



# Shell Petroleum Development Company of Nigeria

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## Disabling of FYNAG Offshore Pressure Safeguarding Desktop Safety Review Report

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Revision	Date	Description	Originator	Checker	Approver
A01	25-05-2021	Issued for Approval	Izu Iloma	Linda Ajilore	Tawheed Olayiwola

### REVISION PHILOSOPHY

All revisions for review will be issued at R01, with subsequent R02, R03, etc. as required.

All revisions approved for issue or design will be issued at A01, with subsequent A02, A03, etc. as required.

Documents approved for Construction will be issued at C01, C02, and C03 respectively.

Documents or drawings revised as "As built" will be issued as Z01, Z02 Z03 etc.

Narrative sections revised from previous approved issues are to be noted in the table below and/or highlighted in the RH margin (using the appropriate revision status) thus: A02

Previous revision highlighting to be removed at subsequent issues.

Drawings/diagrams revised from previous approved issues are highlighted by 'clouding' the affected areas and by the use of a triangle containing the revision status.

### REVISION HISTORY

Rev. No.	Date of Issue	Reason for change
R01	05-05-2021	Issued for Review and Comments

## EXECUTIVE SUMMARY

This report outlines the methodology and results of the Desktop Safety Review study for the disabling of the offshore pressure safeguarding for the FYNAG well (FORC 153) flowline. The study was held on the 30<sup>th</sup> of April 2021 via Skype virtual meeting.

The objective of the DSR is to identify potential process & operational hazards, failures and operability problems associated with this temporary change on the entire flowline system.

The scope was treated in 1 study node. The DSR participants comprised of representatives from the Asset and various relevant disciplines present at the meetings.

No recommendations were made for resolution and tracked to closure in the subsequent phases of the project.

This report is arranged in a general part relevant to introduction, process description, team members, methodology and findings followed by 3 appendices:

Appendix A: DSR Study Worksheets

Appendix B: Action Completion Sheet

Appendix C: DSR PEFS

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## ABBREVIATIONS

FYIP	Forcados Yokri Integrated Project
MMscf	Million Standard Cubic Feet
NAG	Non-Associated Gas
PEFS	Process Engineering Flow Scheme
PFD	Process Flow Diagram
P&ID	Process & Instrument Drawing
SOP	Standard Operating Procedure
SPDC	Shell Petroleum Development Corporation

## 1.0 INTRODUCTION

### 1.1 Background and Scope

The FYIP NAG FORC 153 (FYNAG) is a Non-Associated Gas Well from Estuary JA Cluster, developed and currently producing to the North Bank CPF facility. The FYIP NAG Well has the potential to supply about 50MMscfd of Gas to the North Bank CPF for processing and onward transportation to the Escravos Lagos Pipeline system. The NAG well fluid is transported via a 6" X 5km DSS flowline fully rated (276barg) up to its inlet Pig receiver kicker line at Northbank CPF; downstream of this are class 900# piping and equipment to the Inlet production manifold of the NAG slug catcher.

The 6" X 5km flowline which was commissioned in November of 2020, though fully rated to the CITHP of the well (276Barg), also has pressure safeguarding instrumentation and Shutdown valves offshore (100-PZS-104A HH, 100-PZS-104B LL, 100-XZV-104) and onshore at the CPF (3123-PZA-001 HH and LL and 3123-UZV-001).

It was observed during commissioning and Startup of the NAG well that the design pressure (160barg) of the Offshore HH and LL pressure safeguarding instrumentation on the flowline is below the well CITHP (276barg). This implies there is a risk of instrumentation blow out or LOPC in the event that 100-XZV-104 closes. The likelihood of this risk is high because the pressure instrumentation is installed upstream of shutdown valve 100-XZV-104. See Figure 1.0 below.

The scope of this review is to assess the impact of removal of the offshore pressure safeguarding on the entire flowline system

