



نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض

احداث خطوط انتقال گاز/مایعات گازی از ایستگاه تقویت فشار گاز بینک
تا ایستگاه تزریق گاز سیاهمکان/واحد بهره برداری بینک



شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

HAZID Report For Pipeline

نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادر کننده	بسته کاری	پروژه
D01	0003	RT	GE	320	PEDCO	PPL	BK

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طرح نگهداشت و افزایش تولید ۲۷ مخزن

HAZID REPORT FOR PIPELINE

نگهداشت و افزایش تولید میدان نفتی بینک

D01	OCT. 2022	FI	F. Nourai	M.Fakharian	M.Mehrshad	
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- 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
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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, 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 – Construction of Well Location, Wellhead Facilities, Electrification Facilities, Flowlines for W007S 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 scope of HAZID Study covers Gas & Gas-Condensate Pipelines.

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3.1 NORMATIVE REFERENCES

3.2 INTERNATIONAL CODES AND STANDARDS

- ISO 17776 Petroleum and natural gas industries — Offshore production installations — Major accident hazard management during the design of new installations

3.3 THE PROJECT DOCUMENTS

- BK-GNRAL-HD-000-PR-DB-0001-D05 Process Basis of Design
- BK-PPL-PEDCO-320-PI-PY-0001 Unit Plot Plan Drawing For Pig Receiver Area (in Siahmakan G.I. Station)
- BK-PPL-PEDCO-320-PI-PY-0002 Unit Plot Plan For Binak Production Unit

4.0 HAZID STUDY OVERVIEW

Meetings were conducted in one session on July 23, 2022 held in Horgan Energy company office, Tehran.

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

5.0 ABBREVIATIONS

ERP	Emergency Response Plan
IP	Ingress Protection
LBV	Line Break valve
LDAR	Leak Detection and Repair
PACS	Project Applicable Codes and Standards
PG	Pressure Gauge
PPE	Personal Protective Equipment
ROW	Right of Way
SOP	Standard Operating Procedure
TPD	Third-Party Damage
VOC	Volatile Organic Carbon

6.1 PROCEDURE

HAZID methodology is in accordance with “HAZID Study Procedure” defined by ISO 17776 checklist.

HAZID study is a tool for hazard identification, used early in a project as soon as process flow

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diagrams, heat and material balances, and plot layouts are available. Existing site infrastructure, weather, and geotechnical data are also required, these being a source of external hazards. The method is a design-enabling tool, influencing HSE deliverables in the project.

HAZID study is undertaken in order to deliver a good identification of hazard, threat control and recovery measures. This Study helps to ensure that:

- ✓ Major Hazards with potential to affect personnel, environment and assets are revealed and identified at an early stage in the project, before significant costs have been incurred
- ✓ Hazards are recorded so that they can be avoided, mitigated or highlighted during design
- ✓ Design or construction delays and budget over-runs are avoided
- ✓ Fewer hazards remain un-revealed at commissioning and operation of facilities

6.2 STUDY METHODOLOGY

A structured approach to identify hazards will be utilized based on studying the various operational phases of the under-study plant through:

- ✓ Identifying hazards.
- ✓ Describing their failure modes.
- ✓ Suggesting risk reducing measures that can prevent or mitigate each hazard.

The approach to HAZID is using generic guidewords, generic hazard specified for each hazard identified, the causes (threats), consequences and preventative/mitigation measures identified for the event. Recommendations are recorded when the preventative/mitigation measures do not adequately reduce the risk of the hazard.

HAZID formulates a list of hazards and generic hazardous situations by considering the following process characteristics:

- ✓ Impact of the facility to its surroundings
- ✓ Impact of the surroundings to the facility
- ✓ Interference between main units
- ✓ Location / orientation of plant and equipment
- ✓ Location / orientation of plant and equipment
- ✓ Unplanned releases for isolatable sections or units
- ✓ Environmental hazards and natural hazards.

As each hazardous situation is identified, the causes (threats), consequences, and threats control, recovery measures are listed.

