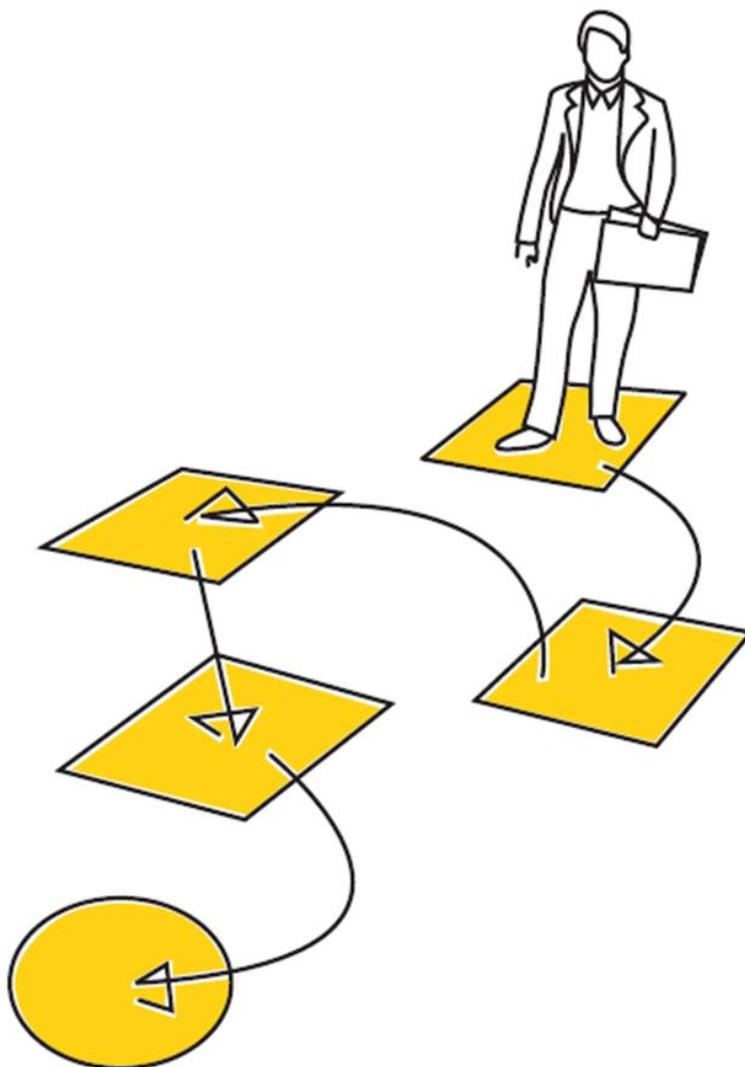


Report

2023 Annual Environmental Report – OCTP Phase 1



Reference MSG: HSE

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2023 Annual Environmental Report -OCTP Phase 1

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1 OBJECTIVE

This report is in accordance with the requirements of the following documents:

- Regulation 25 of the Environmental Assessment Regulations 1999 (LI 1652).
- Environmental Protection Agency (EPA) Certificate for production of hydrocarbons, installation, completions and commissioning activities of the Phase-1 Offshore Cape Three Point (OCTP) Block with validity of 15th November 2018 to 14th May, 2020 (Permit no. CE0021780503) expired, 15th May,2020 to 14th May,2023 (Permit no. CE0021780626) expired and a new permit issued with validity of 15th May, 2023 to 14th May 2026 (Permit no. CE0021781034).
- Environmental Protection Agency (EPA) Certificate for the operation of the gas onshore receiving facility (ORF) at Sanzule with validity of 18th December 2019 – 18th December 2022 (Permit No. CE0021780607) expired, and a new permit was issued with validity of 21st December,2022 to 20th December,2025 (Permit no. CE0021780945).
- Environmental Protection Agency (EPA) Permit to undertake acid stimulation and scale inhibitor treatment on four (4) OCTP Wells (SNKE-1X, OP-5, OP-6 and GI-2) with validity of 5th October,2022 to 4th April 2023 (Permit no CE0021780921).
- Environmental Protection Agency (EPA) Approval to undertake Inspection Maintenance and Repair (IMR) on two (2) OCTP subsea installations OP -3 XT and OP-7 XT with Reference number CE002178080844.
- Environmental Protection Agency (EPA) Permit to undertake the proposed inspection, maintenance and repair works on GI-1 XT and OP-&XT wells within the OCTP Block with validity of 3rd March 2023 to 2nd July 2023 (Permit no CE0021781023).
- Environmental Protection Agency (EPA) Permit to undertake drilling of one (1) Exploratory well (Aprokuma 1X) with validity of 8th March 2022 to 7th February 2023 (Permit no. CE0021780818) was issued.
- Environmental Protection Agency (EPA) Permit to commence with the proposed offshore Geotechnical survey within the CTP Block-4 in the Tano Basin with validity of 20th December 2023 to 19th June 2025.

This annual report presents environmental activities on the Offshore Cape Three Points (OCTP) and CTP Block 4 conducted by Eni Ghana Exploration and Production Limited from January to December 2023.



2 SCOPE

The present Annual Environmental Report provides the description of Eni Ghana's environmental activities conducted in 2023.



REFERENCES

1	Environmental and Social Impact Assessment Doc. 000415_DV_CD.HSE.0208.000_00
2	EPA - Environmental Permits. CE0021781034, CE0021780945, EPA/PET/TN/HO/CE:2178/11/2023/11
3	EPA Guidelines on Environmental Assessment and Management for Offshore Oil & Gas Development in Ghana (2011).
4	Regulation 25 of the Environmental Assessment Regulations 1999 (LI 1652)



3 ACRONYMS

AER	Annual environmental reports
bbl.	Barrel
CAR	Corrective Action Requested
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
FLET	Flowline End Termination
FPSO	Floating Production Storage Offloading
GNPC	Ghana National Petroleum Corporation
HSE	Health, Safety and Environment
HSEQ	Health, Safety Environment and Quality
HQ	Headquarters
IMS	Integrated Management System
ISO	International Standard Organization
JV	Joint Venture
MOU	Memorandum of Understanding
NAG	Non-Associated Gas
OCTP	Offshore Cape Three Points
OSRL	Oil Spill Response Limited
OSCP	Oil Spill Contingency Plan

POD	Plan of Development
PSVs	Platform Supply Vessels
PTW	Permit to Work
SJA	Safe Job Analysis
STMA	Sekondi-Takoradi Municipal Assembly
TBTs	Toolbox Talks
Vs.	Versus
WBG	World Bank Group
WTN	Waste Transfer Note



4 DEFINITIONS

Company	Eni Ghana employees & assets engaged in the oil & gas operations
Contractor	An outside Company awarded a contract by the Company to perform a defined portion of work or to provide services or facilities
Environmental aspects	Elements of an organization’s activities or products or services that can interact with the environment
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s environmental aspects
ESHIA	Environmental, Social, Health Impact Assessment. Process for predicting and assessing the potential environmental social and health impacts of a proposed project, evaluating alternatives and designing appropriate mitigation, management and monitoring measures
Incident	Any accident or injury that disrupt the normal operations development. In this definition “near misses” are included.
Near Miss (NM)	An unplanned or uncontrolled event or chain of events that has not resulted in a recordable injury, illness or physical damage or environmental damage but had the potential to do so in other circumstances.