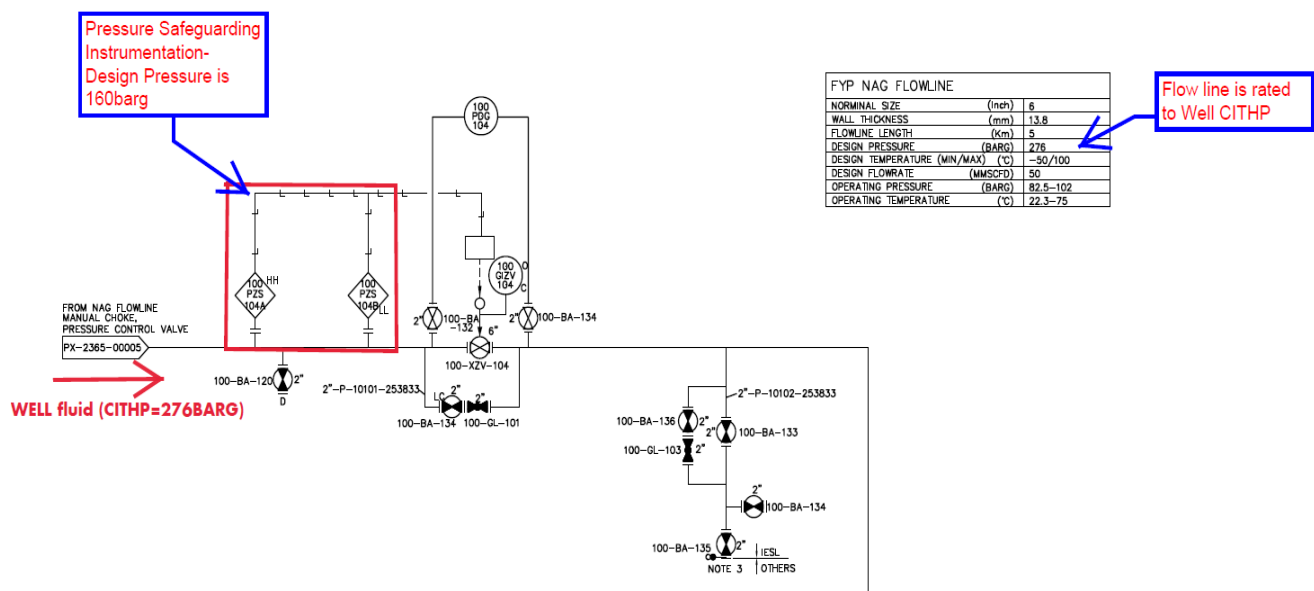


Figure 1.0: FYNAG Flowline Offshore Pressure safeguarding set up

## 2.0 STUDY METHODOLOGY

### 2.1 Study Objectives

The objectives of this study are:

- To identify hazards and operability issues, if any, on the agreed scope and to make recommendations to address the identified issues.
- Verify that the safeguards for all credible process deviations are adequate and make recommendations where necessary.

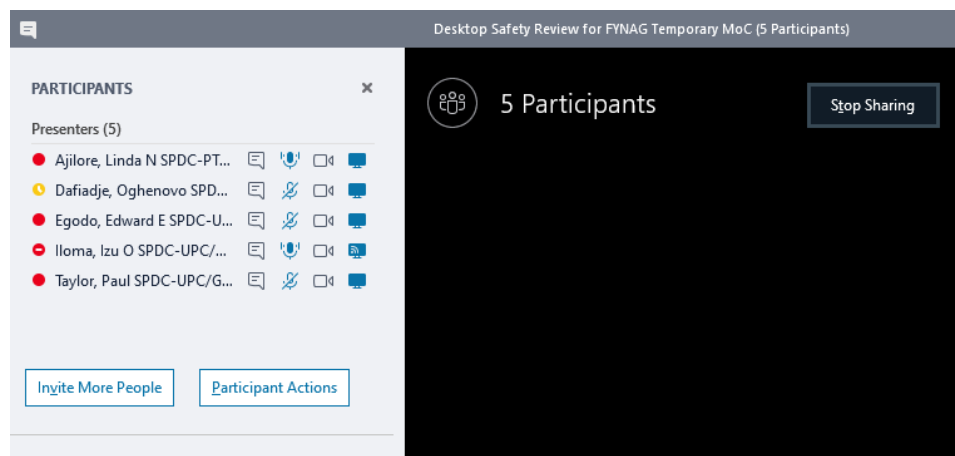
### 2.2 Timing and Team Composition

The Study was held virtually on the 30<sup>th</sup> of April 2021 via Skype for Business. Participants comprised of a good mix of experienced personnel that are aware of the scope and associated issues.

The multi-discipline team was drawn from across various functions/disciplines and the asset team.

Table 1: Attendance List

Name	Position	Company
Iloma Izu	Process/Technical Safety Specialist / Facilitator	SPDC
Linda Ajilore	Senior Process Engineer	SPDC
Egodo Edward	Field Supervisor (Ops), Forcados Area	SPDC
Dafiadje Oghenovo	Snr Project Engineer, FYIP Onshore	SPDC
Taylor, Paul	Commissioning Engineer – DOMGAS and FYIP	SPDC



### 2.3 Recording and Reporting

During the study, all foreseeable and credible hazards and process deviations identified by the team were recorded on a Worksheet. See Appendix A.

### 3.0 FINDINGS AND RECOMMENDATIONS

No recommendations were identified for resolution or further investigation. The detailed worksheet is provided in Appendix A.



## 4.0 CONCLUSION

The DSR was carried out by participants from various disciplines possessing the appropriate skills, experience, and knowledge required for an effective study. The output of this DSR is presented in Appendix A of this report.

