

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1116782 JIV report S/N: 0402

(Note: As practicable as possible the JIT report is to be signed in the field by all the participating parties)

A. GENERAL INFORMATION:

1. Spill incident Number: 1116782 2. Type of incident* OIL SPILL
 3. Name of Location 28" NKPOKU - BOMU PIPELINE
 4. Name of nearest community ALETO 5. State: RIVERS 6. LGA ELEME
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 5TH FEBRUARY 2014
 b. Start date/time of investigation: 11TH FEBRUARY 2014 / 14:03 HOURS
 c. Investigation End date: 11TH FEBRUARY Actual investigation duration, days: ONE (1) DAY
 d. Description of spill point environment 2014
☐ Firmed soil ☒ Loose soil ☒ Recently excavated area
☐ Under water ☐ Swampy ☐ Exposed pipe surface
☐ Well Platform (on Water) ☐ Drill Rig
 e. Description of leak point (tick as applicable);
☐ Drilled hole ☐ Hack saw cut ☐ Tear (_____),
☐ Complete Rupture ☐ Inward dent, ☐ Well head tampering
☐ Failed Weld-on illegal hot tap valve, ☐ Failed Clamp ☐ Missing Pipeline/Flowline
☒ Crude oil theft (illegal bunkering) point, ☐ Third party tampering with Clamp
☐ Third party tampering with valve setting, ☐ Third party tampering with flange,
☐ Corrosion ☐ Saver-pit over flow, ☐ Surge vessel overflow,
☐ Bulging Outward ☐ Flare System/Bund wall failure ☐ Accidental 3rd party
 equipment impact ☐ Valve Failure ☐ com unit failure ☐ Cold vent
☐ Relief valve failure ☐ Others (specify) _____

f. Incident caused by:

- ☒ Third party interference (Sabotage ☐; crude theft ☒; Line theft ☐; Accidental 3rd party damage ☐
☐ Operational ☐ Others (including Mystery spills) _____

g. Spill point coordinates

Measuring unit	
Northing: (m) <div style="font-size: 2em; text-align: center;">89347.49</div>	Easting: (m) <div style="font-size: 2em; text-align: center;">515900.24</div>

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire,

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C. RISK ASSESSMENT

10. Type of environment:

☒ Land ☐ Swamp ☐ Water ☐ Seasonal swamp ☐ Shoreline/Waterfront

i. Type of environment to which oil has spread:

☒ Land ☐ Swamp ☒ Water ☐ River (identify) _____

ii. Weather condition

☐ Rain ☒ Sunny ☐ Dry ☐ Wet ☐ Windy ☐ Hot ☐ Cool

11. Distance from the nearest sensitive habitat

☐ Government reserved and designated protected area [,m]
☐ Drinking water source [,m]
☐ Built up area [,m]
☐ Farmlands [,m]
☐ Fish Farm/Pond [,m]
☐ Fishing net [,m]
☒ Others (specify). **PALM TREES** **60 m**

12. Containment measures put in place;

☐ Booms ☐ Trench ☐ Dyke ☐ Natural depression ☐ Pit
☒ Others: **NONE OBSERVED AS AT TIME OF INVESTIGATION.**

13. Any pictures or video coverage? [☒] [☐]

14. Was there any disruption to the investigation? [☐] [☒]

If yes give brief description:

NOT APPLICABLE

D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL

15. Structures / Properties

S/N	Type of Structures	Description	Size	Number	Comments

16. Crops/Economic Trees

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S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
NONE WITHIN AREA OF IMPACT						