5 INTRODUCTION

The Offshore Cape Three Points (OCTP) development license is located approximately 60 km off the coast of the Western Region of the Republic of Ghana.

The license is for developing oil and gas and the joint venture (JV) is composed of Eni Ghana Exploration and Production Limited (“Operator”) holding 44.444% participating interest (PI), Vitol Upstream Ghana Limited (“Vitol”) holding 35.556% (PI), and Ghana National Petroleum Corporation (GNPC) holding 20% (PI) with 15% carried and 5% paid.

Figure 1 indicates the block area of the OCTP block.

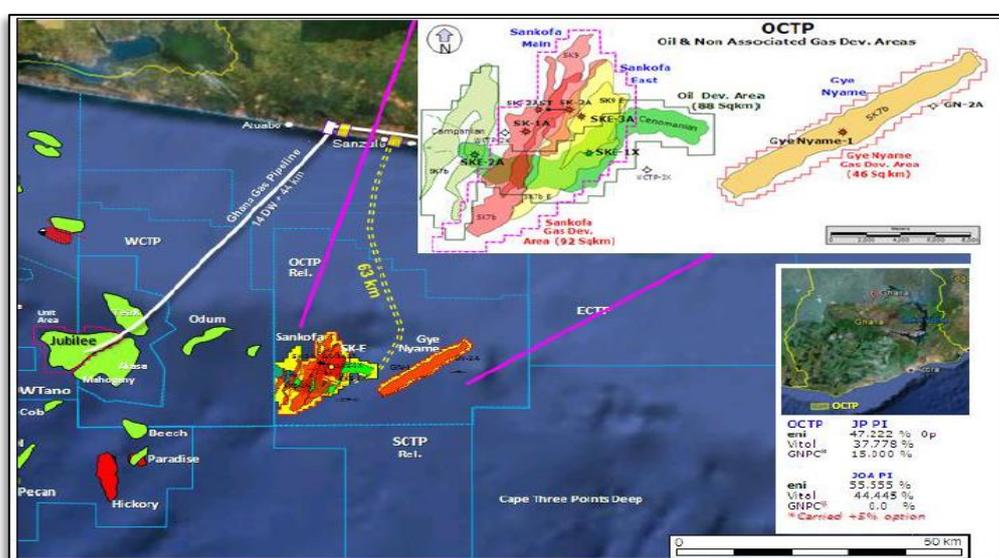


Figure 1 OCTP Block Area

The JV made three non-associated gas (NAG) discoveries: Sankofa Main Field in 2009, Gye Nyame Field in 2011, and Sankofa East Field in 2012. In addition, two oil discoveries were made: Sankofa East Field Cenomanian and Sankofa East Campanian, both in 2012 (“Oil Discoveries”). The estimated volumes in place associated with the discoveries are some 480 MMbbls of oil and 1.5 Tcf of non-associated gas.

The OCTP project considers the development of both oil and non-associated gas in 2 Phases:



- Phase 1: Oil Development Project. This phase consists of 15 subsea wells (10 oil producers, 2 water injectors and 3 associated gas injectors), subsea facilities, and a new conversion, double-hull floating production, storage and offloading (FPSO) unit that is located about 60 km offshore, south of Sanzule.
- Phase 2: Non-Associated Gas (NAG) Development Project. This phase consists of five (5) subsea wells, subsea facilities, gas treating facilities located on the FPSO unit, a 63 km subsea gas pipeline, an Onshore Receiving Facility (ORF), and other associated onshore components.

The Phase 1 Oil Development Project Environmental Impact Assessment (EIA) process was undertaken by ESL Consulting (ESL). The Submission of the Final EIS to the Ghana Environmental Protection Agency (Ghana EPA) was done in July 2015 and the very 1st Environmental Permit for the Phase 1 Development released on July 9th, 2015. Subsequently Permits for oil production were issued & renewed in May 2020. The permit issued in May 2020 expired on the 14th May, 2023 (Permit no. CE0021780626). A new permit was issued on the 15th May, 2023 to 14th May 2026 (Permit no. CE0021781034).

The Phase 2 Gas Development Project Environmental Impact Assessment (EIA) process was undertaken by ERM. The Submission of the Final EIS to the Ghana Environmental Protection Agency (Ghana EPA) was done on July 8th, 2015, and the very 1st Environmental Permit for the Phase 2 Development was issued on July 24th, 2015. The subsequent Permit for gas production was issued on December 18, 2019 and expired on 18th December 2022 (Permit No. CE0021780607). A new permit was issued on 21st December 2022 and would expire on 20th December 2025 (Permit no. CE0021780945). This AER provides the description of the Eni Ghana's environmental activities in 2023 for Phase 1 of the OCTP project.

Eni Ghana's activities in 2023 were covered by six (6) separate Environmental permits granted by the EPA. The Permits are:



Permits valid in 2023

- Environmental Protection Agency (EPA) Certificate for production of hydrocarbons, installation, completions and commissioning activities of the Phase-1 Offshore Cape Three Point (OCTP) Block with validity of 15th November 2018 to 14th May 2020 (Permit no. CE0021780503) expired, another permit with validity of 15th May,2020 to 14th May,2023 (Permit no. CE0021780626) expired and a new permit issued on 15th May, 2023 to 14th May 2026 (Permit no. CE0021781034).
- Environmental Protection Agency (EPA) Certificate for the operation of the gas onshore receiving facility (ORF) at Sanzule with validity of 18th December 2019 – 18th December 2022 (Permit No. CE0021780607) expired, and a new permit was issued with validity of 21st December,2022 to 20th December,2025. (Permit no. CE0021780945).
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- Environmental Protection Agency (EPA) Permit to undertake the proposed inspection, maintenance and repair works on GI-1 XT and OP-7 XT wells within the OCTP Block with validity of 3rd March 2023 to 2nd July 2023 (Permit no CE0021781023).
- Environmental Protection Agency (EPA) Permit to commence with the proposed offshore Geotechnical survey within the CTP Block-4 in the Tano Basin with validity of 20th December 2023 to 19th June 2025.



6 OPERATIONAL SUMMARY AND EVENT

6.1 DRILLING & WELL COMPLETION

There was no drilling and well completion activities in 2023.

6.2 INSPECTION MAINTENANCE AND REPAIRS (IMR) ACTIVITIES

The project scope was to repair leaks on OP-7 and GI-1 with sealant application, perform the Well Barrier Tests and took the opportunity to perform a visual inspection of OP-4 Xmas tree.

The purpose of the project was to perform Inspection, Maintenance and Repair (IMR) campaign on OCTP subsea installations. The main activities involved were:

- 1) Sealant injection on OP-7 XT and corrosion cap installation.
- 2) Sealant injection on GI-1 XT and corrosion cap installation.
- 3) Visual inspection on OP-4 XT.

The campaign lasted for a period of 23 days starting with mobilization on 29th March 2023 and demobilization on the 19th April 2023.

Activities were covered under EPA Approval to undertake the proposed inspection, maintenance and repair works on GI-1 XT and OP-7 XT wells within the OCTP Block with Permit no CE0021781023.

The vessel used for the IMR activities was the Siem Spearfish.