For this study, safety analysis will be performed using selected items from the checklist of ISO

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17776 standard for hazard categories and guidewords that lead to create a picture of hazardous situations and then to analyze and specify preventative/mitigation measures typical to the facilities under study. The checklist is presented in Appendix B. Brainstorming approach is an integral part of HAZID study, which is to be performed using a team composed of client, contractors, and subcontractors delegates and a HAZID Leader.

6.3 HAZID REPORTING FORMAT

Results of the HAZID study will be presented in a worksheet that tabulates the causes (threats), consequences, safeguards (Threat Control & Recovery Measures) and recommendations for each hazard identified. The method used for recording is full recording, i.e., all hazard hierarchy relevant to the context were considered and all operational issues or hazardous consequences were recorded along with any other outcome that may not raise a concern, for the sake of completeness and audit ability.

Where the existing safeguards are found to be inadequate for the hazard, recommendations will be raised. Therefore, from the worksheets it should be inferred that wherever the hazard has no recommendation, its corresponding safeguards are considered adequate.

Sample Format for HAZID worksheets

Section:

Hazard Category:

Guideword	Threats (Cause)	Consequences	Threat Control/Recovery Measures	Recommendations

7.0 HAZID STUDY OUTCOMES

A total of 6 recommendations were obtained that are shown in Appendix C. Recommendations are either closed type, i.e., they are final in their description, or open type, which means the final action depends on a study as clearly indicated in the recommendation. One shall note that all recommendations, open or closed, shall be followed up and finalized. Appendix D consists of detailed HAZID Worksheets of the study.

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8.1 ATTACHMENTS

8.2 APPENDIX A –TEAM MEMBERS

First Name	Last Name	Company	Expertise
Fatemeh	Ghodsi	NISOC	Head of I&C
Sahar	Saba	NISOC	Process
Peyman	Sarvarian	NISOC	Mechanic
Mohammad	Khamisi	NISOC	HSE
Farid	Hedayat Rad	NISOC	Instrument
Hasan	Salari	NISOC	Process
Bahman	Zarei	NISOC	Maintenance
Ghasem	Shahrooei	NISOC	Engineering
Seyed Ali	Mousavi	Gachsaran NISOC	Process
Mohammad	Navid	Gachsaran NISOC	Production Engineer
Mohammad	Fakoor	PEDCO	Process Engineer
Farshid	Amiri	PEDCO	Process
Sepideh	Akbari	PEDCO	I&C Engineer
Sasan	Faramarzpour	PEDCO	Head of Process and Safety Department
Mehdi	Sadeghian	PEDCO	Surface Manager
Fereidoun	Noei	PEDCO	Process
Sadegh	Gharacheh	PEDCO	Process
Mohammad	Fakharian	Hirgan Energy	Project Manager
Masoud	Asgharnejad	Hirgan Energy	Engineering Manager
Mohsen	Aryafar	Hirgan Energy	Process
Parisa	Haji Sadeghi	Hirgan Energy	Head of I&C
Amir Hossein	Saber	Hirgan Energy	Process Safety
Faramarz	Mosayeb Nejad	Hirgan Energy	Piping
Farshad	Nourai	Consultant	HAZID Leader

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8.1 APPENDIX B –HAZARD CATEGORIES (ISO 17776)

Hazard Category
1. Hydrocarbons
2. Refined Hydrocarbons
3. Other Flammable Materials
4. Hazards Associated with Difference in Height
5. Environmental Hazards
6. Dynamic Situation Hazards
7. Open Flame
8. Electricity
9. Toxic Gases
10. Entrapment

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8.1 APPENDIX C – RECOMMENDATIONS LIST




Recommendations	Responsibility	Place(s) Used
1. Consider LDAR program for operation phase.	N	Consequences: 1.1.4.1
2. Plan for development of environmental contingency plans incl. communication with local meteorological institute.	N	Consequences: 5.2.1.2, 8.1.1.2
3. Develop a procedure for minimizing site work in times of extreme environmental conditions and provide adequate and appropriate PPE.	N	Consequences: 5.2.4.2
4. Consider installing a fixed barrier in front of Pig Receiver door in case of pig throw.	C	Consequences: 6.2.1.1
5. Plan for improving process safety culture, effectiveness of training and enforcing appropriate PPE.	N	Consequences: 10.1.1.1
6. Plan for development of ERP for Siahmakan pipeline.	N	Consequences: 10.1.1.1