17. Fish/Nets/Ponds

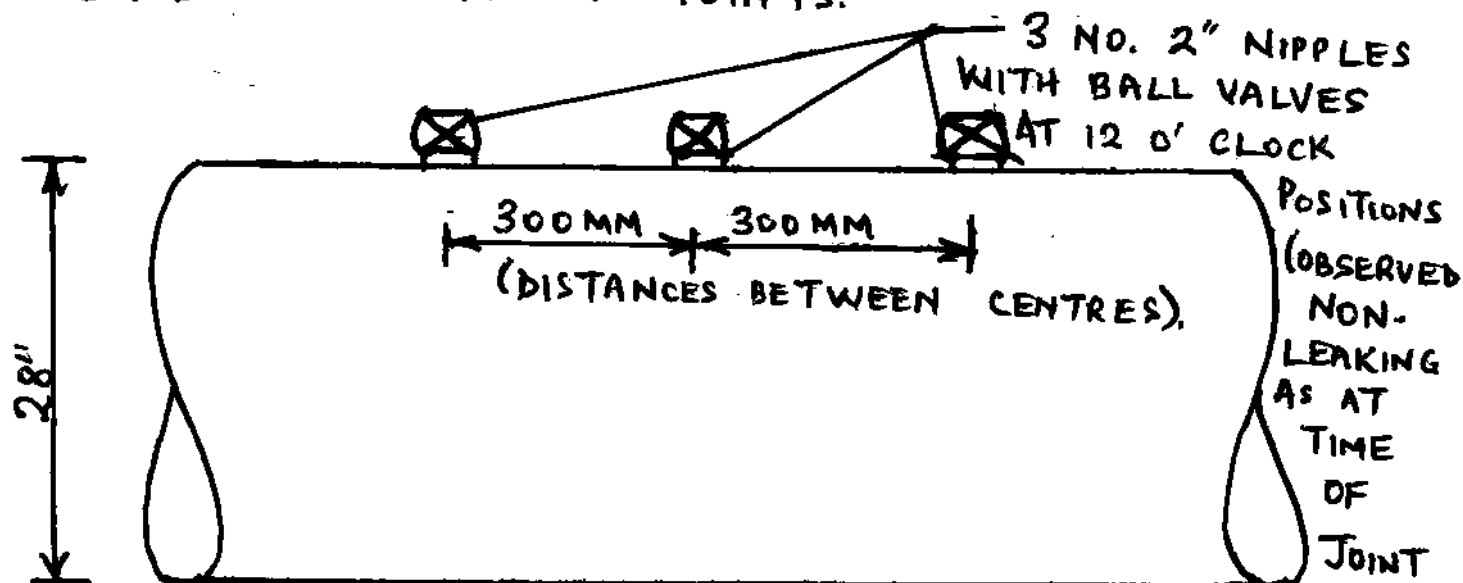
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

18. Others (Specify) i.e. Animal Traps

S/N	Others	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

E. GRAPHIC DESCRIPTION OF LEAK POINT (while detail report of the leak point should be contained in the leak report, overview sketch of the site should be added as an appendix 1)

SECTION OF 28" NKPOKU - BOMU PIPELINE
AT ALETO SHOWING POSITIONS OF 3 NO.
CRUDE OIL THEFT POINTS.



F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA INVESTIGATION).
FROM NKPOKU TO BOMU

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MINNA - MID BELT

[illegible]

20. Impacted Area Details

- Total calculated area of impact 0.005 Ha
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W NO

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Recovered oil V_{rec} :	<u>NIL</u>	Barrels
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22. Computation of estimated residual volume on site

a. Computation of estimated volume of pool of free phase oil (on land or confined water body).

- Area (m^2) occupied by pool of free phase oil 32
- Average Depth (m) of pool of free phase oil 0.001
- Emulsification factor: NIL
- Estimated Volume of pool of free phase oil.

V_{pool} :	<u>0.2</u>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil (V_{inf}).

1. Estimated Volume of infiltrated oil at spill point ($V_{inf a}$)

- Area* (m^2) of soil covered by the oil: NOT APPLICABLE
- Average Depth (m) above leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- Soil type: SILT
- P_e (effective porosity of the soil): 21%
- Cause of spill: THIRD PARTY INTERFERENCE
- Oil type: BONNY MEDIUM
- Oil Residence time on site, day: 6 DAYS
- Average depth of infiltration below leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- Estimated depth of infiltration around spill point: NOT APPLICABLE

Estimated Volume of infiltrated oil at spill point: $V_{inf a}$:	<u>NIL</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ($V_{inf b}$)