Siem Spearfish			
The Subsea Construction Vessel is a Dynamically Positioned (DP2) vessel built in 2014 that was designed for operations in deep water. On board are #2 ROVs capable of operating in 3,300 feet of water.			
Vessel Type	DNV		
Design	STX OSCV 03		
Builder	<u>Vard Brattvaag</u>		
Year Built	2014		
Classification	DNV +1A1, E0, DYNPOS-AUTR, DK(+), HELDK-SH, ICE-1B (hull only), ICE-C, SF, BIS, CLEAN DESIGN, RECYCLABLE, NAUT-AW, <u>Comp-V(3)-C(3)</u> , SPS Resolution MSC.266(84)		
Flag	Bahamas (BS)		
Accommodation	110 Persons		
Helideck	26.1 m (Diameter Octagonal Aluminum Helideck)		
Moonpool	7.2 m x 7.2 m		
Dynamic Positioning	DP2 Class; Kongsberg K-Pos DP-21 DP2 System		
Max Water Depth	1000 m (Based on max ROV operating depth)		
Operating Conditions	N/A		
Storm Conditions	N/A		
TECHNICAL DIMENSIONS			
Length	~396.6 ft	120.9 m	
Breadth	~75.4 ft	23.0 m	
Length between P.P.	~363.4 ft	110.8 m	
Max Design Draft	~21.6 ft	6.6 m	
CAPACITIES			
Base Oil	1,346.02 bbl.	7,557.3 ft ³	214 m ³
Brine	1,006.37 bbl.	5,650.4 ft ³	160 m ³
Fresh Water	5,660.83 bbl.	31,783.2 ft ³	900 m ³

Figure 2 Siem Spearfish Description



6.3 OIL PRODUCTION OPERATIONS

Oil Production activities continued in 2023.

6.3.1 Hydrocarbon Production Volumes

As at end of December 2023 about 11,086,541.61 barrels of oil and 127,112.12 MMscf of gas was produced which consist of 56,455.2 associated gas produced and 70,656.9 non-associated gas production. 4907.37 MMscf representing 3.86% of the gas produced was used as fuel gas whereas about 5,226.21 MMscf AG was flared, because of maintenance activities, routine and upsets representing 4.1 % of total Gas produced. 47,663.24 MMscf representing 37.50% was re-injected. 13.77 MMscf representing 0.0108% was vented and 62,415 MMscf NAG representing 49.10% was exported. The graph below illustrates the different uses for the associated gas produced in 2023.

Month	Oil Produced(bbl)	Associated Gas Produced (MMscf)	Non-Associated Gas Produced (MMscf)	Gas Flared (MMscfd)	Gas Vented (MMscfd)
January	999,551.15	4,690.494	6,182.444	89.07	1.171
February	851,140.22	3,978.81	5,761.4878	1,038.192	0.409
March	992,083.45	4,981.154	6,787.139	119.550	1.282
April	997,396.86	4,765.338	6,527.539	17.840	0.329
May	1,003,021.35	4,978.19	6,608.91	15.36	1.038
June	869,697.78	3,876.35	7,264.23	1,008.680	1.475



July	1,003,084.04	4995.03	6599.428	12.37	0.192
August	968,367.46	5066.019	6350.73	79.24	2.417
September	777,851.64	4,872.77	2,176.95	61.540	1.718
October	902,776.92	4,958.286	5,337.026	802.130	0.679
November	866,955.94	4,862.62	4,767.92	809.640	2.060
December	854,614.80	4,430.15	6,293.12	1,172.600	1.0007
Total	11,086,541.61	56,455.2	70,656.9	5,226.21	13.8

Table 1 Hydrocarbon Production Volumes

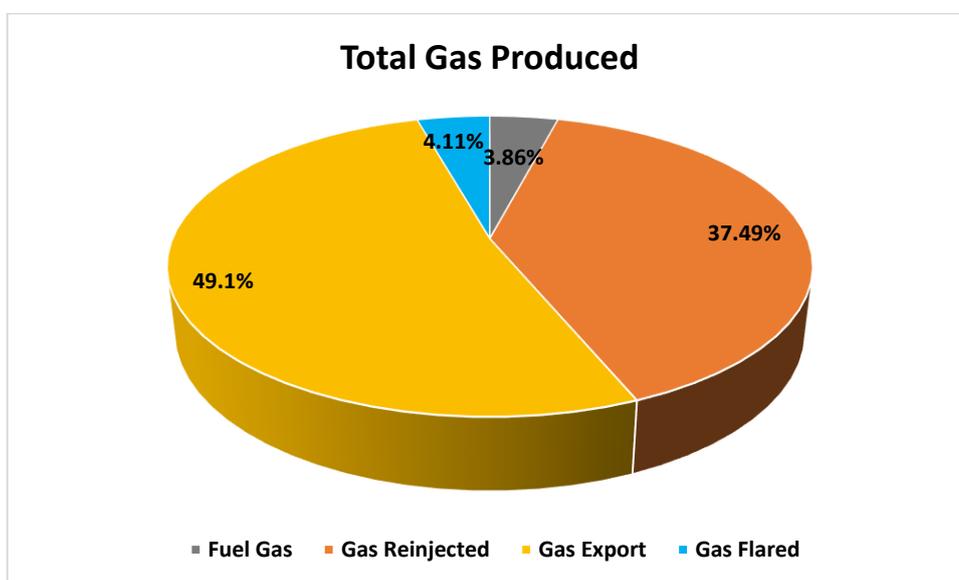


Figure 3 Total Gas Produced



6.3.2 Produced Water

From January to December 2023, Eni Ghana recorded 944855.75 produced water on the FPSO JAK. 166,0326 was discharged.

Studies with Milan HQ team on the PW completed and reinjection of PW ongoing on the FPSO JAK. The System is being strictly monitored and performance assessment to be done in February 2024. The EPA has been duly notified about the reinjection of produced water.

Year 2023	Produced Water (bbl)	Volume Discharge Overboard (bbl)	Oil in Water ppm
Jan		147,089.00	8.08
Feb		123,849.00	7.70
Mar		155,771.00	10.17
Apr		154,122.00	11.75
May		133,322.00	11.85
Jun	126,935.03	148,581.00	6.56
Jul	140,477.90	150,395.00	1.42
Aug	142,042.19	149,381.00	4.73
Sep	133,985.61	148,893.00	5.73
Oct	135,210.04	147,985.00	5.09
Nov	135,279.77	133,336.00	3.18
Dec	130,925.21	67,602.00	4.00
Total	126,935.03	147,089.00	8.08

Table 2 Produced Water Discharged

6.3.3 Gas Flaring

About 5,226.21 MMscf of AG was flared in 2023 because of non-routine activities (eg. Bundle replacement activity on HP-B compressor, annual turn around maintenance, backflush of gas Injection (GI) Compressor B 1st and 2nd Stages' Discharge Coolers...), emergency flaring (HP compressor trip, Process shut down, etc..) and Routine flaring (Field GOR issues).

For non-routine activities, the agency was notified, and completion report submitted after completion of the activities. This complied with sections 6.4.5 of the EPA Permits issued for Phase 1 operations (Permit no: CE0021781034).



6.3.4 Floating, Production, Storage, Offloading (FPSO) Equipment

The FPSO JAK is a new conversion double hull/double balcony unit installed above the main oil and non-associated gas reservoirs inside the OCTP area. It is about 63 km from shoreline (Sanzule), and it is controlled and operated by Eni Ghana.