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8.2 ATTACHMENT E – HAZID WORKSHEETS

Hazard Category: 1. Hydrocarbons

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
1. Condensate	1. Leakage due to corrosion, erosion, or rupture due to TPD, etc.	1.1. Fire and explosion with possibility of injury/fatality	1	B	H	1.1.1. Material selection	3	C	M		
						1.1.2. Corrosion allowance					
						1.1.3. Minimizing dead points and pockets in piping design					
						1.1.4. Drain connections at dead points					
						1.1.5. Maximum allowable fluid velocity to minimize erosion					
	1.2. Environmental pollution	2	B	H	1.2.1. Material selection	3	C	M			
					1.2.2. Corrosion allowance						
					1.2.3. Minimizing dead points and pockets in piping design						
					1.2.4. Drain connections at dead points						
1.3. Loss of product, loss of production and damage	2	B	H	1.3.1. Material selection	3	C	M				
				1.3.2. Corrosion allowance							
				1.3.3. Minimizing dead points and pockets in piping design							

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Hazard Category: 1. Hydrocarbons

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
		to assets in case of fire/explosion, which also causes loss of reputation				1.3.4. Drain connections at dead points 1.3.5. Maximum allowable fluid velocity to minimize erosion					
	2. See also Environmental Hazards category										
	3. Bad Operation or Maintenance due to human error	3.1. Extreme process conditions or overload of equipment, also damage due to impact and similar events, which leads to leakage and fire/explosion or toxic release	2	C	S	3.1.1. Operating manual 3.1.2. Training for the operation phase 3.1.3. Level of automation to minimize human error	3	D	M		



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Hazard Category: 5. Environmental Hazards

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
1. Tectonic	1. Natural disasters like earthquake or other earth movement	1.1. Damage to equipment and possible injury/fatality for personnel	1	B	H	1.1.1. Geotechnical study 1.1.2. Seismic design acc. to PACS 1.1.3. Operational controls like contingency plans, drills, etc. 1.1.4. For other safeguards, see Hydrocarbons category	3	C	M		
		1.2. Possibility of spillage due to earth movement with subsequent pollution problems	3	B	S	1.2.1. Freeboard allowance 1.2.2. LBVs across a seasonal river minimizes water pollution in case of pipeline failure	4	C	L		
2. Weather	1. Flood	1.1. Damage to equipment due to flooding	4	D	L	1.1.1. Environmental design data 1.1.2. Area topology reduces likelihood of flooding 1.1.3. Flood control study based on hydrology survey results	4	E	L		
		1.2. Possibility of soil and water pollution	3	C	M	1.2.1. Area topology reduces likelihood of flooding	3	D	M	2. Plan for development of environmental contingency plans incl. communication with local meteorological institute.	N
	2. High winds,	2.1. Possibility of	3	C	M	2.1.1. Environmental design data	4	D	L		

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض احداث خطوط انتقال گاز/مایعات گازی از ایستگاه تقویت فشار گاز بینک تا ایستگاه تزریق گاز سیاهمکان/واحد بهره برداری بینک							 	
	HAZID Report For Pipeline								
شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	پروژه BK	بسته کاری PPL	صادرکننده PEDCO	تسهیلات 320	رشته GE	نوع مدرک RT	سریال 0003	نسخه D00	شماره صفحه: ۱۶ از ۲۰

Hazard Category: 5. Environmental Hazards

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
	storm	damage to equipment and injury to personnel			H	2.1.2. Mechanical design for structures/piping			M		
	3. Temperature extremes	3.1. Interference in performance of instrumentation	2	B	H	3.1.1. Environmental design data 3.1.2. Sunshade for instrumentation exposed to the sunlight	3	C	M		
		3.2. Damage or performance reduction of sun-exposed electrical equipment	3	A	S	3.2.1. Environmental design data 3.2.2. Sunshade for electrical motors exposed to sunlight 3.2.3. Electrical cables are buried or their covers are suitable for sun exposure	4	B	M		
		3.3. Fatigue, injury and increased risk of human error in case of maintenance	3	A	S	3.3.1. Environmental design data 3.3.2. Operational controls and PPE	4	B	M		
		4. Dust	4.1. Damage to electrical equipment, instrumentation/telecom equipment	2	B	H	4.1.1. Environmental design data 4.1.2. IP protection of instrumentation, telecom and electrical enclosures	3	C	M	


