طرح نگهداشت و افزایش تولید 27 مخزن

PROCESS & UTILITY DESCRIPTION

نگهداشت و افزایش تولید میدان نفتی بینک

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AFC: Approved For Construction
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AB-R: As-Built for CLIENT Review
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REVISION RECORD SHEET

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CONTENTS

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.

2.0 SCOPE

The scope of this document is to present a brief process and utility description of Binak gas compressor station unit and utility.

3.0 NORMATIVE REFERENCES

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3.1 THE PROJECT DOCUMENTS

- BK-GNRAL-PEDCO-000-PR-DB-0001 Process Basis of Design
- BK-GNRAL-PEDCO-000-PR-DC-0001 Process Design Criteria
- BK-GCS-PEDCO-120-PR-LI-0006 Utility Consumption List
- BK-GCS-PEDCO-120-PR-RT-0001 Flare Network Study Report
- BK-GCS-PEDCO-120-PR-LI-0005 Chemical Consumption List
- BK-GCS-PEDCO-120-PR-UF-0001 Utility Flow Diagrams (UFD)
- BK-GCS-PEDCO-120-PR-PF-0001 Process Flow Diagram (PFD)

3.2 ENVIRONMENTAL DATA

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

3.3 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.

4.0 PROCESS DESCRIPTION

4.1 SUMMARY

National Iranian South Oil Company (NISOC) plans to conduct an integrated project includes several sub-projects to preserve and increase production Binak oilfield.
Binak oilfield that 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. 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. In addition condensate is also sent to Binak production unit.

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4.2 COMPRESSOR STATION

Existing Binak compressor station, with working capacity of 13 MMSCFD, is located 20 km from Bandar Genaveh, in South West of Iran. The sour gas from Binak production unit and Binak Booster cluster is processed in existing compressor station and transferred to Siahmakan slug catcher using 8-inch pipeline with 45 km length.

A new compressor station with design capacity of 15 MMSCFD with TEG dehydration package should be added into existing facilities to increase feed gas pressure from 5.5 barg to 54.8 barg. Refer to NISOC instruction, and in order to maximize flexibility of new compressor station, 2 +1 arrangement (2 in operation and 1 as standby) is considered for the system.

The gas feed from GOLKHARI with 10” pipeline enters and distributes into Slug Catcher Drum (V-2104) . the outlet gas from Slug Catcher will gather in a common header with gas feed from BINAK cluster 8” pipeline and then is fed to Inlet Knock Out Drum (V-2105).

The outlet gas from Inlet Knock Out Drum is fed to three compression trains. three compression trains are considered in parallel (it is noted that two compression trains are in service).

In The each train gas is fed to 1st Stage Gas Compression Suction Drums (V-2101 A/B/C) and The outlet gas from each suction drum is fed to Reciprocating 1st Stage Gas Compressor (C-2101 A/B/C) to reach the required pressure then distributes and enters to the 1st Stage Gas Compression Air Coolers (AE-2101 A/B/C) to be cooled down to 60°C.

The outlet gas from 1st Stage Gas Compression Air Coolers (AE-2101 A/B/C) fed to 2ND Stage Gas Compression Suction Drums (V-2102 A/B/C) and The outlet gas from each suction drum is fed to Reciprocating 2ND Stage Gas Compressor (C-2102 A/B/C) to reach the required pressure then distributes and enters to the 2ND Stage Gas Compression Air Coolers (AE-2102 A/B/C) to be cooled down to 60°C.

The outlet gas from 2ND Stage Gas Compression Air Coolers (AE-2101 A/B/C) will gather in a common header and then is fed to 2ND Stage Compression Discharge Drum (V-2103) and The outlet gas from each 2ND Stage Compression Discharge Drum (V-2103) is fed to Dehydration Package (PK-2101).

The Dehydration Package is removed water with Glycol from the process gas stream to achieve an outlet dry gas with dew poin 5 °C and then transfer them to Siahmakan GIS.

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Main Compressor Station Facilities includes:

- Slug Catcher Drum (V-2104)
- Inlet Knock Out Drum (V-2105)
- 1st Stage Gas Compression Suction Drum (V-2101 A/B/C)
- 1st Stage Gas Compressor (C-2101 A/B/C)
- 1st Stage Gas Compression Air Cooler (AE-2101 A/B/C)
- 2_{ND} Stage Gas Compression Suction Drum (V-2102 A/B/C)
- 2_{ND} Stage Gas Compressor (C-2102 A/B/C)
- 2_{ND} Stage Gas Compression Air Cooler (AE-2102 A/B/C)
- 2_{ND} Stage Gas Compression Discharg Drum (V-2103)
- Dehydration Package (PK-2101)
  - Lean Glycol Storage Tank (TK-2102)
- Pig Launcher (PL-3201)
- Fuel gas k.o. Drum (V-2205)
- Plant & Instrument Air System including:
  - Air Compressor Package (PK-C-2203 A/B)
  - Nitrogen Receiver (PK-DR-2203 A/B)
- Nitrogen Package (PK-G-2204)
  - Air Compressor Package (PK-C-2204)
  - Nitrogen Receiver (V-2204)
- Service Water Distribution Network
- Depressurizing & Venting System including:
  - LP flare K.O. Drum (V-2201)
  - LP Flare K.O. Drum And Closed Drain Drum Sump (SU-2201)
  - LP Flare Ignition Package (IG-2201)
  - LP Flare Stack (FST-2201)
  - LP Flare K.O. Drum Pump (P-2201 A/B)
- Corrosion Inhibitor Package
- Close Drain System :
  - Closed Drain Drum (V-2202)
  - LP Flare K.O. Drum And Closed Drain Drum Sump (SU-2201)