The FPSO treats all crude oil and associated gas (which is re-injected for reservoir pressure support) produced from the OCTP. Crude oil is separated from associated gas and water, stabilized and stored into storage tanks in the FPSO unit before being metered and offloaded. Oil producers, gas and water injection wells are connected directly to the FPSO unit through flexible risers and flowlines. Treated oil is delivered to tankers and associated gas is re-injected in the reservoir.

A picture of the FPSO is shown in Figure 4 below.



Figure 4 FPSO JAK

6.4 ONSHORE SUPPORT BASE FACILITIES

In 2023, the following facilities were used by Eni Ghana as onshore support facilities for offshore operations in Ghana:

- Eni Ghana Logistics Base in Takoradi.
- Dedicated berthing space in the Takoradi Commercial Port.
- Takoradi Air Force Base passenger terminal and heliconia helicopter base.

6.4.1 Takoradi Logistics Base

The Takoradi logistics base facility provided support in line with operational requirements. The logistics base provides pipe yard storage, covered warehousing and office accommodation. Below are some of the activities that continuously occur at the Logistics Base:

- Bundling of casings and pipes.
- Offloading of casings and pipes.
- Loading and transferring of lifting equipment (mini containers, baskets and other containers) to the Port.
- Waste collection by Zoil Services Ltd and Zeal Environmental Technologies.
- Storage of Oil Spill Response Equipment.

The base consists of a yard and one building used as offices. It covers an area of 20,000 m² with 4,000 m² of warehousing facility, 15,000 m² used as pipe yard and 1,000 m² used as offices and other amenities (canteen and changing rooms). Casings and other materials such as mud mats, float shoe, mini containers, baskets and slings are stored in the warehouse. An aerial view of the logistics base is seen in Figure 5.



Figure 5 Logistics Base

6.4.2 Takoradi Commercial Port

Takoradi port facilities were used in 2023 for:

- Loading of equipment from trailer at quayside unto supply vessel.

- The importation of materials with some dock space to serve as a loading/offloading point for equipment and machinery.
- Dispatching equipment and for temporary storage of materials and equipment.
- Transfer of waste produced offshore to waste contractor.
- Loading of supplies for the FPSO and support vessels.
- Waste collection by Zoil.
- Bunkering operations.

6.4.3 Takoradi Air Force Base

The Takoradi Air Force Base was used to facilitate efficient transportation of personnel to support offshore and onshore operations.

6.4.4 Main Project activities for 2023

Activities that occurred in 2023 are listed below:

NAG System Upgrade (ORF Spool Installation and FPSO LTS, NAG-NAG Exchanger modification)

- On ORF, the project scope was installation of Train 1 Cooler bay spools to increase the NAG capacity of train 1; this will allow the plant to have full spare configuration to handle up to 260 MMscfd. EPCI Contractor – SPIE Oil and Gas Services, Kick-off meeting was held on 30th June and activity completed on 21st of August.
- On the FPSO, debottleneck analysis were developed to identify the minimum required actions to increase the NAG capacity; focus was on Optimize the time, identified the quickest design modification considering the existing study (developed in the past and the available equipment & material). Update of the studies started in May and concluded at end of June by EPEG, detail design completed in July by Yinson.

Load Bank

- Installation of Load Bank has been successfully commissioned and online. Start-up on 21st November. Certification and operated manual implemented.



GI FCM conversion to OP FCM

- To convert a Gas Injector FCM (Flow control Module) into an Oil Producer to allow for oil production through this FCM. Project starts on Q4-2022. Main activities done in 2023 are:
 - Finalization of design by BH.
 - Purchase of all new elements (choke, production spool etc).
 - Started of FCM Assembly.

3rd HP Compressor (FPSO Future Design upgrade)

- Installation of a 3rd HP Compression Train to guarantee zero flaring during compressor train maintenance activity and boost gas injection capacity on the FPSO.

On the basis of Existing Engineering studies, final Report for Technical Requirements for compressor selection have been completed (mainly 130 MMscfd with double stage configuration was determined) in October.

Compressor Process datasheets, issued by Yinson and reviewed by Company by December.

CI (Company Instruction) issued to Yinson to trigger the EPC Process. Contract and Installation Strategy is under discussion and will be released, within Q1-2024.

Asset Damage and PAGA System Upgrade in ORF

- A heavy thunderstorm with lightning strikes was experienced in ORF which resulted in damages of some assets hence the urgent need to protect the assets by installing:
 - New PAGA system at the Permanent Accommodation Camp (PAC).
 - New Thunderstorm Warning System for Ghana Onshore Receiving Facility (ORF Plant).
 - Update of the lightning protection system (ORF Plant).

The required modifications to existing electrical panels (ORF Plant) Bids have been received from tenderers and undergoing evaluation. Duration 12months, Delivery Q4 2024.

Energy efficiency

- Calculation Tool for Energy Efficiency Monitoring was developed. Thanks to that is now possible to monitor the Energy Efficiency Parameters. Energy Efficiency Report issued on monthly basis.

Part of these activities allows to achieve the Energy Certification ISO 50001.



7 ENVIRONMENTAL MANAGEMENT

7.1 ENVIRONMENTAL MANAGEMENT STRUCTURE

Eni Ghana is committed to follow and comply with all applicable legal and regulatory requirements on its operations. Above that, Eni Ghana considers environmental protection as an engine of a continuous improvement process that guarantees achievements over time. For this reason, Eni Ghana has developed a set of guidelines that clearly include Company's principles on managing Environmental matters.

The HSE Department oversees Environmental Management. In order to manage environmental related risks, the Company implements a series of practices from the identification of risks and assessment of impacts to developing appropriate standards, implementation of environmental management plans, procedures, work instructions and control of effectiveness of these through continual monitoring and periodic auditing and inspections of procedures and operational sites to ensure compliance, communicate responsibilities and monitoring.

The environmental management system is implemented through the Company's HSE Integrated Management System (IMS). Eni Ghana's HSE IMS is applicable to all Company's activities and within this framework, all Environmental Impact Assessment (EIA) studies, Environmental Management Plans and programs (including specific procedures and plans) and other formal documentation are implemented in order to assure that all requirements contained in these documents are adequately managed. Since December 2010, Eni Ghana has been certified in accordance with the Environmental Management System-EMS (ISO 14001) standard. ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system and helps organizations improve their environmental performance. This permits Eni Ghana to implement proactive environmental objectives and manage activities through the best practice tools. The EMS regularly confirms compliance by an independent authorized certification body which verifies and endorses full alignment with the requirements of international standards for Environmental Management. Eni Ghana also achieved certification in ISO 50001 in October 2023, Energy Management Systems. It is also an internationally agreed standard that sets out the requirements for energy consumption, energy use and energy efficiency. The system helps organizations improve their energy performance.



Further, in 2023, top management provided leadership and direction to ensure the company was operating in an environmentally responsible manner.

A number of management plans implemented for specific environmental issues continued in 2023. Among these plans include the following:

- HSE Policy.
- Water Management Plan.
- Waste Management Plan.
- Environmental Monitoring Program..
- Fugitive monitoring plan.
- Marine Mammal and Sea Turtle Policy Protection Program.
- Offshore Hazardous Material Management Plan
- Oil Spill Contingency Plan.
- Blowout Emergency Response Plan (BOERP)
- Air and GHG Emission Management Procedure.

