طرح نگهداشت و افزایش تولید 27 مخزن

DRAINAGE PHILOSOPHY

نگهداشت و افزایش تولید میدان نفتی بینک

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CONTENTS

1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 25 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 Client (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 purpose of this document is to provide process drainage philosophy for New Gas Compressor Station.

This document shall be used as the standard reference for process drainage philosophy. This will ensure consistent quality process deliverables. The standards used in this document were mainly derived from IPS (Iranian Petroleum Standards). The drainage philosophy described here are intended to serve as a guideline. In case of discrepancy between this document and IPS documents, IPS documents shall govern. Moreover, in some case, client (owner) may exclude requirement of this specification within some sub-project due to available (operating) drainage system.

Appropriate drainage facilities shall be provided for the collection, containment and treatment of any liquid that could be released into the facility during course of normal plant operation, abnormal operating conditions, before and during maintenance operations and during emergency upset condition.

Drainage facilities are therefore required for the following purposes:

- Drainage of the liquid inventory of equipment following shutdown and prior to maintenance and inspection.
- Blow through of level gauges, transmitters and standpipes.
- Collection and disposal of minor leakage from equipment

3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

- IPS-E-PR-725 Process Design of Plant Waste Water Sewer Systems
- IPS-E-PR-730 Process Design Plant Waste Water Treatment and Recovery Systems
- IPS-E-PI-240 Engineering Standard for Plant Piping System

3.2 INTERNATIONAL CODES AND STANDARDS

- API PUB 421 Design and Operation of Oil Water Separators

3.3 THE PROJECT DOCUMENTS

- Process Basis of Design: BK-GNRAL-PEDCO-000-PR-DC-0001
- Process Design Criteria BK-GNRAL-PEDCO-000-PR-DB-0001

3.4 ENVIRONMENTAL DATA

Refer to "Process Basis of Design; Doc. No. BK-00-HD-000-PR-DB-0001”

4.0 DESCRIPTION OF DRAINAGE SYSTEM

4.1 DEFINITION OF DRAINAGE SYSTEM

There are no continuous drain streams from process. All streams are normally contained and recycled. Drainage occurs only during shutdown and maintenance of equipment. Drains are separated based on the chemical nature of streams. There shall be two types of drains (CLOSED AND OPENED) provided:

- Closed hydrocarbon drains system (Compressor Station Unit)
- Open hydrocarbon drains system (Compressor Station Unit)

4.2 MAJOR DESIGN POINTS

In the design of the drainage facilities the following points should be taken into account:

- All underground drains containing water must be designed, constructed and installed with high integrity using ductile materials such that no leakage occurs into the surrounding soil.
- Equipment containing liquids with subzero temperatures (e.g. after depressurizing) may also be provided with a drain connection to the closed drains header system, but any requirement for heat tracing these lines shall be considered where appropriate.
- The closed drain headers and lateral sub-headers should slope to the closed drain drum; each sub-header connection to the header shall be isolated in accordance with the Isolation Philosophy.
- Automatic discharges (e.g. drain of Fuel Gas Drum), shall either be routed to a process vessel or piped via a dedicated header to the closed drain drum.
- For vessels that experience coarse or corrosive service, suitable Roding points shall be provided in the drains line. Roding will be performed when the system is shutdown and the vessel has been isolated, depressurized and drained of process fluid. Vessels that collect solids (e.g. sand and corrosion product) shall have full bore drain valves.
- Piping requiring Roding points shall be installed in the straight length sections of the main drain header via a blind flange.
- In the case of hot or cold operating conditions the process equipment and process piping shall be suitably insulated; however for drains this is not necessary as the fluid in these lines will be stagnant and heat loss or gain is expected to be insignificant. Personnel protection may be necessary for systems handling hot fluids to protect operating personnel.

4.3 OPEN HYDROCARBON DRAINAGE SYSTEM

4.3.1 Non-Contaminated Surface Water Run-Off

This system shall collect rainwater of roads, car parks, roofs of buildings (except in process and utilities areas) unobstructed areas. The water shall be collected by a system of ditches located in the plant area (mainly at top and bottom of slopes and along roads) directly to the sides of the plant.

4.3.2 Non-Contaminated Sewer

None contaminated process waste effluents (Non-Hazard) from process and utility areas such as:

- Process units: Wash down from non-oily equipment,
- Utility areas: Wash down from non-oily equipment,
- Fresh water drains.

The water shall be collected by system of ditches located in plant area (mainly at top and bottom of slopes and along roads) directly to the sides of plant.

4.3.3 Accidentally Oily Contaminated Water Sewer

The water from roofs of buildings in Process and Utility areas shall be connected to this system. This water will be collected in a drain network and sent to the oily water sump. The oily water sump shall have retention corresponding to the maximum of 15 minutes of rainfall.

- Rainfall intensity: 53 mm/h

Open drains system collects drainage from process equipment, piping and rain from curbed areas, and flooring. Piping should be configured so that an operator performing manual drainage should always be able to see the drain line discharge.

