Scope description

for

C09G-C-1 wet gas compressor surge prevention and process control system upgrade

Project B-1146

Ploiesti, Romania

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C09G-C-1 wet gas compressor surge prevention and process control system upgrade

The project involves the C09G-C-1 wet gas compressor control system upgrade in order to foresee in sophisticated performance and antisurge controls based on CCS’ control algorithms. The 2-stage C09G-C-1 wet gas compressor unit, working medium hydrocarbons, is driven by a fixed speed electric motor. Suction pressure is controlled by compressor inlet valve throttling through the performance controller. Each compressor stage is protected by a dedicated antisurge controller. The performance and antisurge control algorithms are upgraded from a very basic phylosophy to CCS’ sophisticated algorithms. The entire CCS control system complies with the API (American Petroleum Institute) standard 670 for turbo-machinery control systems.

The C09G-C-1 wet gas compressor control system is based on Emerson’s DeltaV hardware and software platforms and will be integrated in the refinery’s DCS. The new DeltaV hardware, operating in redundant configuration, will be added to the existing cabinet UC2-CR-01.

The entire CCS scope of supply is defined as follows:

1. Design, supply and installation of an additional redundant Emerson DeltaV controller system in existing DCS cabinet.

2. Supply of Emerson Application Station (DV250) for operator, engineering and maintenance activities.

3. Provision of operator and engineering documentation in English language.

4. Definition, supply, installation and testing of field proven transmitters, including isolation and purge valves, required for accurate surge protection purposes.

5. Definition, supply, installation and testing of flow measuring device (V-cone) for compressor’s LP section discharge to provide for accurate surge protection purposes.

6. Design, supply and installation of each compressor stage recycle valve actuation kits (boosters, positioners, position feedback) in order to increase stroke speed for reliable surge protection purposes.

7. Supply and installation of suction throttle valve and antisurge valves’ positioners with position feedback indication.

8. 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 (1-pair per device) 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 (marshalling).
   b) Preparation, installation, mounting and testing of transmitters including supply of materials for wiring, support, tubing, heat tracing and weather proof boxes.
   c) Preparation, installation, mounting and testing of valve booster relays, valve positioners with position feedback indication (positioning information is not existing now and needs to be installed).
   d) Cutting, welding and installation of compressor’s first stage V-cone in the discharge side.

9. Provide Emerson services for support. Emerson’s scope includes:
   a) Assistance in DeltaV DCS/SIS set-up.
   b) Assistance in DeltaV process screens changes.
   c) FAT assistance.
   d) Assistance in setting up OPC communication implementation in DeltaV.
   e) DeltaV commissioning assistance.
10. Perform Factory Acceptance Test (FAT) prior to shipment of hardware to site.

11. Provide commissioning assistance.

12. Provide operator training.

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

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