Among others, these plans generally deal with the under-listed environmental issues:

- Emissions to air and ambient air quality.
- Liquid Discharges (bilge water, wastewater, sewage effluent etc.).
- Chemicals Management.
- Waste Management.
- Oil and chemical spills (spill prevention and response).
- Marine Mammals and Sea Turtles.

7.2 ENVIRONMENTAL MONITORING

Eni Ghana's operations have environmental aspects that must be adequately monitored to ensure local environmental quality and ecological conditions are preserved. Monitoring programs were necessary to ensure discharges and emissions from operational activities meet regulatory limits for various environmental parameters and where there are exceedances, measures are put in place to achieve compliance. In order to efficiently carry out this essential environmental function, two (2) contractors were in place to support environmental and biodiversity management activities, which were ESL Consulting and



Envaserv Research Consult. ESL Consulting provides onshore Environmental Monitoring services on our onshore facilities whilst Envaserv Research provides environmental services on all our facilities.

Monitoring is done in order to ensure compliance with regulatory requirements, comply with WBG (World Bank Group) requirements as well as evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts.

In 2023, there was no offshore Environmental campaign but a follow up monitoring (Bioaccumulation of Heavy Metals in some tissues of fish around the ENI Ghana asset and fish landing sites in the western region.

7.3 BIOACCUMULATION OF METALS IN FISHES

Envaserv Research Consult was commissioned by Eni Ghana Exploration and Production Limited to study the bioaccumulation of heavy metals (Ni, Hg, Ba) and total petroleum hydrocarbons (TPH) in fish tissues near Eni Ghana Assets and landing beaches in the Western Region of Ghana, following the results of the offshore Environmental monitoring Campaign.

The study examined nine fish landing sites, focusing on onshore areas and offshore areas. Results showed that Ni and TPH were present in appreciable amounts in fish species, exceeding the permissible limits recommended by WHO and the European Union. Nickel accumulation concentration was highest in muscle. Barium concentrations were below detection limits, and Hg concentrations were very low.

Eni Ghana would follow up on the results and recommendations (if applicable) from the final report yet to be submitted by Envaserv.





Figure 6 Bioaccumulation of metals in fishes

7.4 ENERGY MANAGEMENT

Eni Ghana started its campaign to achieve the ISO 50001 Certification. An Energy Gap analysis was conducted in 2021 and its significant Energy Users (SEU) identified with Energy Baseline identified. Eni Ghana reviewed its Energy Management System Procedures, trained internal and Lead Auditors, carried out Energy Awareness Training and conducted internal Audits on all its sites.

In September 2023, External Auditors from RINA conducted the certification Audit, where Eni Ghana was certified with ISO 50001, following the stage 1 Audit in July 2023.



Figure 7 ISO 50001 Certificate

7.5 OFFSHORE CHEMICAL USAGE

There was no drilling operation in 2023 and hence no offshore chemical usage for drilling in 2023. Below are chemicals used for production in 2023 on the FPSO JAK.

There were no obsolete chemicals on the FPSO JAK during the reporting year.

Chemical Product Name	Function Group	OSPAR Classification	Total ltr
Methanol	Oil/gas treatment	Green	2,009,507
TEG	Gas treatment	Yellow	33,000
versalis e®-embr H03G01	Demulsifier	Black	70,184
versalis e®-cori H03D01	Corrosion inhibitors (gas stream)	Black	46,952



versalis e®-pour H03R03	PPD (subsea), Pour point depressant	Yellow	229,413
Sodium Metabisulphite 60%	Oxygen Scavenger(SMBS-35TB3005)	Green	56,308
versalis e®-scin W03S01 WI	Scale inhibitor (water)	Red	25,287
versalis e®-anfo H03A01	Defoamer, Anti-foaming agent	Yellow	28,500
versalis e-bioc W03C03	Membrane Biocide	Red	34,899
versalis e®-scin W03S01 TOP	Scale inhibitor (oil)	Red	8,688
VERSALIS E-®BIOC W03C01	Biocide 1 (Sea Water)	Red	5,344
versalis e®-bioc W03C02	Biocide 2 (Sea water)	Red	4,800
versalis e-padi H03P01	Wax (subsea), dispersing agent	Yellow	65,101
versalis e®-cori W03D02	Corrosion inhibitors (Liq stream)		45,380
MEG	NAG System treatment		1,562,962
Descaling Liquid	Liquid acid descaler	Not classified	375
RO Biosulphite	De-chlorinating agent	Not applicable	675
Sodium Hypochloride	Potable water chlorination	Not classified	675
Oxygen Scavenger Plus	Boiler water oxygen scavenger	Not classified	50
Vaptreat	Fresh water generator treatment	Red	420
Autotreat	Multifunctional boiler water treatment	Not classified	415
Disclean	Purifier maintenance disc cleaner	Not classified	50
Electrosolv-E	G.P. cleaner & degreaser for elect.	Not classified	50
Enviroclean	General purpose cleaner	Not classified	1,725
Gamazyme 700FN	Sewage Plant Activator / Cleaner	Not classified	36
Sodium Metabiosulphite Solution 40%	De-chlorinating agent	Not classified	47,669
Metal Brite H.D.	Rust stain remover	Yellow	100
Rocor NB	Corrosion inhibitor	Not classified	350
Handcleaner	Handcleaner	Not applicable	35
versalis e®-embr W03G01	Polyelectrolyte	Black	6,237
versalis e®-bioc W03C01	Biocide for Cargo & Slop tanks	Red	5,844
versalis e®-bioc 2000	Biocide for Cargo & Slop tanks	Red	5,872



Carbon Remover	Heavy duty degreaser	Not classified	25
Unitor USC	Ultrasonic cleaner detergent	Not classified	24

Table 3: Chemicals Usage on FPSO JAK

CHEMICALS USED DURING IMR CAMPAIGN		
Chemical Product Name	Function Group	Total Amount Used
GLY FLO	Sealant	Approx. 60 litres
FLO SEAL	Sealant	Approx. 80 litres
Transaqua HT2	Hydraulic fluid	Approx. 750 litres

Table 4 IMR Chemical Usage

7.6 RESERVOIR FLOWS

Blowout Emergency Response Plan (BOERP) was in place to be activated in the event of a blow-out. The plan has the below objectives:

- To protect personnel at well site preventing further accident during the first stage of the emergency.
- To prevent further environmental and/or facility damage while adequate equipment and personnel for the response are being mobilized.
- To reduce response time for the intervention by locating the critical equipment and planning for its mobilization, identifying in advance critical issues and properly address them into the Company organization.
- To reduce the overall event time by determining the proper response structure and prioritizing response activities.

7.7 WASTE MANAGEMENT

Waste generated during 2023 was managed as stated in the Eni Ghana Waste Management Plan. MARPOL regulations on offshore waste management were complied with as stipulated



in the permit conditions. Waste generated is segregated into six (6) waste categories i.e. (food, oily waste, plastic, metal, paper and hazardous). At the logistics base however, segregation is done to include wood waste and spill kits. Segregation is carried out at source. As per MARPOL requirements, food waste is discharged after maceration to achieve a size of <25 mm. The Waste Management Contractor, Zoil Services Limited, authorized by EPA provided waste management services for FPSO. Table 6 and 7 below shows the types and volumes of waste generated. There is currently a recycling system (with facilities for recycling plastic waste generated) in place adopted by Eni Ghana’s waste management contractor to minimize environmental impacts caused by disposing of plastics to landfills. Shredded plastics are transported to a plastics recycling company in Accra for remolding into waste bins. Hazardous waste comprising oily water and drill cuttings were sent to shore to be managed via high temperature thermal desorption unit by Zoil Services Limited.

