طرح نگهداشت و افزایش تولید ۲۷ مخزن

PIPING MATERIAL SPECIFICATION

نگهداشت و افزایش تولید میدان نفتی بینک

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Status:

IDC: Inter-Discipline Check
IFC: Issued For Comment
IFA: Issued For Approval
AFD: Approved For Design
AFC: Approved For Construction
AFP: Approved For Purchase
AFQ: Approved For Quotation
IFI: Issued For Information
AB-R: As-Built for CLIENT Review
AB-A: As-Built –Approved

REVISION RECORD SHEET

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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 CLIENT (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 CLIENT (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.

2.0 SCOPE

The purpose of this specification is to supplement the requirements for BINAK new wellhead facilities and manifold extension.

3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

- IPS-E-TP-350(1) Engineering Standard for Linings
- IPS-M-PI-110(1) Material and Equipment Standard for Valves
- IPS-M-PI-150(2) Material Standard for Flanges and Fittings
- IPS-M-PI-190(3) Material and Equipment Standard for Line Pipe
- IPS-E-PI-140(1) Engineering Standard for Onshore Transportation Pipelines
- IPS-E-PI-221(1) Engineering Standard for Piping Material Selection
- IPS-E-PI-240(2) Engineering Standard for Plant Piping System

3.2 INTERNATIONAL CODES AND STANDARDS

- ASME B1.20.1 Pipe Threads General Purpose (Inch)
- ASME B16.5 Steel Pipe Flanges And Flanged Fittings
- ASME B16.9 Factory–Made Wrought Steel Buttwelding Fittings
- ASME B16.10 Face To Face And End To End Dimension Of Valve
- ASME B16.11 Forged Steel Fittings, Socket Welding And Threaded
- ASME B16.21 Nonmetallic Flat Gaskets For Pipe Flanges
- ASME B16.25 Butt-Welding Ends
- ASME B16.34 Steel Valves, Flanged And Buttwelding Ends
- ASME B16.48 Steel Line Blanks
- ASME B18.2.1 Square And Hex. Bolts And Screws, Inch Series
- ASME B18.2.2 Square And Hex. Nuts
- ASME B31.3 Process Piping
- ASME B31.4 Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids
- API 5L Specification For Line Pipe
- API 6D Pipeline Valves
- API 599 Steel Plug Valves, Flanged Or Buttwelding Ends
- API 600 Steel Gate Valves, Flanged And Buttwelding Ends
- API 601 Metallic Gaskets For Piping, Double-Jacketed, Corrugated And Spiral Wound
- API 602 Compact Steel Gate Valves
- API 6FA Specification for Fire Test For Valves

- API 608 — Metal Ball Valves-Flanged, Threaded, and Welding End
- BS-1868 — Flanged And Butt-Welding Ends Steel Check Valves For Petroleum And Petrochemical Industries
- BS-1873 — Flanged And Butt-Welding Ends Steel Globe Valves For Petroleum And Petrochemical Industries
- BS EN ISO 17292 — Metal ball valves for petroleum, petrochemical and allied industries
- BS EN ISO 15761 — Steel gate, globe and check valves for sizes DN 100 and smaller, for the petroleum and natural gas industries
- BS 6775 (PART 2) — Testing Of Valve Specification For Fire Type Testing Requirement
- MSS SP-83 — Class 300 and 6000 pipe unions, socket welding and threaded
- MSS SP-80 — Bronze Gate, globe angle and check valves
- MSS SP-95 — Swage Nipples And Ball Plugs
- MSS SP-97 — Forged Carbon Steel Branch Olet Fittings
- MSS SP-120 — Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
- ANSI/NACE MR0175/ ISO 15156 — Petroleum And Natural Gas Industries - Materials For Use In H2S Containing Environments In Oil And Gas Production

3.3 THE PROJECT DOCUMENTS

- BK-GNRAL-PEDCO-000-PR-DC-0001 — Process Design Criteria
- BK-SSGRL-PEDCO-110-PI-CN-0001 — Piping Wall Thickness Calculation
- BK-SSGRL-PEDCO-110-PI-RT-0001 — Piping Corrosion Study & Material Selection Report

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.

