
	<p>نگهداشت و افزایش تولید میدان نفتی بینک</p> <p>فعالیت های روزمینی در بسته های کاری تحت الارض</p> <p>عمومی و مشترک</p>							
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## طرح نگهداشت و افزایش تولید 27 مخزن

### CONTROL PHILOSOPHY

#### نگهداشت و افزایش تولید میدان نفتی بینک



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 IFC: Issued For Comment  
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 AFD: Approved For Design  
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 AFP: Approved For Purchase  
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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, construction of well location, access roads, wellhead facilities for 6 new wells (with electric power supply for 2 of them) and required modifications on 4 workover wells (with electric power supply) shall be done. In addition, construction of 6 new flowlines from new wells to Binak B/C unit (with extension of relevant manifold) are in the Project scope of work.

### GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Construction of New Well Locations, Modifications on Workover Wells, Wellhead Facilities, Electrification Facilities, Flowlines and Extension of Binak B/C Manifold
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 Wellheads facilities and Flowlines.



## 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-W018S-PEDCO-110-PR-PI-0001 P&ID - W018S
- BK-W028-PEDCO-110-PR-PI-0001 P&ID - W028
- BK-W046S-PEDCO-110-PR-PI-0001 P&ID - W0046S
- BK-W035-PEDCO-110-PR-PI-0001 P&ID - W035
- BK-W008N-PEDCO-110-PR-PI-0001 P&ID - W008N
- BK-W007S-PEDCO-110-PR-PI-0001 P&ID - Extension of Binak B/C Manifold
- BK-W007S-PEDCO-110-PR-PI-0002 P&ID - W007S

### 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 DISTRIBUTION CONTROL SYSTEM



Well Head Control Panel Unit is provided for the Wellhead X-mass tree and WHCP has a common section which has general control. This control consists of hydraulic pumps, ESD and logic header push buttons and signal lamps. Higher levels of ESD will affect this section to shut down panel totally. Besides, each well has individual module for controlling the related X-mass tree (SSSV and SSV). A loop of fusible plugs around the X-mass tree will release the logic pneumatic header and shut down the WHCP in case of fire by means of melt-able plugs at the end of fusible plug header. Panel Face includes PB, signal lamp, solenoids and pressure switches etc. for controlling the SSSV and SSV.

Sequences and interlocks of opening and closing of X-mass tree valves are as follows and it is implemented in pneumatic logic of WHCP.

In opening operation, First SSSV and then SSV shall be opened. Also, in closing operation First SSV and then SSSV shall be closed. It is not safe to open or close SSSV in un-equalized pressure condition. Also, in case of emergency or normal shut down, it is considered SSSV and SSV to be closed. Required safeguarding and interlocks have been considered for prevention of Un-wanted closing / opening of SSSV.

The control and safety equipment located at well head area shall be self- sufficient. The area is un-manned so the WHCP and HPU shall be designed in order to protect the area automatically in absent of personnel and also provide enough data during the presence of operators for operation and maintenance purposes.

The Wellhead panel will be located outdoor. The panel shall be installed on concrete floor & under a sunshade. It shall be designed to operate continuously at mentioned site / environmental conditions.

There is no utility available in area so all the requirements shall be foreseen by the vendor.



The hydraulic safety control panel shall operate SSSV valve and SSV valve through reliable hydraulic Pressurized system supplied integrally with control panel.

All loos items as per project material requisition (such as SSV/SSSV command line tubing, fusible plug...) shall be provided by WHCP vendor and the tube length shall be based on project documents

#### 4.1 WELLHEADS FACILITIES AND FLOW LINES



The control and safety equipment located at well head area shall be self- sufficient. The area is un-manned so the WHCP and HPU shall be designed in order to protect the area automatically in absent of personnel and also provide enough data during the presence of operators for operation and maintenance purposes.

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The hydraulic safety control panel shall operate SSSV valve and SSV valve through reliable hydraulic Pressurized system supplied integrally with control panel.

All loos items as per project material requisition (such as SSV/SSSV command line tubing, fusible plug...) shall be provided by WHCP vendor and the tube length shall be based on project documents

#### 4.2 HYDRAULIC POWER UNIT





The hydraulic pressure is needed for actuation of two type of valves (SSV and SSSV) and pneumatic pressure (N2) for related logics and fusible plug loop. The panel shall be designed for fail safe, action to trip, de-energized/depressurized/contacts open or close to trip shall be considered and mentioned for panel in operation time by Vendor in related documents.) and also it shall be designed to prevent damage to the actuator due to the high hydraulic pressure or entry of dirty oil to the actuator.