Waste management hierarchy used at all sites is depicted in Figure 8. To ensure effectiveness of the waste management hierarchy, appropriate identification and segregation of waste streams were practiced. To facilitate this, colour-coded containers as described in Figure 9 below was at all operational sites. However, colour codes for containers are adjusted from one site to site depending on availability of particular types of colors.

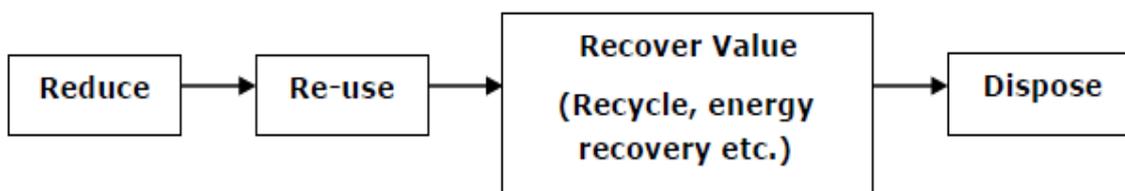


Figure 8 Waste Management Hierarchy

Colour	Collection Location
	PLASTIC WASTE
	HAZARDOUS WASTE
	OILY WASTE



	FOOD WASTE
	PAPER WASTE
	METAL WASTE

Figure 9 Colour Coding for Waste Management

7.7.1 Waste Quantities Generated and Discharged

Waste generated from operational activities were diverse in their characteristics, large in their amounts and some were hazardous in nature. Thus, quantifying and characterizing the generated amounts in association with their types, sources, and their chemical and biological characteristics was critical to evaluating possible management practices.

The Company HSE supervisor on board the FPSO JAK prepares Waste Transfer Note (WTN) from the waste manifest and according to Waste Management Plan. The WTN prepared has the following details:

- Details of the waste in transit (classification, description, characteristics, quantity and mode of transport).
- Transport operator with business name and details of permits (the condition of the vehicle and its preparation will be his responsibility).
- Identification of the vehicle and the person responsible for the waste (e.g., the driver, in the case of road transport).
- Addressee (business name, destination plant, location and details of permits) and intended route; The quantity of waste transported (a directly weighted quantity or, at least an estimation).

The waste is shipped onshore where the waste management contractor receives the waste, ensures further waste segregation according to Eni Ghana's waste management plan before transporting the waste for final disposal/treatment. A waste register (waste log) and copies of all WTNs that were produced from the site are maintained by an HSE personnel in the office. The Waste Register includes, as a minimum, the following information:

- Source of waste (e.g., FPSO, Logistics Base, etc.).



- Waste description (e.g.: oily rags).
- Classification of waste streams (i.e., hazardous or non-hazardous).
- Quantity [weight (kg) or volume (in liters or in m³)].
- WTN numbers.
- Dates of transfer.
- Mode of transport.

Macerated or ground food waste with particle size no greater than 25 mm is discharged at sea as defined by "MARPOL" (Marine Pollution) international standards.

Civil sewage discharged from W.Cs, washbasins and showers are treated in a purification system before being discharged to sea. Discharge is compliant with "MARPOL" international standards. All discharges into sea and to a reception facility are recorded in a Garbage record book.

In Table 6 and 7 below, total quantities of waste generated in 2023 and the treatment/disposal options is presented. Main treatment options used were:

- Recycling.
- Disposal to Landfill.
- Treatment.

FPSO Waste Type	Quantity (tons)	Contractor In Charge of Disposal	Method of Recycling, Reuse or Disposal
Oily Rags	3.7	Zoil Service Limited	Treatment
General Waste	8.5	Zoil Service Limited	Disposal to Landfill
Plastic	11.9	Zoil Service Limited	Recycling
Metal Scraps	10.9	Zoil Service Limited	Recycling
Paper/Cardboard	13.2	Zoil Service Limited	Recycling
Macerated Food Waste	17.55	Zoil Service Limited	Treated and discharged overboard
Food Waste	0.2	Zoil Service Limited	Disposal to Landfill



Fluorescent Tubes	0.87	Zoil Service Limited	Treatment
Lithium Batteries	0.32	Zoil Service Limited	Treatment
Medical Waste	0.203	Zoil Service Limited	Treatment
Electronic Waste	0.92	Zoil Service Limited	Treatment

Table 5 FPSO Waste Generated

Logistics Base Waste Type	Quantity (tons)	Contractor In Charge of Disposal	Method of Recycling, Reuse or Disposal
Oily Rags	0.1682	Zoil Service Limited	Treatment
General Waste	2.7209	Zoil Service Limited	Disposal to Landfill
Plastic	1.0237	Zoil Service Limited	Recycling
Metal Scraps	11.11	Zoil Service Limited	Recycling
Paper/Cardboard	0.05	Zoil Service Limited	Recycling
Septic Waste	112.5	Zoil Service Limited	Treatment and disposal
Food Waste	0.4541	Zoil Service Limited	Disposal to Landfill

Table 6 Logistics Base Waste Generated

Effluent from the FPSO (both AFT and Forward accommodation Units) in the form of general wastewater and septic water are sent to the Sewage Treatment Plant for treatment before discharging the treated effluent overboard.

The Sewage Treatment Plant on the FPSO JAK is the Wartsila Enhance Super Trident Unit which is made up of a sewage treatment plant, sewage holding tank and pipeline for the discharge overboard.

7.7.2 Resource Usages (Water and Electricity)

Eni Ghana Exploration and Production Ltd has developed a water management plan which helps comply with Ghanaian legislation/permitting regulation on water use, Eni HSE standards and policies, relevant WBG requirements and industry best standards.



There are two water sources at the Takoradi logistics base, Company Borehole, and water from the municipal assembly.

A total of 342.95 m³ of water was used from the borehole and 28.33 m³ was used from the Municipal Assembly for the Logistics Base.

Month	Fresh Water Domestic (m³) (Company)	Fresh Water Domestic(m³) (STMA)
January	22	0
February	29.4	0
March	27.7	0
April	29.4	0
May	20.5	0
June	22.2	0
July	24.45	0
August	44.1	0
September	42.6	0
October	40.3	0
November	40.3	0
December	0	28.33
Total	342.95	28.33

Table 7 Monthly Water consumption for Logistics base 2023

A total of 54,240,410.65 m³ of seawater was drawn, of which 1,112,343.3 m³ was used for reinjection, 1,2041.0 m³ for Domestic use and 4,143,640.8 m³ for other uses on the FPSO JAK.