4.0 ABBREVIATIONS

# :	CLASS
A/G:	ABOVE GROUND

ASB :	ASBESTOS
BB :	BOLTED BONNET
BC :	BOLTED COVER
BE :	BEVEL ENDS
BLE :	BEVELED LARGE END
BW :	BUTT WELDING
C.A:	CORROSION ALLOWANCE
CONC :	CONCENTRIC
CS :	CARBON STEEL
ECC :	ECCENTRIC
FB:	FULL BORE
FLGD:	FLANGED
FR :	FLAT RING
GJ. :	GASKET JOINT
GO:	GEAR OPERATED
GR. :	GRADE
HEX :	HEXAGONAL
HO:	HANDWHEEL OPERATED
LR :	LONG RADIUS
MO:	MOTOR OPERATED
NB :	NOMINAL BORE
NPS :	NOMINAL PIPE SIZE
NPT:	NOMINAL PIPE THREAD
OS&Y :	OUTSIDE SCREW & YOKE
PBE:	PLAIN BOTH END
PSE :	PLAIN SMALL END
PTFE:	POLYTETRAFLUOROETHYLENE
RB :	REDUCED BORE
RED :	REDUCER/REDUCING
RF :	RAISED FACE
S.S.:	STAINLESS STEEL

SB :	SCREWED BONNET
SCH :	SCHEDULE
SCR'D :	SCREWED
SF :	SERRATED FINISH
SG :	SCREWED GLAND
SMLS :	SEAMLESS
SPW :	SPIRAL WOUND
STD :	STANDARD
SW :	SOCKET WELDING
TBE :	THREADED BOTH ENDS
THK :	THICKNESS
THRD:	THREADED
TLE :	THEREADED LARGE END
TR :	TRIM
TSE :	THEREADED SMALL END
UB :	UNION BONNET
W.T :	WALL THICKNESS
WB :	WELDED BONNET
WN :	WELDING NECK
XS :	EXTRA STRONG
XXS :	DOUBLE EXTRA STRONG

5.0 PIPING COMPONENTS

5.1 PIPE

5.1.1 For carbon steel pipes, dimensions shall conform to ASME B36.10M or API 5L where applicable. The nominal thickness for "Stainless Steel Pipe" shall be selected in accordance with ASME B36.19. Tolerances of pipes shall meet the requirements of IPS-M-PI-190(3).

5.1.2 End pipe for sizes 1/2" to 1 1/2" shall be plain end, for size 2"and above shall be beveled end. End of galvanized pipe shall be threaded.

5.1.3 For all Materials Carbon Content and CE=C+ (Mn/6) + (Cu+Ni)/15 + (Cr+Mo+V)/5 shall meet the requirements of IPS-M-PI-190(3). In addition, all the main piping and related

materials shall be according to the requirements of NACE MR 0175 / ISO 15156 and IPS-M-PI-190(3) for sour services.

5.1.4 Pipes with sizes 1/4",3/8",1¼",2½",3½",4½",5",7",9",14",18",22",shall not be used, except as may be required by equipment connections.

5.2 FITTING

5.2.1 Dimensions and tolerances for butt-weld fitting (be normally used for nominal diameter 2" and larger) shall conform to ASME B16.9.

5.2.2 Dimensions and tolerances for Socket weld fittings and/or screwed fitting (be normally used for nominal diameter 1 1/2" and smaller) shall conform to ASME B16.11.

5.3 FLANGES

5.3.1 Machining shall be in accordance with ASME B16.5. Roughness of RF shall be between 3.2 and 6.3 micrometers (125 to 250 micro inches AARH)

5.3.2 Orifice flanges shall conform to ASME B16.36. Quantities shown on Material Requisition must be understood as "pair" of orifice flanges supplied with assembly bolting.

5.4 VALVES

5.4.1 All socket welded ball valves of nominal sizes ½" to 1 ½" shall have extended ends (Sch. 160 nipples) with an overall length of 400mm.

5.4.2 Valve trim numbers for gate, globe and check valves are as API 600 (2015) Table 8.

5.5 GASKETS

5.5.1 Spiral wound gaskets shall conform to ASME B16.20 and Non-metallic flat gaskets shall conform to ASME B16.21.

5.6 BOLTS AND NUTS

5.6.1 Thread shall be in accordance with ASME B1.1 and Nuts shall conform to ASME B18.2.2.

5.6.2 Stud bolts shall be threaded full length and chamfered both ends. Length for standard flange assembly shall be in accordance with ASME B16.5. Stud bolts shall be supplied with 2 Heavy Hex nuts.

