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1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.



With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

As a part of the Project, a New Gas Compressor Station (adjacent to existing Binak GCS) shall be constructed to gather of 15 MMSCFD (approx.) associated gases and compress & transfer them to Siahmakan GIS.

GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Surface Facilities; New Gas Compressor Station
EPD/EPC CONTRACTOR (GC):	Petro Iran Development Company (PEDCO)
EPC CONTRACTOR:	Joint Venture of : Hirgan Energy – Design & Inspection (D&I) Companies
VENDOR:	The firm or person who will fabricate the equipment or material.
EXECUTOR:	Executor is the party which carries out all or part of construction and/or commissioning for the project.
THIRD PARTY INSPECTOR (TPI):	The firm appointed by EPD/EPC CONTRACTOR (GC) and approved by CLIENT (in writing) for the inspection of goods.
SHALL:	Is used where a provision is mandatory.
SHOULD:	Is used where a provision is advisory only.
WILL:	Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR.
MAY:	Is used where a provision is completely discretionary.

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2.0 SCOPE

The purpose of this document is to provide process control philosophy for New Gas Compressor Station.



3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

- IPS-E-IN-180 Engineering Standard for Instrument Electrical Power Supply and Distribution Systems
- IPS-E-IN-190 Engineering Standard for Transmission Systems
- IPS-G-IN-220 Engineering and Installation Standard for Control Centers
- IPS-G-IN-250 Engineering & Construction Standard for Distributed Control System
- IPS-G-IN-260 Engineering and Installation Standard for Indicating Lights, Alarms and Protective System
- IPS-G-IN-270 General Standard for Instruments of Fire & Gas Detection Equipment
- IPS-G-IN-290 Engineering and Construction Standard for Programmable Logic Controllers
- IPS-M-IN-190 Material and Equipment Standard for Transmission System
- IPS-M-IN-220 Material Standard for Control Panels and System Cabinets
- IPS-M-IN-250(1) Material and Equipment Standard for Distributed Control System (DCS)
- IPS-M-IN-260 Engineering and Equipment standards for Alarm and Protective Systems
- IPS-M-IN-280 Material and Equipment Standard for Miscellaneous Items
- IPS-M-IN-290 Material and Equipment Standard for Programmable Logic
- IPS-G-IN-250 Distributed Control System

3.2 INTERNATIONAL CODES AND STANDARDS

- API 552 Transmission Systems
- API RP 550 Manual on Installation of Refinery Instrument and Control System

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3.3 THE PROJECT DOCUMENTS



- BK-GNRAL-PEDCO-000-PR-DC-0001 Process Design Criteria
- BK-GNRAL-PEDCO-000-PR-DB-0001 Process Basis Of Design
- BK-GCS-PEDCO-120-PR-PI-0002~25 P&IDs

3.4 ENVIRONMENTAL DATA

Refer to "Process Basis of Design; Doc. No. BK-GNRAL-PEDCO-000-PR-DB-0001".

3.5 ORDER OF PRECEDENCE

In case of any conflict between the contents of this document or any discrepancy between this document and other project documents or reference standards, this issue must be reported to the CLIENT. The final decision in this situation will be made by CLIENT.

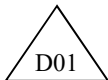
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4.0 DISTRIBUTED CONTROL SYSTEM

Control system of compressor station is consisted of three dedicated system as DCS, ESD and F&G which all of them have processor to implement all related functions. However, the supervisory network of DCS is integrated as an Industrial Ethernet and all operating and engineering workstations are connected to it in Control room. Moreover, serial and hardwire connection between DCS and ESD panels are considered for signal data communication. Monitoring of ESD & F&G system is via common workstation in control room. Also F&G system is connected to DCS through serial link and to ESD through hardwire link. In addition to above systems, the control system of compressors which is independent from DCS and its UCPs are located in control building with relevant monitoring workstation in control room. This system is connected to DCS through serial link and hardwire and to ESD through hardwire link.

4.1 INLET PIPELINE

To control the flow, temperature and pressure of gas from BINAK & GOLKHARI; one flow transmitter (FIT-2101 & FIT-2102), one pressure transmitter (PIT-2102 & PIT-2104) and one temperature transmitter (TIT-2102 & TIT-2104) are located on each gas pipe.



4.2 SLUG CATCHER DRUM

The slug of gas line from GOLKHARI is collected in Slug Catcher Drum (V-2104).

The liquid level of drum is detected by level transmitter (LIT-2111) and controlled by LICA-2111. When the level rises above the set point (HLL); the LICA-2211 starts the pumps (P-2101A/B) and when it decreases to low point it will stops them.