- SSSV actuator swept volume:250 CC(for wells W008N, W018S)
- SSSV actuator swept volume:19 CC(for well W028,W035)
- SSV actuator swept volume: 6000 CC
- SSSV opening / closure time: 5-10 / 2-5 Second
- SSV opening / closing time: 270 / 14-38 Second
- SSSV Crack open hydraulic pressure:5000 PSI
- SSV Crack open hydraulic pressure:2500 PSI
- SSSV Actuator Hydraulic Design Pressure:5000 PSI
- SSV Actuator Hydraulic Design Pressure: 5000 PSI
- SSSV Maximum Working Pressure: 3500 PSI (for wells W008N, W018S)
- SSSV Maximum Working Pressure: 4950 PSI(for well W028,W035)
- SSV Maximum Working Pressure: 2500 PSI
- SSV Minimum Working Pressure: 600 PSI

Two hydraulic pressure levels are required for this panel. High hydraulic pressure for actuation of SSSV (5000, to be finalized as per process data), medium pressure for actuation of SSV (2500 PSI, to be finalized as per process data). Suitable dedicated regulator to be considered by vendor to Supply medium-pressure hydraulic level from high pressure line.

For panel logics and fusible plug the nitrogen pressure is required.



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Vendor shall supply the accumulators for HP, MP supplies headers with suitable volume to avoid fluctuation in supplied pressure and prevent the damage the SSV and SSSV.

Vendor is responsible for define suitable pressure levels according to above information. Vendor shall send queries in case any further details are needed.

Open /close status indicator (green/red colored) for SSV and SSSV, pressure gauges for hydraulic line to SSV/SSSV and pressure gauges/low alarm indicators for nitrogen headers and high/low alarm indicators for flow line pressure before/after choke shall be considered in panel drawers face dedicated for each well, (Note: all the indicators in panel face shall be finalized by CLIENT requirement and vendor recommendation).

Independent commands headers for SSSV and SSV (after hydraulic pump) to be considered by Vendor.

The Nitrogen bottles and pumps will be used as back-up for generating required high and medium pressure levels. Low pressure N2 bottle shall also supply for logics and fusible plugs.

#### 4.3 PUMPS



Two types of pumps are required to be installed in the panel for recovering the pressure of hydraulic lines due to leakage of system in long term or start-up.



- For manual applications, hand pump shall be used. This pump will be installed inside the panel to pressurize the hydraulic system to the highest pressure level in the panel.
- To keep the pressure of hydraulic line in normal operation, a N2 driven pump is needed to generate the highest pressure level in the panel.

In addition to above mentioned pumps, required connection and valves to be considered in panel battery limit ,as a feasibility for extra portable hand pump connection, to be used in emergency condition (while automate/manual pumps inside panel are out of service).

The N2 driven pump shall operate automatically for start-up at normal operation (pressurized by nitrogen bottles) except it hand pump shall operate.

Both hand pump and a N2 driven pump shall be able to produce hydraulic pressure up to 5000PSI separately.

Vendor is responsible to consider any more intensifier sets to achieve best panel performance guarantee if required.

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#### 4.4 NITROGEN BOTTLES (2 SEPARATED BANKS)



The Nitrogen bottles and pumps will be used as back-up for generating required high and medium pressure levels. Low pressure N2 bottle shall also supply for logics and fusible plugs.

Two set of Nitrogen bottles shall be supplied Nitrogen gas for N2 driven pump, logics and fusible plugs. The WHCP Vender is responsible for design of suitable pressure, volume and number of Nitrogen bottles for each HP, MP supplies headers .for calculation of pressure, volume and numbers of Nitrogen bottles both of below notes to be considered together (As minimum, bottles with capacity of 50 liter with quantity: 4 main bottles and 4 reserved bottles shall be considered),

Requirement Nitrogen Gas for N2 Driven Pump Supply At Least for Two Times Actuation of Each Valves (SSV and SSSV) is required

Requirement Nitrogen gas for N2 driven pump supply at least six months operation of WHCP without refill is needed at worst scenario (for each of Nitrogen banks)

Necessary requirements shall be provided by vendor for changeover between sets of nitrogen bottles so reserved one could be in service without any interrupt so low pressure bottles could be recharged or replaced.

Two nitrogen headers shall be provided for main and reserved bottles. Each nitrogen header shall be supplied with a pressure gauge



#### 4.5 MANIFOLDS AREA

Each flow line connection to the manifold will be furnished with an ESD valve and two pressure transmitters, one for high high and low low pressure. In case of high high and low low pressures a signal will be sent to ESD to close the ESD valve 1701 A~F.

Flow rate of fluid from wells and pressure of manifolds is controlled by FIC(cascade control with Level of separator signal to be removed based on P) on each flow line. Function: FIC-1701 A~F on flow lines keep the flow rate of each flow line and consequently the pressure of manifold at their set points also manage increase of existing bank level by duplicating analogue signal of level in existing control panel. FIC-1701A~F closes valve when the flow increases over set point value and opens valve when the flow rate of flow line decreases below the set point value. Manual set point for control could be also implemented from new DCS system through a selector switch depend on operator preference.

control/ESD/F&G for new manifold system will be installed in existing control room of Binak Cluster unit. All signals shall be transferred to new systems by hard wire.

In manifold, Electrical and Instrument Post" adopted to provide control, safeguard of the manifold facilities.

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All the monitoring process parameters of new lines will be displayed on DCS graphic screens at receiving area.

In manifold, the closed drain header receives fluid from an emergency relief from PSVs and collecting maintenance drains from the area during Operation such as manual de-pressurizing and maintenance.