Table 8 Monthly Water consumption for FPSO 2023

Month	Cooling systems	Injection/(Enanced Oil Recovery)	Domestic/Sanitary Uses	Other uses (Process Use)
January	4,490,953.1	9,1626.3	1,023.0	390,037.7
February	3,778,419.0	75,229.0	920.0	418,359.0
March	4,207,002.6	101,280.3	1,023.0	368,075.7
April	4,187,774.5	99,342.8	990.0	363,417.2
May	4,160,932.0	101,054.0	1,023.0	339,013.0
June	3,914,769.0	94,648.0	990.0	344,374.6
July	3,950,532.0	96,655.0	1,023.0	327,729.5
August	4,083,914.0	96,999.0	1,023.0	324,820.0
September	4,036,045.6	94,535.8	990.0	307,045.2
October	4,174,705.8	71,997.0	1,023.0	334,845.0
November	3,996,196.0	95,729.0	990.0	304,347.0
December	4,274,742.0	93,247.0	1,023.0	321,577.0
Total	49,255,985.6	1,112,343.3	12,041.0	4,143,640.8

As part of Eni Ghana's Energy consumption, use and efficiency, a total of 353,630,080.13 KWh was used for activities on the FPSO JAK.

Table 9 Monthly Electricity consumption for FPSO 2023

Month	Consumption (kWh)
Jan	32,430,171.16
Feb	21,795,182.23
Mar	33,973,916.02
Apr	32,857,260.71
May	25,859,356.93
Jun	25,869,987.71
Jul	34,209,962.89
Aug	34,404,686.83
Sep	32,619,632.43
Oct	31,303,372.9
Nov	25,443,783.12
Dec	22,862,767.18



The logistics base used a total of 492.52 KWh as energy consumed for the year 2023.

Month	Consumption (kWh)
Jan	38.99
Feb	44.73
Mar	45.02
Apr	41.74
May	44.59
Jun	37.81
Jul	37.88
Aug	39.94
Sep	36.34
Oct	38.70
Nov	44.64
Dec	42.15
Total	492.52

Table 10 Monthly Electricity consumption for Logistics Base 2023

7.7.3 Emissions to air and ambient air quality

During the reporting year, Eni Ghana monitored emissions emitted on the FPSO and other supporting vessels. Emissions generated were calculated using SHERPA, an excel based tool developed by the Eni Upstream for accounting air emissions. The SHERPA tool collects, manages and consolidates air emissions allowing accounting for GHG emissions, in addition to other air pollutants (SO_x, NO_x, CO, nmVOCs) on the basis of activity data (e.g., diesel consumptions, fuel gas consumption, flaring volumes, etc.).

Table 11 below indicates emissions generated by the FPSO and supporting vessels in 2023.

Site	Emission Source	Parameter					
		NO _x (t)	SO ₂ (t)	CO ₂ (t)	CO (t)	nmVOCs (t)	CH ₄ (t)
FPSO	Flare Stack	153.99	0	347,060.76	675.00	493.14	1,436.77
FPSO (Gas Fuel)	Turbines & Boilers	620.71	0	311,569.62	291.67	3.56	6.50
FPSO (Diesel Fuel)	Turbines & Boilers	3.59	2.56	911.67	0.28	0.08	0.02
FPSO PSVs	Turbines	184.76	19.55	7,855.18	131.55	8.38	0.30



Table 11 Air Emissions

Please refer to rep ms hse 200 eni ghana (2023 Annual Environmental Report Phase 2) page 34 on fugitive campaign results and OGMP 2.0

7.8 ENVIRONMENTAL INITIATIVES

In 2023, new initiatives and additional managerial efforts were implemented to affect environmental aspects. These initiatives included:

- Beach Cleaning Campaign initiative .
Whiles the old initiatives remained ongoing.
- Implementation of Process Safety Management System PSMS.
- HSE Personal commitment.
- Conventional lights replacement with LED.
- Pact for Safety.
- HSE contractor Management tool.
- Process safety Fundamentals.
- Plastic waste recycling initiative.
- Waste segregation initiative at the Accra Head office.
- Marine Mammals and Sea Turtle awareness session.

7.9 INSPECTIONS AND AUDITS

In line with ESHIA Phase 2, Eni Ghana provided periodic audits and inspections. HSE inspections were conducted on a regular basis at all operational sites. These included both physical condition inspections as well as procedural audits. Eni Ghana assigned HSE supervisors at the FPSO, Logistics Base and other operational sites to ensure that Eni's expectations, compliance activities, and HSE procedures were adhered to. Tasks performed by HSE supervisors at the FPSO, and Logistics Base included the following:

- Risk assessment process including Project Risk Register, Permit to Work (PTW), Task risk analysis (TRA), Toolbox Talks (TBTs), and Pre Job-Meetings.
- Task risk analysis (TRA) done on activities such as lifting, chemical mixing, work at height, and working in confined spaces.
- Waste Management (Waste Segregation, Waste Inventories, issuing of WTN, monitoring and implementation of legal requirement for compliance.



- HSE daily and bi weekly meetings with contractors.
- Chemical Management (Handling, Storage, MSDS, Transportation, etc.).
- DROPS (hunting for potential dropped objects).
- Monitoring of Operational Health and Safety standards.
- Ensuring good housekeeping.

Beyond routine inspection and monitoring activities conducted, both internal and external auditors to ensure compliance with regulatory requirements as well as with internal HSE standards carried out audits.

7.9.1 Internal Audit

The following internal audits were conducted in 2023:

- Level 1 HSE Technical Audit (Takoradi Logistics Base) – August 2023.
- Level 1 HSE Technical Audit (ORF) – August 2023.
- Level 1 HSE Technical Audit (FPSO) – August 2023.
- Level 1 Process Safety Audit Report – August 2023.
- HSE legal and Compliance Review – December 2023.
- Contractor HSE Audit (Rigworld) – July 2023.
- Contractor HSE Audit (Bajfreight) –April 2023.

7.9.2 External Audits

- In September 2023, WBG Env. & Soc. Audit (in person audit, site visit and review of AMR QMRs).
- In October 2023, RINA conducted a Recertification Audit for ISO 14001 & ISO 45001 standards and a certification audit for ISO 50001.

8 ENVIRONMENTAL INCIDENTS

Oil Sheen was detected around the GI-1 in late December 2022 and was confirmed in January 2023 via a satellite Image. The ongoing actions (Chopper and vessel survey, Radar satellite image acquisition and Methanol injection via MIV line) were in place. Subsequent satellite image showed no leak around the GI-1 Well.



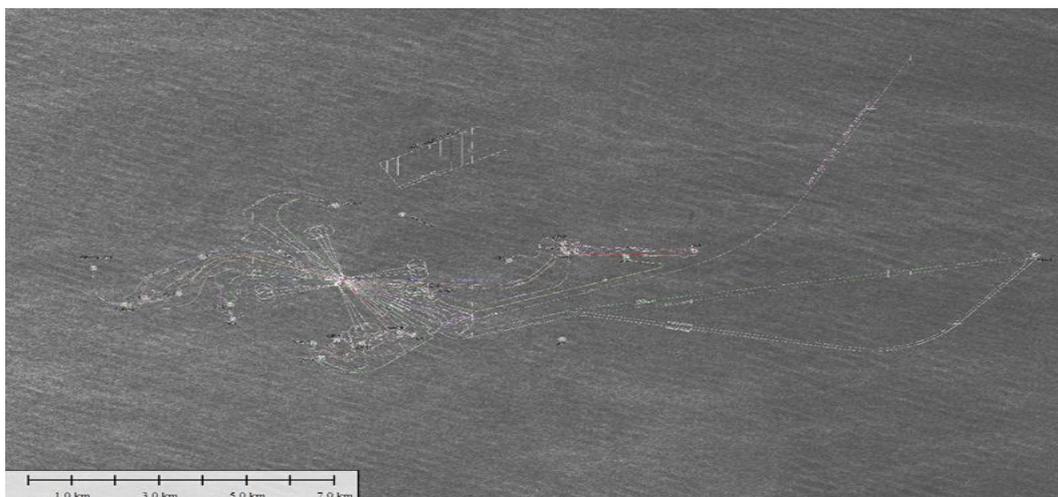


Figure 10 Satellite Image acquired in January 2023

Inspection Maintenance and Repair (IMR) campaigns were executed in March-April 2023 to cure any leaks. Eni Ghana continues to engage regulators and stakeholders on the actions in place and planned future activities.