4.3 INLET KNOCK OUT DRUM



The liquid separated in the inlet knock out drum (V-2105) is sent to the closed drain under level control.

Inlet knock out drum is provided with a level transmitter and a level indicating controller in DCS that modulates the level control valve on the liquid outlet line. The level control will be configured as control valve with high and low alarm in the DCS.

The level transmitter (LIT-2119) is installed for detecting the liquid level in drum and control valve (LCV-2114) is considered to control the level via the controller LICA-2119.

4.4 SUCTION DRUM

Each stage of compression of each train is provided with a suction drum (V-2101A/B/C & V-2102A/B/C) to remove any liquid carry over in the gas. The liquid collected in the scrubber is controlled by on/off valve.

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Compressor suction drums are provided with a level transmitter and a level indicating controller in DCS that modulates the level control valve with high and low alarm in DCS.

The level transmitter (LIT-2121A/B/C & LIT-2131A/B/C) is installed for detecting the liquid level in drum and on/off valve (XV-2122A/B/C & XV-2131A/B/C) is considered to control the level via the controller LIA-2121A/B/C & LIA-2131A/B/C.



4.5 COMPRESSOR

Pressure controllers will control the related upstream compression station unit pressure through relevant Pressure Control.

Pressure controller PIC-2121A/B/C will control the compressor suction pressure through Pressure Control Valve PCV-2123A/B/C, installed on the compressor's spill back lines.

Spill back control will be done through control valve which provided at the downstream of the discharge cooler.

Pressure controller PIC-2135 A/B/C will control the compressor discharge pressure through Pressure Control Valves which provided at the downstream of the discharge 2nd Stage Air cooler. (PCV-2135 A/B/C), that installed on H/C gas lines to flare header.

All compressor controls will be finalized by vendor.

4.6 AIR COOLER

The compressed gas from compressor is cooled down to the required temperature by the compressor discharge cooler (AE-2101A/B/C & AE-2102A/B/C).

The compressor discharge temperature is controlled by the temperature transmittal (TIT-2126A/B/C & TIT-2135A/B/C) provided at the downstream of the discharge cooler by changing fan variable pitch (half of the fans are auto-variable blade pitch). The Temperature indicating controller (TICA-2126A/B/C TICA-2135A/B/C) is configured with high and low alarm in DCS.





4.7 DISCHARGE DRUM

The gas compressor unit is provided with a Discharge Drum (V-2103) to remove any liquid carry over in the gas. The liquid collected in the scrubber is controlled by control valve.

Discharge drum is provided with a level transmitter and a level indicating controller in DCS that modulates the level control valve with high and low alarm in DCS.

The level transmitter (LIT-2141) is installed for detecting the liquid level in drum and on/off valve (XV-2144) is considered to control the level via the controller LICA-2141.

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4.8 INSTRUMENT AIR

Two Air Compressor Packages (PK-C-2203A/B) have been considered for providing required instrument & plant air (one is in service and one is standby).

The air compressor system will be a package unit, and the final control system design will depend upon the particular vendor chosen. Air compressor package will be equipped with load/unload control system.

To maintain the pressure of Air Receiver (V-2203) at required pressure, a closed loop control system has been considered. The loop contains pressure transmitter which has been located on this line (PICA-2203) which is in linked with air compressor packages control panel.

With air consumption at plant production and pressure reduction, turn on command on the compressor will be sent through this panel towards this equipment and vice versa by pressure re-increasing to the set value, turn off command on the compressor.



4.9.1 PLANT AIR

A pressure transmitter (PIT-2201) is located on plant air header to indicate the pressure of line.

If the pressure decreases to set point the controller (PIC-2201) will be closed the control valve (PCV-2201).

4.9 NITROGEN PACKAGE

In order to produce required nitrogen for compressor dry seal gas, blanketing and purging of equipment's, Nitrogen Generation Package (PK-C-2204) has been considered.

The Nitrogen Package will be a package unit, and the control system design will depend upon the particular vendor chosen.



4.10 CLOSE DRAIN DRUM

The drain liquid which is collected from all units and collected by closed drain header will be routed to Closed Drain Drum (V-2202).

The level transmitter (LIT-2221) is installed for detecting the liquid level in drum via the controller LICA-2221.

When the level increases to set point (HLL) the controller (LICA-2221) starts the pumps (P-2202A/B) and when it decreases to low point it will stops them.

NOTE: In case of low level of LICA-2221, the control system stops both pumps. If liquid level of V-2202 reaches H1 level; lead pump will be started. In case of H2 level alarm, lag pump will be

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4.11 CORROSION INHIBITOR PACKAGE

Corrosion Inhibitor Package (PK-2207) includes storage tank and injection pumps and required control system will be supplied by vendor.