	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض								
	احداث خطوط انتقال گاز/مايعات گازی از ایستگاه تقویت فشار گاز بینک تا ایستگاه تزریق گاز سیاهمکان/واحد بهره برداری بینک								
شماره پیمان:	HAZID Report For Pipeline							شماره صفحه: ۱۷ از ۲۰	
۰۵۳ - ۰۷۳ - ۹۱۸۴	پروژه	بسته کاری	صادرکننده	تسهیلات	رشته	نوع مدرک	سریال		نسخه
	BK	PPL	PEDCO	320	GE	RT	0003		D00

Hazard Category: 5. Environmental Hazards

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
		4.2. Personnel injury and health problems and increased possibility of human error	2	B	H	4.2.1. Environmental design data 4.2.2. Operational controls	2	C	S	3. Develop a procedure for minimizing site work in times of extreme environmental conditions and provide adequate and appropriate PPE.	N

Hazard Category: 6. Dynamic Situation Hazards

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
1. Vehicles in Pipeline ROW	1. TPD	1.1. Leakage or spillage due to impact; see Hydrocarbons category for details	2	C	S	1.1.1. Safe separation distance between access roads and pipeline 1.1.2. For other safeguards, see Hydrocarbons category	3	D	M		
2. Pig	1. Pig Receiver door is opened before barrel adequately depressurized	1.1. Possibility of severe personnel injury or fatality upon	1	B	H	1.1.1. Mechanical interlock on Pig Receiver door 1.1.2. Pressure balance line, vent connection and PGs are provided for the operator to	3	D	M	4. Consider installing a fixed barrier in front of Pig Receiver door in case of pig throw.	C

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض احداث خطوط انتقال گاز/مایعات گازی از ایستگاه تقویت فشار گاز بینک تا ایستگاه تزریق گاز سیاهمکان/واحد بهره برداری بینک								
	HAZID Report For Pipeline							شماره صفحه: ۱۸ از ۲۰	
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	BK	PPL	PEDCO	320	GE	RT	0003	D00	

Hazard Category: 6. Dynamic Situation Hazards



Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
		impact or damage to equipment, etc.			H	control and check barrel pressure 1.1.3. SOP for pigging 1.1.4. Pig sigs are provided for monitoring pig location			M		

Hazard Category: 7. Open Flame

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
1. Not applicable											

Hazard Category: 8. Electricity

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
1. Lightning Discharge	1. Local atmospheric conditions cause lightning strike	1.1. Damage to electrical equipment, instrumentation/telecom equipment	1	B	H	1.1.1. Lightning arrester 1.1.2. Separate discharge wells for electrical, lightning and instrumentation earthing systems with surge diverters	3	D	M		

	نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض							
	احداث خطوط انتقال گاز/مایعات گازی از ایستگاه تقویت فشار گاز بینک تا ایستگاه تزریق گاز سیاهمکان/واحد بهره برداری بینک							
شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴	HAZID Report For Pipeline							شماره صفحه : ۲۰ از ۲۰
	نسخه	سریال	نوع مدرک	رشته	تسهیلات	صادرکننده	بسته کاری	پروژه
	D00	0003	RT	GE	320	PEDCO	PPL	BK

Hazard Category: 10. Entrapment

Hazard	Causes	Consequences	Risk Matrix			Safeguards	Risk Matrix			Recomm.	Resp.
			S	L	RR		S	L	RR		
1. Emergency Case	1. Limited access to escape routes	1.1. In case of accidents in process area, personnel injury with possibility of fatality	1	C	H		1	C	H	5. Plan for improving process safety culture, effectiveness of training and enforcing appropriate PPE.	N
										6. Plan for development of ERP for Siahmakan pipeline.	N