Project Scope Description

for

130K1 Compressor surge prevention and steam turbine control system upgrade

Project B-1114

Ploiesti, Romania

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130K1 Compressor surge prevention and steam turbine control system upgrade

The project involves the 130K1 unit control system upgrade in order to foresee in sophisticated performance, steam turbine speed, antisurge and auxiliaries controls based on CCS’ control algorithms. The 130K1 unit consists of a steam turbine driven compressor, working medium hydrogen with contamination of hydrocarbons (up to 20% maximum contamination level).

The 130K1 unit’s control system is based on Rockwell Automation’s Allen-Bradley ControlLogix hardware and software platform. A separate and dedicated Woodward ProTech GII electronic overspeed protection device is installed. The entire CCS control system complies with the API (American Petroleum Institute) standard 670 for turbo-machinery control systems.

The entire CCS scope of supply is defined as follows:
1. Design, supply, fitting and connection of control cabinets, completely furbished with PLC, signals isolators and overspeed prevention system for installation in the local control room (I/O room).
2. CCS control system integration with existing Honeywell DCS and Bently Nevada conditioning monitoring systems.
3. Definition, supply, installation and testing of field proven transmitters, including isolation and purge valves, required for accurate surge protection purposes.
4. Definition, supply and fitting of local Exd HMI for installation at 130K1 deck for local operation and monitoring.
5. Definition and supply of desktop PC station for operator, engineering and maintenance purposes.
6. Design, provision and installation of turbine engineering package to fit 9 Exd speed sensors in modified design speed measurement accommodation on existing steam turbine.
7. Design, provision and installation of MCC cabinet for new control oil system.
8. Provide engineering package to remove existing hydraulic governor system and drive turbine’s main inlet valve using redundant current to hydraulic convertors for steam valve actuation. Provide engineering for control oil system design.
9. Provide for antisurge valve 130FCV504 actuator replacement package to improve valve’s responses, including boosters and position feedback transmitter.
10. Provide local subcontractor services for installation and construction of field signals and instrumentation. Local subcontractor will under CCS responsibility executing the following activities:
   a) Preparation, installation and testing of instrument cables, power cables and communication cables between field and control room, including supply of new supporting cable trays, for the new transmitters. Installation and testing of instrument cables and communication wiring between the control room sub-systems (Honeywell DCS, Bently Nevada, MCC).
   b) Preparation, installation, mounting and testing of transmitters including supply of materials for wiring, support and tubing.
   c) Installation and testing of 130FCV504 upgraded actuator package.
   d) Installation and testing of redundant hydraulic to pressure convertor skid.
11. Provide Honeywell’s services for support. Honeywell’s scope includes:
   a) Assistance in DCS screen and logic adjustments.
   b) Assistance emergency shutdown logic adjustments.
   c) Assistance in Modbus communications tests between DCS and CCS control system.
12. Provide for operator and engineering documentation (in both English and Romanian language).

13. Perform Factory Acceptance Test (FAT) prior to shipment of hardware to site.

14. Provide commissioning assistance.

15. Provide operator training.

16. Provide capital spares for entire control system.

After implementation of the hard and software modifications and proper commissioning of the control system including compressor surgeline validation, CCS expects that the compressor surge control line safety margin can be set between 8% to 10% of compressor’s surge flow.

It is assumed that the antisurge, steam and seal gas valves, existing cables and other existing equipment in the scope of this project are in proper condition and can be re-used.