The level of Corrosion Inhibitor Storage Tank (PK-TK-2207) is measured by a level transmitter, considered for level indication of tank and to stop Corrosion Inhibitor Pumps (PK-P-2207A/B) at low liquid level of storage tank.

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4.12 LP FLARE KNOCK OUT DRUM

The relieved gas which gathered from each point of plant will be routed to LP Flare K.O. Drum (V-2201). Separated liquid in drum will be pumped to closed drain header by LP Flare K.O. Drum Pumps (P-2201A/B).

When the level of liquid rises above the set point, the level transmitter (LIT-2251) is considered to control the level via the controller LICA-2251.

When the level increases to set point (HLL) the controller (LICA-2251) starts the pumps (P-2201A/B) and when it decreases to low point it will stops them.

NOTE: In case of low level of LICA-2251, the control system stops both pumps. If liquid level of V-2201 reaches H1 level; lead pump will be started. In case of H2 level alarm, lag pump will be started.

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4.13 FUEL GAS DRUM



The branch split from outlet header of Inlet K.O. Drum will be routed to Fuel Gas K.O. Drum (V-2205). The liquid collected in the scrubber is controlled by on/off valve and routed to closed drain system.

The level transmitter (LIT-2271) is installed for detecting the liquid level in drum and on/off valve (XV-2271) is considered to control the level via the controller LICA-2271.

The pressure of the vessel is controlled by PICA-2272. PICA-2272 closes the valve (PCV-2272A/B) when pressure of fuel gas K.O. drum rises above the set point, and opens it when the pressure falls below the set point.

5.0 MACHINERY & PACKAGE EQUIPMENT CONTROL

Generally all machinery and equipment packages (Packages) shall be controlled by DCS/ESD. In some cases the machinery or package vendor will supply the control panel (e.g. for gas compressor). This will however interface with the DCS/ESD.

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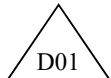
The DCS will control and monitor the package. The DCS workstation will be the main operator interface.

The ESD system will protect all packages on the facilities.

The F&G system will monitor all packages on the facilities.



Where necessary, local “Gauge Boards” /control panel is will be supplied by the package vendor. These will incorporate all local indication required at the package by the operator in the field, such as pressure and temperature gauges/ push buttons/status Indicators. Where alarms or other electronic indications are required, they could be driven from DCS/ESD.

For details of the Packages Instrument/control system please review document “Specification For Instrument and Control of Package Unit System (PU), BK-GNRAL-PEDCO-000-IN-SP-0004”.



5.1 MOTOR OPERATED VALVE (MOV) CONTROL SYSTEM

Motor Operated Valves (MOVs) will be installed in some areas of the New Binak Compressor Gas Station unit to enable unit operations to be carried out remotely in the operator workstations in New Binak Compressor Gas station unit. The operator interface to the MOVs arriving via the DCS screens in the operator station. The MOV's will interface with the DCS for receipt of movement commands from the DCS and the transmission of status and alarm indication by hardwire.

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6.0 ELECTRICAL SYSTEM

6.1 UNINTERRUPTIBLE POWER SUPPLY (DC CHARGE)

A dual redundant Uninterruptible Power Supply (UPS 110 VAC) system is to be provided to ensure continued operation of instrumentation and control systems for a specified period (min. 2 hours) after a main power failure. The time period must be sufficient to allow the operators to shut down the plant safely; the UPS must be able to supply all connected systems at maximum load for a minimum period of two hours.

In addition a dual redundant Uninterruptible Power Supply (24VDC) for F&G system is to be provided to ensure continued operation of Fire detection/alarm/extinguishing system for a specified period (min. 24 hours) after a main power failure

7.0 FIRE & GAS DETECTION SYSTEM (FGS)

The New Binak Compressor Gas Station unit will be provided with a Fire and Gas Detection System (F&G) for process area and control building and A FACP for existing Electrical Building.

Interface with Existing F&G system has been considered in new F&G system configuration.

For details of the F&G system please review document “Fire & Gas Detection Design Criteria - BK-GCS-PEDCO-120-IN-DC-0001”.

8.0 EMERGENCY SHUTDOWN SYSTEM (ESD)

The New Binak Compressor Gas Station unit will be provided with an Emergency Shutdown System (ESD).

For details of the ESD system please review document “ESD Philosophy - BK-GCS-PEDCO-120-PR-PH-0005” ” and “Instrument & Control System Design Criteria - BK-GCS-PEDCO-120-IN-DC-0002”.