4.4 CLOSED HYDROCARBON DRAINAGE SYSTEM

Closed drain system will be provided to handle hydrocarbon liquid and probable water from process and utility systems include pumps, vessel, etc. All closed drain connections shall be hard piped from the equipment item to the closed drain header, keeping the hazardous fluids out of contact with the atmosphere.

The closed drain system vents directly to the flare system, thereby permitting degassing of any un-stabilized liquid that may have been passed into the closed drains.

Prior to shutdown of any equipment item, the liquid level in each vessel shall be lowered as far as possible through the normal liquid outlet lines. This is envisaged that the liquid level can be lowered to the low-low trip before releasing the liquid to closed drain system. The liquid to be drained to the closed drain system is the residual liquid below the low-low trip level in the largest vessel connected

to the closed drain system.

In case of total plant shutdown, it could be envisaged to drain the whole facility. Because the closed drain vessel cannot accommodate the entire drainage volume, vessels will be drained one by one.

The closed drain system is designed to operate at near atmospheric pressure to enable drainage from depressurized equipment. This system shall be designed in accordance with the following principles:

- All HP/LP drains from equipment will be routed to the closed drain drum via drain header.
- Closed drain drum shall be in direct, open connection with flare system, thereby allowing relieving gas to flare.

By considering check valves at the end of drain sub headers, backpressure from HP drains to LP drain sub headers will be eliminated.

The sources of closed drain are:

- Suction Drums (V-2101 A/B/C, V-2102 A/B/C)
- inlet K.O. Drum (V-2105)
- Gas K.O. Drum (V-2205)
- Discharge Drum (V-2103)
- Slug Catcher (V-2104)
- Gas Pig Receiver (PR-2102)
- Corrosion Inhibitor Package (PK-2207)
- Flare K.O. Drum Pumps (P-2201A/B)
- Dehydration Package (PK-2101)
- Gas pipeline pig launcher (PL-3201)

The collected liquid in closed drain drum will be transferred by pumps subsequently. Therefore two closed drain pumps (2x100%) are considered to transfer accumulated oil to the slug catcher drum (V-2104). A stand-by pump shall be provided with automatic startup if the operating pump lags.

Closed drain drum is located in a pit and liquid collected in the sump is pumped by sump pump to oily water sump (SU-2202).

Sizing of drain drum is based on handling the liquid volume of the largest vessel (V-2104) in the plant. This drum shall hold the volume from bottom to NLL. Drum design temperature is in accordance with the highest temperature of the stream entering the drum.

The released vapor from closed drain drum will be routed to flare.

4.5 TEG DRAINAGES

The TEG drains system is dedicated to handling drains from TEG dehydration and Regeneration, TEG storage and handling system. This system shall be independent from any other drainage system.

The TEG drain drum (Glycol drain rundown drum) shall be designed for the maximum inventory due to draining of the largest volume vessel in the TEG system. The TEG drains drum shall be provided with nitrogen blanketing to avoid air ingress.

4.6 DOMESTIC SEWER SYSTEM

The upstream limit of the domestic sewer system covered by this specification shall be the external side of a manhole located at approximately 1 meter from the external face of the building. This manhole and all the upstream part of the domestic sewer system including grease interceptor shall be developed as a part of the building plumbing system.

The domestic sewer system shall be developed as a part of the building plumbing system. The domestic sewer system shall be a closed system, which shall receive all domestic wastes from the plant buildings, including foul and kitchen wastes. Wastes from toilet areas shall be collected in a manhole located immediately outside each building.

The sewer shall be directed by gravity to a Septic pit that unloaded by road-tankers equipped with a pump to transfer sewer to tanker.

5.0 OILY WATER

This underground system shall collect wastewater, which is continuously oil contaminated during normal operations:

- Purges and open drains from equipment in process and utility areas;
- Accidental spillages associated to specific equipment;

6.0 FEEDSTOCK CHARACTERISTICS AND CAPACITY

6.1 DOMESTIC SEWER

The domestic waste comes from toilets, showers, kitchen etc. It is collected into a closed sewer. The following design criteria are used:

Population (max): Depends to each sub-project (refer to corresponding design basis) Rate: 100 litters/ person/day (Average)

Specification: 20g BOD5/ person/day; 4.5 g TKN (as N)/ person/day Total Suspended Solids (TSS): 300 mg/l

6.2 OILY WATER FROM OILY WATER SEWER (OPEN DRAIN)

The following design criteria are used:

Fluid: Oily Water; Stream type: intermittent

Normal flow rate: 0.75 m^3/hr (1); Design flow rate: 0.75 x 1.2 = 0.9 m^3/hr (Note 1)

Normal oil density: 500 - 850 kg/m^3; Design oil density: 920 kg/m^3 Viscosity: 1.3mPa.s (viscosity of water at 10°C)

PH: 6~8.5 ; Temperature: ambient (design 5°C); Pressure: Atm. (Gravity flow).

NOTE 1: The normal & design flow rate are based on measured data on existing similar plant.

6.3 NON-CONTAMINATED SURFACE WATER RUNOFF

This system shall collected rainwater on roads, car parks, roof of building (except in process and utility area), and unconstructed areas. The water shall be collected by system of ditches located in plant area (mainly at top and bottom of slopes and along roads) directly to the sides of plant.