inputs.
- The DO analyzers have been installed in the delivery line of the RAS pumps in the SBR defeating the purpose of real-time continuous monitoring of DO levels as per the concessionaire agreement.





- As evident from the picture below the instantaneous flow value shown in the flow meter is higher than the pump discharge. The value on flow meter is 2082 Cum/hr, against two pumps running in parallel with each pump discharge of 992 Cum/hr.



Therefore, the site calibration of all the plant Instruments and Analyzers is necessary and the concessionaire has been instructed to immediately arrange for site calibration. The concessionaire informed that they will arrange the same shortly.

- The foaming in the Parshall flume is affecting the flow measurement at the plant inlet. The concessionaire has been instructed to provide remedial measures to arrest the foaming at the units affecting the field instrument measurements. The concessionaire has been advised to provide de-foaming agent dosing at the inlet to the plant and affected units. Also, it has been observed, the concessionaire is not doing any periodic maintenance and cleaning of the sensors as evident from the picture below.





- The status of communication of analytical data to the CPCB/SPCB shall be shown on the SCADA screen.
- The concessionaire has not provided any cable route markers for identification of cables in the plant. The concessionaire has been instructed to provide the cable route markers for all the buried cables in the plant.
- The status of communication of analytical data to the CPCB/SPCB shall be shown on the SCADA screen.
- The concessionaire has not developed any format for daily, weekly, monthly reports that are to be generated through SCADA. The report formats have already been recommended for approval during the review of Operation and Control Philosophy for the plant.
- The concessionaire has not developed the formats of scheduled maintenance of plant instruments and equipment, making it difficult to assess the frequency fault conditions of plant equipment.
- The concessionaire has also not interfaced the O&M and troubleshooting manuals to SCADA system for ready reference rectification of defects.
- The Pressure transmitters installed at the pumping station need to be calibrated as erratic readings of pressure have been observed during visit.
- The pressure gauges installed at the chlorinators are not functioning properly and need to be attended for rectification. Further the leakage of glycerin is observed in some of the pressure gauges.



- The On-line Chlorine Analyzer does not show the correct residual chlorine values. The values were also checked using reagent but the values do not match. The analyzer needs to be calibrated.



- The SCADA screens and logics developed were also checked during the visit and following observations were conveyed:
  - For identification of plant equipment in LOCAL mode, the symbolic representation along with the TEXT shall be displayed on each screen.
  - The mechanical screen mode of operation, whether Timer mode or Differential level mode shall be displayed clearly on the Screen.
  - Pump status like under "Maintenance" or "Out of order" shall be displayed on the screen in yellow colour, while drive unavailable to operate.
  - Tag nos. for all the field instruments shall be mentioned against each instrument in the SCADA screen.
  - All the equipment, valves and drives including Bypass gate should always be in remote mode and operated from the SCADA system unless in case of any failure.
  - DG sets running hours need to be recorded & shown in SCADA screens.
  - The TEXT and background of all the parameters shall be such that the values are clearly visible.
  - The O&M manuals for all the plant equipment shall be available and a designated TAB for the purpose shall be provided on the SCADA screen.
  - The communication healthy/failure status and alarm shall be verified in the SCADA system.
  - The overall plant periodic and daily reports in the excel format shall be developed



and the same shall be generated through SCADA on daily and periodical basis.

- The concessionaire has not interfaced the IPS PLC system data to the STP SCADA system in the control room.

#### **Sundar Nagar and ICI Nallah IPS: -**

- The PLC-HMI system is not functional in any of the Intermediate pumping stations as evident from the picture below:



- The concessionaire has not provided any wireless communication equipment for interfacing the IPS PLC system to the respective STP.
- The concessionaire has not provided the Air conditioner in the PLC Control Room at the IPSs. The concessionaire has been instructed to provide the same.
- The batteries for UPS system found drained and have not been charged. The concessionaire has been instructed to keep the batteries charged and maintained in order to run the control system efficiently without any interruptions in the operation and control of the pumping stations.
- The Pressure transmitters installed at the pumping station need to be calibrated as erratic readings of pressure have been observed during visit.
- Pressure switch installed at the individual pump delivery shall be checked for STOP command at shutoff head of the pump as per the Operation and Control Philosophy.
- The concessionaire has not provided any cable route markers for identification of cables in the plant. The concessionaire has been instructed to provide the cable route markers for all the buried cables in the pump house.
- The concessionaire has been instructed several times during the site visits, but still the Canopy for weather protection of field instruments has not yet been provided. The instruments have been covered with polythene.



- PLC panel has been raised by 500 mm above the finished floor level, but the cable termination below the panel has not yet been covered.



- The concessionaire has not provided any cable route markers for identification of cables in the plant. The concessionaire has been instructed to provide the cable route markers for all the buried cables in the pump house.

#### **5 MLD STP Shuklaganj: -**

- At present during site visit, no physical instrumentation activities were going on at site. However, all major Instrumentation and PLC-SCADA system items have been procured at site. The List of inventory items at site are annexed (Annexure-1 & 2) with the report.

Regards,

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