طرح نگهداشت و افزایش تولید ۲۷ مخزن

HAZOP REPORT FOR PIPELINE

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
FI: Final Issue

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, New Gas/Condensate Pipelines (from Binak New GCS to Siahmakan GIS/Binak PU) shall be constructed.

GENERAL DEFINITION

The following terms shall be used in this document.

CLIENT:	National Iranian South Oilfields Company (NISOC)
PROJECT:	Binak Oilfield Development – Surface Facilities; Gas & Gas-Condensate Pipelines
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 HAZOP study covers all P&IDs for Gas & Gas-Condensate Pipelines. The list of P&IDs is presented in appendix B.

3.1 NORMATIVE REFERENCES

3.2 INTERNATIONAL CODES AND STANDARDS

- IEC 61882:2016 Hazard and Operability studies (HAZOP Studies) – Application guide

3.3 THE PROJECT DOCUMENTS

- BK-GNRAL-HD-000-PR-DB-0001-D05 Process Basis of Design

4.1 PURPOSE

The purpose of this document is to provide the results of “HAZOP Study” for **Binak Oilfield Development – Surface Facilities; Gas & Gas-Condensate Pipelines**.

The objective of HAZOP study is to perform and achieve the following tasks and goals as far as practicable given the latest piping and instrumentation diagrams (P&ID’s) to identify any potential hazards associated with the system and its utility systems:

- To identify any potential operating difficulties,
- Examine the effectiveness of those measures already incorporated in the design to mitigate the frequency and/or consequences of such hazards;
- To raise action items for addressing those hazards that the present design does not satisfactorily address.

5.0 HAZOP STUDY OVERVIEW

Meeting was conducted in one session at June 25, 2022 held in Neyshekar Hotel main meeting hall, Ahvaz.

A team comprising of experts from different disciplines of National Iranian South Oilfields Company (NISOC), Petro Iran Development Company (PEDCO) and Hirgan Energy Company conducted the study with a third-party HAZOP Chairman and Scribe. The list of team members is presented in appendix A.

6.0 PROCEDURE

The review methodology will be the "Guide Word" HAZOP technique and will be performed in accordance with the guidelines published by the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE) and also noted in IEC 61882.

The purpose of the review should not be only to resolve the action items but also to identify credible deviations from the design intent. The method identifies hazards and postulates possible accident sequences resulting from such hazards; Innovative thinking then identifies the consequences of these scenarios. The process demonstrates to the Owner/Management that prudent steps which have been taken to provide a safe installation and operation.

The scope of the HAZOP shall be therefore, on identifying potential process hazards or operability concerns, not on finding solutions to reduce or eliminate these concerns. Attempting to solve problems by the HAZOP team can result in a long and inefficient study process. At the same time, the HAZOP study cannot be intended as a review of Project Design Basis and Operating Philosophies, since these must be considered as resolved when the HAZOP study will be carried out.

Each system or equipment should be divided into subsystems by consensus of the review team. The selected system shall be identified by a study node numbers and for easy reference a color code can also be inserted on the related P&ID prior to the review and worksheet during the review.

List of possible parameters and guidewords

Deviations	Guide Word	Parameter
No/Less Flow	No/Less	Flow
More Flow	More	Flow
Reverse/Misdirected Flow	Reverse/Misdirected	Flow
High Temperature	High	Temperature
Low Temperature	Low	Temperature
High Pressure	High	Pressure
Low Pressure	Low	Pressure
High Level	High	Level
Low Level	Low	Level
Maintenance Hazards	Other than	Maintenance
Leakage	As well as	Flow

eviations	Guide Word	Parameter
Corrosion	As well as	Operation
Composition	As well as	Composition
Start-up/Shutdown Hazards	Other than	Start-up/Shutdown
Loss of Utilities	Other than	Operation
Miscellaneous	As well as	Operation

7.0 HAZOP OUTCOMES

In order to facilitate the study, the process was broken down into 2 nodes. The node list is presented in appendix C. A total of 14 recommendations were obtained which are shown in appendix D. The recommendations are categorized in two groups, namely OPEN and CLOSED.

Closed recommendations are those that the team have arrived at a consensus that it is required to be done. 14 closed recommendation were obtained in the meetings. Open recommendations are those that need more information from vendor for the final decision. Zero open recommendations were proposed during the meetings.

Appendix E consists of detailed HAZOP Worksheets of the study.