- Closed Drain Drum Pumps (P-2202 A/B)
- Sump Pumps (P-2203 A/B)

- Oily Water Sump (SU-2202)
- Diesel Oil System:
  - Diesel Oil Drum (V-2206)
  - Diesel Generator Package (PK-2206)
  - Fire Water Diesel Pump (P-2206)

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Table 1-Inlet & Outlet BINAK GCS Characteristics

SPECIFICATION		STATION MAIN INLET HEADER (SUMMER/WINTER)	STATION MAIN OUTLET HEADER (SUMMER/WINTER)
STDANDARD VOLUMETRIC FLOW (MMSCFD)		14.6	14.027/14.068
MASS FLOW	(kg/hr)	17833/15677	17171/15105
PRESSURE	(Barg)	5.3/5.3	50.9/49.6
TEMPERATURE	(°C)	37.2/19.2	58.3/57.7
Molecular Weight		24.52/21.56	24.58/21.56
Viscosity	(Cp)	0.011	0.014
Density	(kg/m^3)	6.16/5.74	55.86/45.29

For detail information about feed and product composition refer to “Process Flow Diagram (PFD) (Doc.no: BK-GCS-PEDCO-120-PR-PF-0001)”.

5.0 UTILITIES PROCESS DESCRIPTION

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5.1 FUEL GAS

Fuel gas is supplied from inlet Fuel Gas K.O Drum (V-2205). Pressure of fuel gas is controlled and set at 4.9 Barg by a pressure control valve, and then it is sent to Fuel Gas K.O. Drum (V-2205) drum. A pressure control valve is considered on fuel gas line for flare header purging purpose which keeps fuel gas pressure at 0.2 to 0.5 barg. Fuel gas consumers are flare ignition panel, dehydration package and purging purpose.

For detail information about feed and product composition refer to “Utility Consumption List (Doc.no: BK-GCS-PEDCO-120-PR-LI-0006)”.

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5.2 INSTRUMENT & PLANT AIR

Two parallel air compressor packages (PK-C-2203 A/B) (one duty and the other stand-by) are considered. The maximum capacity of package is 191 Nm^3/h, which supply the air discharge pressure at 9 Barg with temperature of 65 °C.
Outlet of air compressor package routed to instrument air receiver to separate possible condensed water. Air receiver is designed to supply sufficient volume to maintain air flow for at least 15 minutes in case of air compressor’s trips. A branch is considered on Air receiver outlet header in order to provide plant air.
After that, compressed air flows to Air dryer package (PK-DR-2203 A/B) for dries the air stream in order to generate Instrument air and then fed to instrument air receiver (V-2203).instrument air routed to instrument air distribution header, 1ST stage gas compressor (C-2101A/B/C) and dehydration package.

5.3 FLARE NETWORK SYSTEM

Flaring system has one network pressure relieving gases. There will be one flare stack. The flare system consists of gathering lines, main header and flare stack and the related tip. So gases from flare header will be routed to flare system, and burnt in flare tip.
A K.O. drum will be considered for liquid entrainment trapping from flare network. Separated liquid in flare K.O Drum (V-2201) will be sent to close drain header by flare K.O drum pumps (P-2201 A/B). It should be noted that flare system design with smokeless facility.

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5.4 CHEMICAL INJECTION PACKAGE

Corrosion inhibitor package (PK-2207) consists of a corrosion inhibitor tank and injection pumps. Gas corrosion inhibitor injection rates are considered as 1 Pint/MMSCF (each pint equals to 0.47 litre) for gas compressor station lines with assumption of making 70%(fuel oil)-30%(corrosion inhibitor) solution.
The corrosion inhibitor has to be utilized in gas pipeline Pig Launcher (PL-3201), Gas Discharge Drum outlet (V-2103), Gas Pig Receiver outlet (PR-2002), slug catcher drum outlet (V-2104), Fuel Gas K.O. Drum (V-2205) and Inlet K.O. Drum outlet (V-2105).

5.5 FUEL OIL SYSTEM

Diesel (fuel oil) is the fuel of diesel generator and fire water pumps and another consumption is corrosion inhibitor package.Fuel oil storage drum is filled by road tankers. The required fuel oil will be transferred to consumers by P-2206.

5.6 CLOSED DRAIN SYSTEM

A closed drain system will be designed to handle liquid hydrocarbons and probable water from vessels, pumps and air coolers. For the vessels in operation, liquid to be drained to the closed drain system is the residual liquid between high and low liquid level which will be control by level controller and drained to the closed drain system.
Closed drain system consists of a closed drain vessel, transfer pumps interconnecting piping and the inlet header. Closed drain vessel shall be in direct, open connection with the flare system, thereby allowing relieving gas to flare network through the closed drain.
In case of total plant shutdown, it could be envisaged to drain the whole facility based on drainage philosophy. The closed drain system is designed to operate at near atmospheric pressure to enable drainage from depressurized equipment.

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5.7 NITROGEN PACKAGE

In order to produce required nitrogen for compressor sealing, blanketing and purging of equipment during start up or maintenance purpose the air compressor packages (PK-C-2204) is considered for supply Nitrogen at plant. The maximum capacity of package is 124 Nm^3/h, which supply the air discharge pressure at 9 Barg with temperature of 65 °C.
Nitrogen package consists of air compressor and and nitrogen receiver for 15 min continues consumption. Generated nitrogen distributed to nitrogen header.

Nitrogen package with capacity of 34 Nm^3/h (base on receiving gas compressor vendor sealing gas consumption data) is considered to supply dry gas seal for 1ST stage gas compressors (C-2101A/B/C) and Blanketing (TK-2102) & (V-2107) .