- Area* (m^2) of soil covered by the oil: NOT APPLICABLE
- Average Depth (m) above leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- Soil type: NOT APPLICABLE
- P_e (effective porosity of the soil): NOT APPLICABLE
- Cause of spill: NOT APPLICABLE
- Oil type: NOT APPLICABLE
- Oil Residence time on site, day: NOT APPLICABLE
- Average depth of infiltration below leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- Estimated depth of infiltration around spill point: NOT APPLICABLE

Estimated Volume of infiltrated oil at spill point: $V_{inf b}$:	<u>NIL</u>	barrels
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3. E

Estimated Volume of infiltrated oil outside immediate spill point(s) region ($V_{inf c}$)

- Area (m^2) of soil covered by the oil: 13
- Area (m^2) of the pool of free phase oil in touch with soil: NIL
- Average Depth (m) below ground surface of infiltration of oil: 0.005
- Soil type: SILT
- P_e (effective porosity of the soil): 21%

Estimated Volume of infiltrated oil. At $V_{inf c}$:	<u>0.09</u>	barrels
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23. Computation of estimated volume of oil on open water based on standard coloration.

- Total area of oil on open water: NIL

ALTHOUGH
THE CRUDE
OIL
THEFT
POINTS
WERE
OBSERVED
NON-LEAKING
AS AT TIME
OF
INVESTIGATION,
SPILL ESTIMATE
WAS BASED
ON THE
IMPACT
OBSERVED ON
SITE DURING
JIV,
INCLUDING
SLIGHT
DISCHARGE
FROM THE
POINTS ON
EXPOSURE.
REPAIR WAS
TEMPORARILY
DONE BY
PLUGGING
THE CRUDE THEFT
POINT VALVES
AND
DISCONNECTING THE VALVE HANDLES.

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ii. Table of average depth of oil on water based on coloration (

***Spill Factors from USCG FOG (2000 Edition)*

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

NOT APPLICABLE

iii.	Percent Total Estimated Volume of oil on open water, V_{wat} :	100% NIL	Barrels
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24. Calculation of evaporated volume:

i. Estimated Volume available for evaporation within surface area: 0.3 BARREL

ii. E-Factor: 15%

iii.	Estimated Volume of evaporated oil, V_{evap} :	0.05	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

25. Net Estimated Spilled Volume $V_{ren}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inr}(bbls) + V_{pool}(bbls) + V_{rec}(bbls) =$
 $0.05 + NIL + 0.09 + 0.2 + NIL \approx 0.35$

Estimated Reported Volume** $V_{ren}(bbls) =$ **0.4 BARREL**

Calculation of the respective estimated volume is to be done on site as far as practicable using the new spill volume estimation software on site; Conversion of m^3 to barrels is Volume (m^3) \times 6.29; **Round up estimated volume to next whole number using the following rules:

- Any spill volume in excess of 1 bbl is rounded up to the next whole number.
- Any spill volume in less than 1 bbl is rounded up to the next 0.1 bbl.

Examples: Calculated volume = 15.3 bbl ----- Reported volume = 16 bbl
 Calculated volume = 0.35 bbl ----- Reported volume = 0.4 bbl
 Calculated volume = 0.01 bbl ----- Reported volume = 0.1 bbl.

Wherever this estimation tool is not applicable please refer to paragraph 6c (Deviations) of the JIV procedure to use appropriate steps for column estimation; record the calculation in a plain sheet of paper and attach to the JIV report.

26. GENERAL STATUS OF THE SITE

A. Joint investigation of the incident site found that there is no residual impact after the initial response and therefore recommend that the site be closed out ☐

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- B. Investigation of the incident site showed that there is residual impact on site requiring further works ☒

27. REPRESENTATIVES

This report was filled, agreed and signed on the 11 / 02 / 20 14 by joint investigation representatives from

- Host Community: ☒
- Department of Petroleum Resources [DPR]: ☒
- National Oil Spill Detection and Response Agency [NOSDRA]: ☒
- State Ministry of Environment [SME]: ☒
- Nigeria Police Force [NPF]: ☒
- Shell Petroleum Development Company [SPDC]: ☒
- Signatories agree with reported findings: ☒
- Separate DPR form has been filled out with same findings ☒

Tick as applicable

28. Appendix 1: Overview sketch of the site

Location: 28" NKPOKU - BOMU PIPELINE AT ALETO

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