8.1 ATTACHMENTS

8.2 APPENDIX A –TEAM MEMBERS

First Name	Last Name	Company	Expertise
S.Mehdi	Ashrafian	NISOC	Project Manager
Shamsolah	Bahadori	NISOC	Construction Manager
Fatemeh	Ghodsi	NISOC	Head of I&C
Mohammad	Torfi	NISOC	Process
Sahar	Saba	NISOC	Process
Niloofar	Rezaei Baba ahmadi	NISOC	Process
Mohammad Reza	Cheraghchi	NISOC	Process
Fazel	Moafi	NISOC	Instrument
Behzad	Zandian	NISOC	Instrument
Peyman	Sarvarian	NISOC	Mechanic
Hojjat	Jafarpour	NISOC	Mechanical
Faride	Parvin	NISOC	Mechanical
Mohammad	Khamisi	NISOC	HSE
Mohammad	Shirali	NISOC	Commissioning
Ali	Hamidan	NISOC	Commissioning
Naji	Hamid	NISOC	Commissioning
Khodadad	Kavosi	NISOC	Commissioning
Reza	Gholgheysari	NISOC	Process Engineer
Mobin	Saeedi	NISOC	Instrument
Mohammad	Bakhshi Mohammadi	Gachsaran NISOC	Production Engineer
Shahram	Valizadeh	Gachsaran NISOC	Production Engineer
Vahid	Mussavi	Gachsaran NISOC	Production Engineer
Mohammad	Fakoor	PEDCO	Process Engineer
Farshid	Amiri	PEDCO	Piping Lead Engineer
Hadi	Mozaffari	PEDCO	Electrical Engineer
Mahdi	Karimi	PEDCO	Head of Electrical Department
Pouria	Bavarsad	PEDCO	Piping Engineering
Sadegh	Gharacheh	PEDCO	Process
Morteza	Taherkhani	PEDCO	Head of I&C
Sepideh	Akbari	PEDCO	I&C Engineer
Sasan	Faramarzpour	PEDCO	Head of Process and Safety Department

First Name	Last Name	Company	Expertise
Pouya	Maleki	PEDCO	Process Engineer
Mehdi	Sadeghian	PEDCO	Surface Manager
Vahid	Abdeshadi	PEDCO	Project Engineer Manager
Masoud	Asgharnejad	Hirgan Energy	Engineering Manager
Mohsen	Aryafar	Hirgan Energy	Process
Saeed	Ghanbari	Hirgan Energy	Process
Parisa	Hajisadeghi	Hirgan Energy	Head of I&C
Mohammad	Fakharian	Hirgan Energy	Project Manager
Ali	Baghaei	HAZOP Consultant	Process Safety
Firoozeh	Khosravi	HAZOP Consultant	Process Safety

8.1 APPENDIX B – DRAWINGS LIST

Drawing No.	Drawing Title	Place(s) Used
BK-PPL-PEDCO-320-PR-PI-0001_D03	Gas Pipeline (to Siahmakan G.I. Station) (3 sheets)	Nodes: 1
BK-PPL-PEDCO-320-PR-PI-0002_D03	Condensate Pipeline (to Binak PU)	Nodes: 2

8.1 APPENDIX C – NODES LIST

Nodes	Color	Type	Drawings	Equipment ID	Date
1. Gas Pipeline (to Siahmakan G.I. Station)	L Blue	Line	BK-PPL-PEDCO-320-PR-PI-0001_D03	PL-3201	1. 06/25/2022
		Pig Receiver		PR-3201	
		Pig Launcher			
2. Condensate Pipeline (to Binak PU)	Violet	Line	BK-PPL-PEDCO-320-PR-PI-0002_D03	-	1. 06/25/2022

8.1 APPENDIX D – RECOMMENDATIONS LIST

Recommendations	Place(s) Used	Responsibility	Status
1. Proxy limit switch signal of ESDV-3201 should be routed directly to DCS.	Consequences: 1.1.2.2	Contractor	Closed
2. Define high alarm on PIC-2152.	Consequences: 1.1.3.1	Contractor	Closed
3. Consider startup/backup instrument gas for LBV-3201 and LBV-3202.	Consequences: 1.1.4.1	Contractor	Closed
4. Pig signaler ZS-3201 should be changed to local indicator (flag type).	Consequences: 1.7.1.1	Contractor	Closed
5. Pig receiver barrel should be shown concentric on P&ID.	Consequences: 1.7.1.1	Contractor	Closed
6. Remove pig launcher/receiver and PL-3201, PR-3201 door position indicator.	Consequences: 1.7.1.1	Contractor	Closed
7. Remove spectacle blind of ESDV-3202.	Consequences: 1.7.1.1	Contractor	Closed
8. Note on PID that pig launcher and receiver doors are equipped with mechanical interlock to prevent opening before depressurizing.	Consequences: 1.7.1.1	Contractor	Closed
9. Relocate balance line of PL-3201 to launcher side of kicker line block valve.	Consequences: 1.7.1.1	Contractor	Closed
10. Relocate balance line of PR-3201 to receiver side of kicker line block valve.	Consequences: 1.7.1.1	Contractor	Closed
11. Remove corrosion inhibitor injection, CC and CP from pig launcher P&ID.	Consequences: 1.7.1.1	Contractor	Closed
12. Remove insulation joint of 4" condensate pipeline.	Consequences: 2.1.1.1	Contractor	Closed
13. Check requirement for installation of check valve at tie-in point (TP05) of 4" condensate pipeline.	Consequences: 2.1.1.1	Contractor	Closed
14. Show on PID of 4" condensate pipeline drain and vent connections and spectacle blind.	Consequences: 2.1.1.1	Contractor	Closed