## Appendix A. DSR Worksheets

Hazard: Hydrocarbon Gas. Rating: P-5C, A-5B, C-5B, E-2D

S/N	CAUSE	CONSEQUENCE(S)	EXISTING SAFEGUARDS	RECOMMENDATION	ACTION PARTY
1	• Closure of 100-BA-123 upstream the Barred Tee	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP • Loss of Production from NAG Well	• Manual valves are Locked open (LO) • High pressure trip on 100-PZH-101 trips the well • Line is fully rated to CITHP of 276 barg	•	•
2	• Closure of 100-BA-121/132 downstream the Barred Tee	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP • Loss of Production from NAG Well	• Manual valves are Locked open (LO) • High pressure trip on 100-PZH-101 trips the well • Line is fully rated to CITHP of 276 barg	•	•
3	• Closure of BA-1101/1102 upstream the pig receiver A-3123	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP • Loss of Production from NAG Well	• Manual valves are Locked open (LO) • High pressure trip on 100-PZH-101 trips the well • Line is fully rated to CITHP of 276 barg	•	•
4	• Fail closure of 3123-UZV-001 upstream the pig receiver A-3123	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP • Loss of Production from NAG Well	• High pressure trip on 100-PZH-101 trips the well • Line is fully rated to CITHP of 276 barg	•	•
5	• Closure of BA-1111 downstream the pig receiver A-3123	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP • Loss of Production from NAG Well	• Manual valves are Locked open (LO) • High pressure trip on 100-PZH-101 trips the well • Line is fully rated to CITHP of 276 barg	•	•
6	• Control loop failure of 3123-FQIC-003 resulting in closed position of 3123-FCV-003	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP with over pressurization of the #900 rated piping resulting in potential for LOPC with fires, environmental impact, asset damage and personnel injuries. • Loss of Production from NAG Well	• High Pressure trip on 3123-PZA-001 trips 3123-UZV-001 • High pressure trip on 100-PZH-101 trips the well • Flow Line is fully rated to CITHP of 276 barg	•	•
7	• Fail closure of 3123-UZV-003 upstream the slug catcher V-3123	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP with over pressurization of the #900 rated piping resulting in potential for LOPC with fires, environmental impact, asset damage and personnel injuries. • Loss of Production from NAG Well	• High Pressure trip on 3123-PZA-001 trip 3123-UZV-001 • High pressure trip on 100-PZH-101 trips the well • Flow Line is fully rated to CITHP of 276 barg	•	•
8	• Closure of BA-1143/1138/1140 /1130A upstream the slug catcher V-3123	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP with over pressurization of the #900 rated piping resulting in potential for LOPC with fires, environmental impact, asset damage and personnel injuries. • Loss of Production from NAG Well	• Manual valves are Locked open (LO) • High Pressure trip on 3123-PZA-001 trips 3123-UZV-001 • High pressure trip on 100-PZH-101 trips the well • Flow Line is fully rated to CITHP of 276 barg		•
9	• CH-1102 failed internals	• Blocked outlet for FYNAG well leading to pressure build-up to CITHP with over pressurization of the #900 rated piping resulting in potential for LOPC with fires, environmental impact, asset damage and personnel injuries. • Loss of Production from NAG Well	• High Pressure trip on 3123-PZA-001 trip 3123-UZV-001 • High pressure trip on 100-PZH-101 trips the well • Flow Line is fully rated to CITHP of 276 barg	•	•
10	• Any SB in wrong position after maintenance	• Unable to start up. • Blocked outlet for FYNAG well leading to pressure build-up to CITHP with over pressurization of the #900 rated piping resulting in potential for LOPC with fires, environmental impact, asset damage and personnel injuries.	• Pre-start up and commission Checks • High Pressure trip on 3123-PZA-001 trips 3123-UZV-001 • High pressure trip on 100-PZH-101 trips the well • Flow Line is fully rated to CITHP of 276 barg	•	•
11	• Line rupture due to external impact or integrity related issues	• LOPC to environment leading to environmental impact • Low flowline pressure leading to reduced production	• Low pressure trip on 100-PZL-101 trips the well • Low Pressure trip on 3123-PZA-001 trips 3123-UZV-001	•	•

## Appendix B. Action Completion Sheet

HAZOP Action Completion Sheet						
System			Node		Date of HAZOP	
Guidewords	Cause/Deviation		Consequence			
No Flow			•			
Protection/Evaluation			Ranking	Action		
•						
ACTION PARTY RESPONSE	Action Owner		Action No.			Action Due Date
	Response:					
	Supporting Drawings/Documentation Reference Nos.:					Action Party to complete all boxes in this section and then pass to Project HSE Engineer after Discipline Technical Authority approval.
	Responsible Party:		Signature:	Date:		
STATUS						
APPROVAL BY DISCIPLINE TECHNICAL AUTHORITY	Comments:					Status 2 when this section is completed.
	Discipline Technical Authority:		Signature:	Date:		
ACCEPTED BY PROJECT LEAD TECH HSE ENGINEER	Comments:					Status 3 when this section is completed.
	Project Lead Technical HSE Engineer		Signature:	Date:		
PROJECT APPROVAL	Project Lead:		Signature:	Date:		Action closed out. Status 4.

### Description:

1: Under consideration by Action Party

Status 3: Accepted by Safety Engineer pending close out

2: Approved by Discipline Technical Authority

Status 4: Closed Out

## Appendix C. PEFS



Fynag pefs for Risk  
Assessment.pdf