5.7 BRANCH CONNECTIONS

5.7.1 Branches shall be as specified in the individual line classes.

5.7.2 For pipe line to be pigged, tee or branch with 40% or more of the main line diameter shall be equipped with scraper guide bars.

6.0 GENERAL TESTING REQUIRMENTS

6.1 Pressure testing of the following piping shall be in accordance with ASME B31.3 test procedures. The test pressure shall be held for a sufficient time to allow detection of any leaks and for a minimum time of 1 hour.

a) Metallic piping including carbon steel, lined carbon steel, stainless steel, corrosion resistant alloys and ductile iron but excluding copper shall normally be tested at 1.5 x the design pressure.

7.0 PIPING AND PIPELINE CLASSES

7.1 PIPING CLASSES NUMBERING

Each piping class is identified from two alphabetical characters which precede a two digit figure. The first alphabetical character indicates pressure rating of flange and the second alphabetical character indicates material as follows:

1st alphabetical character		2nd alphabetical character	
A	Class 150	N	Carbon Steel
C	Class 300	S	Stainless Steel
F	Class 600	X	Non Metal Pipe
G	Class 900	Z	Galvanized Carbon Steel
H	Class 1500		
L	Class 3000		
M	Class 5000		

The third figure indicates the design code and the forth figure indicates corrosion allowance for metallic as follows

3rd figure		4th figure for metal pipe			4th figure for non-metal pipe	
Fig.	**Design standard**	**Fig.**	**C.A.**	**NACE MR 0175 / ISO 15156 Requirement**	**Fig.**	**Material type**
0	ASME B 31.3 (For Inside of Plant)	0	0 mm	No	1	GRE
		1	1 mm	No	2	PE
1	ASME B 31.4 (For Liquid Pipeline)	2	1 mm	Yes	3	RTP (Reinforced Thermoplastic pipe)
		4	3 mm	No		
2	ASME B 31.8 (For Gas Pipeline)	5	3 mm	Yes		
		6	6 mm	No		
		7	6 mm	Yes		

7.2 SUMMARY OF PIPING AND PIPELINE CLASSES

Table 1: piping classes

Piping Class	ANSI Rating /Facing	Max Pipe Size (In)	Base Material	Max. TEMP. °C	NACE MR 0175 / ISO 15156 Req.	C.A. (mm)	Service
AN01	150/RF	10	Carbon Steel	85	---	1	Diesel Oil
AN04	150/RF	16	Carbon Steel	85	---	3	Plant Air, Fire Water (AG)
AN05	150/RF	16	Carbon Steel	85	Yes	3	Crude Oil , Close Drain, Condensate, Fuel Gas
AX02	150/RF	4	HDPE	85	---	0	Fire Water(UG), Potable Water(UG)
AZ00	150/RF	4	Carbon Steel+Hot Dip Galv.	85	---	0	Instrument Air<4", Potable Water
AS00	150/RF	2	Stainless Steel	85	---	0	Chemical
CN05	300/RF	12	Carbon Steel	85	Yes	3	Crude Oil, Condensate
CS00	300/RF	2	Stainless Steel	85	---	0	Chemical
FN05	600/RF	6	Carbon Steel	85	Yes	3	Crude Oil
AN15	150/RF	4	Carbon Steel	85	YES	3	Crude Oil (Burn Pit)
LN15*	3000/RTJ	6	Carbon Steel	85	YES	3	Crude Oil
LN17*	3000/RTJ	6	Carbon Steel	85	YES	6	Crude Oil
MN17*	5000/RTJ	6	Carbon Steel	85	YES	6	Crude Oil

*Note: Test Pressure for individual wellhead components such as valves, flanges, stone traps and,… which are fabricated based on API 6A, will be specified based on this standard and minimum required thickness (t) to tolerate these test pressures has been summarized below based on Barlo's formula and 90% of SMYS:

$t=PD/(2*(90\%S)$

Where:

t: Minimum Required Thickness for Specified Test Pressure (mm)

P: Test Pressure based on API 6A (psi)

D: External Pipe Dia. (168.3 mm)

S: Specified Minimum Yield Strength (52000 psi)

Class	P(psi)	t (mm)
LN15	6000	10.79
LN17	6000	10.79
MN17	7500	13.49

Test Pressure at filed will be calculated based on design pressure and Specification for Pipeline Flushing, cleaning and hydrostatic testing document No.: BK-GENRAL-PEDCO-000-PL-SP-0008.

8.0 CLASS DESCRIPTION

Class description has been summarized in Attachment #1.