8.1 APPENDIX E – HAZOP WORKSHEETS

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 1. No/Less Flow

Causes	Consequences	Safeguards	Recommendations
1. Decreased flow of dehydrated gas from upstream	1. No hazardous consequence		
2. ESDV-3201 closed by failure or error	1. Loss of gas to downstream		
	2. Increased pressure upstream of valve with possibility of damage	1. High pressure protection at compressor discharge	1. Proxy limit switch signal of ESDV-3201 should be routed directly to DCS.
		2. Limit switch on valve	
3. Blockage of pipeline during pig	1. Increased pressure upstream of blocked point with possibility of damage	1. High pressure protection at compressor discharge	2. Define high alarm on PIC-2152.
4. LBV-3201 or LBV-3202 closed by failure	1. Increased pressure upstream of valve with possibility of damage	1. High pressure protection at compressor discharge	3. Consider startup/backup instrument gas for LBV-3201 and LBV-3202.
	2. Decreased pressure downstream of valve with no hazardous consequence		
5. ESDV-3202 closed by failure or error	1. Increased pressure upstream of valve with possibility of damage	1. High pressure protection at compressor discharge	
		2. Limit switch on valve	
6. Rupture in pipeline due to corrosion, TPD, landslide, etc	1. Severe environmental impact	1. LBV-3201	
		2. LBV-3202	
		3. PALL-3201 that will activate ESD-1 and close ESDV-3201	

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 2. More Flow

Causes	Consequences	Safeguards	Recommendations
1. No issue was identified			

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 3. Reverse/Misdirected Flow

Causes	Consequences	Safeguards	Recommendations
1. Check valves are considered where required			

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 4. Low Temperature

Causes	Consequences	Safeguards	Recommendations
1. Depressurizing for maintenance	1. Possibility of hydrate formation and freezing	1. Operating procedure to depressurize at defined time length	

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 5. High Pressure

Causes	Consequences	Safeguards	Recommendations
1. External fire case for pig launcher	1. Damage to equipment	1. PSV-3201	
2. External fire case for pig receiver	1. Damage to equipment	1. PSV-3202	

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 6. Low Pressure

Causes	Consequences	Safeguards	Recommendations
1. No new issue was identified			

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 7. Miscellaneous

Causes	Consequences	Safeguards	Recommendations
1. See Recommendation			4. Pig signaler ZS-3201 should be changed to local indicator (flag type).
			5. Pig receiver barrel should be shown concentric on P&ID.
			6. Remove pig launcher/receiver and PL-3201, PR-3201 door position indicator.
			7. Remove spectacle blind of ESDV-3202.
			8. Note on PID that pig launcher and receiver doors are equipped with mechanical interlock to prevent opening before depressurizing.

Node: 1. Gas Pipeline (to Siahmakan G.I. Station)

Deviation: 7. Miscellaneous

Causes	Consequences	Safeguards	Recommendations
			9. Relocate balance line of PL-3201 to launcher side of kicker line block valve.
			10. Relocate balance line of PR-3201 to receiver side of kicker line block valve.
			11. Remove corrosion inhibitor injection, CC and CP from pig launcher P&ID.

Node: 2. Condensate Pipeline (to Binak PU)

Deviation: 1. Miscellaneous

Causes	Consequences	Safeguards	Recommendations
1. See Recommendation			12. Remove insulation joint of 4" condensate pipeline.
			13. Check requirement for installation of check valve at tie-in point (TP05) of 4" condensate pipeline.
			14. Show on PID of 4" condensate pipeline drain and vent connections and spectacle blind.

8.1 APPENDIX F – MARKED-UP P&IDS