Below is the volume of oil spill incident reported.

	Oil Spillages					
	Number			Quantity (m3)		
	≤ 10m3	> 10m3	total number	≤ 10m3	>10m3	Total number
Jan	1	0	1	0.08m3 – 0.78 m3	0	1

Table 12: Record detail on oil spillages in 2023

9 EMERGENCY PREPAREDNESS

In 2023, eni Ghana continued to implement its best available proactive practices to manage its significant incident scenarios and Emergencies. To do that, emergency



preparedness and drills were conducted during the reporting period which included several level one at the operative sites (ORF, FPSO, Takoradi Logistics Base) according to the site-specific drill plans and the Accra HO. Planned Level 2 drills were conducted also at the FPSO JAK and Takoradi logistic Base as per eni Ghana's Emergency response drill 4Y plan.

These exercises were aimed at:

- Minimize in case of an emergency, as far as reasonably practicable, negative consequences to human life, environment, Eni Ghana assets and business, and eni reputation by an effective and efficient response.
- Ensure the availability of adequate information on emergency situations through a good communication system and at all levels.
- Ensure efficient management of pre-alarms and emergencies through all available and dedicated resources.

The Eni Ghana Emergency Response strategy and plan (ERSP) and Medical Emergency Response Plan details all stages and phases of the emergencies and procedure to respond accordingly.

2023 emergency exercises conducted includes **Level 1**- Fire, Helicopter Crash, MEDEVAC and Abandon Drill, Pollution during bunkering, Muster Drill, Toxic Gas Released etc. and **Level 2** emergency exercise.

1. FPSO Level 2 Fire and Explosion- FPSO

Objective

- Test the effectiveness of Eni Ghana Emergency Response Plan and Strategy.
- Test the internal in country notification and mobilization process (Yinson FPSO, ORF (Sanzule), ER Team of Eni Ghana in Accra office and onshore Takoradi Logistics Base).
- Test the flow of communication between Eni Ghana Yinson, HOERT, FPSO and Supply vessels.
- Identify needs of communication with stakeholders, partners, and authorities.
- Test the external notification/communication process (i.e. Yinson, WARA, Heliconia, Local Authorities, Bourbon).
- Check the effectiveness and competence of the site's emergency teams in terms of firefighting.
- Test the Medical Emergency response plan for Eni Ghana and Yinson.



- Test the activation of MEDEVAC procedure.
- Verify the effective use of MYGIS in reporting emergencies.

Scenario

On Tuesday 31st March around 09:00am, Gas leak from MC2 module traveled to the forward offloading hose area where there was an ongoing welding activity which led to an explosion followed by a fire.

The main events of the scenario are:

- Fire and explosion.
- Activation of FPSO emergency team.
- Activation of Eni Ghana HOERT.
- Vessel support to fight fire.
- Two personnel sustained injuries (1 contractor expat, 1 Eni Ghana Local employee).
- Helicopter MEDEVAC.
- Pre-alert of OSRL for possible spills.

2. Takoradi Logistics Base Oil Spill, Fire and Medevac

Objective

- Test the effectiveness of Eni Ghana Emergency Response Plan and Strategy.
- Test the flow of communication between Eni Ghana Log Base ERT, HOERT, and contractors.
- Identify needs of communication with stakeholders, partners, and authorities.
- Test the external notification/communication process (i.e., WARA, Local Authorities, Ghana fire service, OSRL).
- Check the effectiveness and competence of the site's emergency teams in terms of firefighting.
- Utilize the log keeper tool on MYGIS for notifications and updates.
- To test our response to flooding resulting from a heavy rainfall.



Scenario

On Tuesday 22nd August around 09:25am, Oil (Fuel) Spillage during fuel transfer {From fuel (Diesel) truck into a stationed storage tank} resulting into fire and Medevac of 1 contractor (Mate of the truck). Spilled fuel travelled into the drainage system due to heavy rainfall and flooding of the logistics base.

The main events of the scenario are:

- Fire and explosion.
- Activation of Log Base safety warden and first aiders.
- Activation of Eni Ghana HOERT.
- One personnel sustained injuries.
- Fire brigade support.
- Ambulance MEDEVAC.
- Pre-alert of OSRL for possible spills.

10 SAFETY EXCLUSION ZONE

Consistent with industry practice and acquired Environmental Permits, a 500m radius safety exclusion zone was established around the FPSO during operational activities. However, for 2023 the safety exclusion zone was kept clear of fishermen and any other incursions.

11 CONCLUSION

In 2023, Eni Ghana worked to:

- Decrease the negative impact and/or reasonably minimize environmental impacts from operations offshore.
- Comply with Company standards, EPA permit conditions and WBG requirements.
- Maximize safety for its personnel.



These achievements are reflected by the fact that only minor environmental incidents (oil sheen detection in January 2023) were recorded despite the high level of operational activity (Oil Production and Oil Offtakes) that Company was engaged in.

Eni Ghana worked with a number of regulators and parastatal organizations to further improve capacity in relation to the oil industry.

Planning for oil spills, putting in place OSRL secondee to help with readiness of the company in the event of oil spill, acquisition of radar satellite images, vessel and chopper monitoring. A wide range of environmental monitoring activities was conducted throughout 2023, including the fugitive campaign monitoring.

12 PLANNED ENVIRONMENTAL ACTIVITIES FOR 2024

Activities to be undertaken in 2024, which will aim at ensuring the Company compliance with environmental regulations and maintaining a good environmental performance within Company's operations. These will include following:

- Waste Management activities and proper planning (Rig; FPSO; Logistic Base; ORF).
- Permit Process - EPA permits for light well intervention (Acids Works), Inspection maintenance and Repairs and geotechnical and geophysical surveys.
- Compliance with IFC/WBG Requirements through Environmental monitoring activities.
- Avian, Sea Turtles & onshore & offshore monitoring activities
- Oil Spill Response Management and awareness training.
- Continue the Implementation of No Net Loss Implementation plan and Additional Conservation Actions and implement the measures to offset quantified Net Loss.
- Plastic waste recycling model implementation to continue in communities in the Area of Influence (AoI).
- Beach Cleaning Initiative.
- Continue the implementation of cybertaker for Biodiversity Monitoring (sea turtle Monitoring) with the support of FFI.
- Satellite Monitoring around the FPSO Area.
- Water Balance Improvement and optimization.
- OGMP 2.0 (level 5) Implementation.



- Maintain active engagement with Ghana EPA in relation to Environmental matters
- Fugitive Monitoring Campaign on FPSO and ORF.
- Continue improvement of waste segregation at the Eni HQ office in Accra and all operative sites.

