

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0451 882369

(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: 882369 2. Type of incident \* OIL SPILL  
 3. Name of Location 28" NKPOKU - BOMU PIPELINE  
 4. Name of nearest community ELELENWO 5. State: RIVERS 6. LGA OBIO/AKPOR  
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District NPE/PH I

**B. INCIDENT INFORMATION:**

**9. Details of incident**

- a. Date of incident: 22ND OCTOBER 2012.  
 b. Start date/time of investigation: 24TH OCTOBER 2012, 25TH, 28TH OCTOBER 2012 AND  
 c. Investigation End date: 30TH OCTOBER 2012.  
 d. Description of spill point environment  
 Firmed soil  Loose soil  Previously excavated area  
 Under water  Swampy  Exposed pipe surface  
 Well Platform (on Water)  Rig  
 e. Description of leak point (tick as applicable);  
 Drilled hole  Hack saw cut  Explosive tear,  
 Complete Rupture  Inward dent,  Well head tampering  
 Failed Weld-on illegal hot tap valve,  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  
 Outward dent  Flare System/Bund wall failure  
 Valve Failure  com unit failure  Cold vent  
 Relief valve failure  Others (specify) \_\_\_\_\_  
 f. Incident caused by:  
 Third party interference  Operational  Mystery \_\_\_\_\_

**g. Spill point coordinates**

Measuring unit		MINNA MID BELT	
Northing:	<u>92716.12m</u>	Easting:	<u>513697.80m</u> — SP <sub>1</sub>
②	<u>92722.21m</u>		<u>513693.14m</u> — SP <sub>2</sub>

\*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

i. Type of environment to which oil has spread:

- Land       Swamp       Water       River (identify) \_\_\_\_\_

ii. Weather condition

- Raining       Sunny

11. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [            ,m]  
 Drinking water source [            ,m]  
 Built up area [ **5** ,m]  
 Farmlands [            ,m]  
 Fish Farm/Pond [            ,m]  
 Fishing net [            ,m]  
 Others (specify). [            ,m]

12. Containment measures put in place;

- Booms       Trench       Dyke

Others: NATURAL DEPRESSION

13. Any pictures or video coverage? [  ] [ N ]

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

If yes give brief description:

JOINT INVESTIGATION OF THE SECOND SET OF THEFT POINTS WAS DISRUPTED ON 28TH OCTOBER 2012 BY COMMUNITY REPRESENTATIVES FROM ELELENWO COMMUNITY WHO NOTIFIED THE JOINT INVESTIGATION TEAM THAT THE LEAK ACTUALLY OCCURRED IN ELELENWO AND NOT AKPAJO AS INITIALLY ERRONEOUSLY REPORTED.

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
	NONE WITHIN AREA OF IMPACT				

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16. Crops/Economic Trees

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

17. Fish/Nets/Ponds

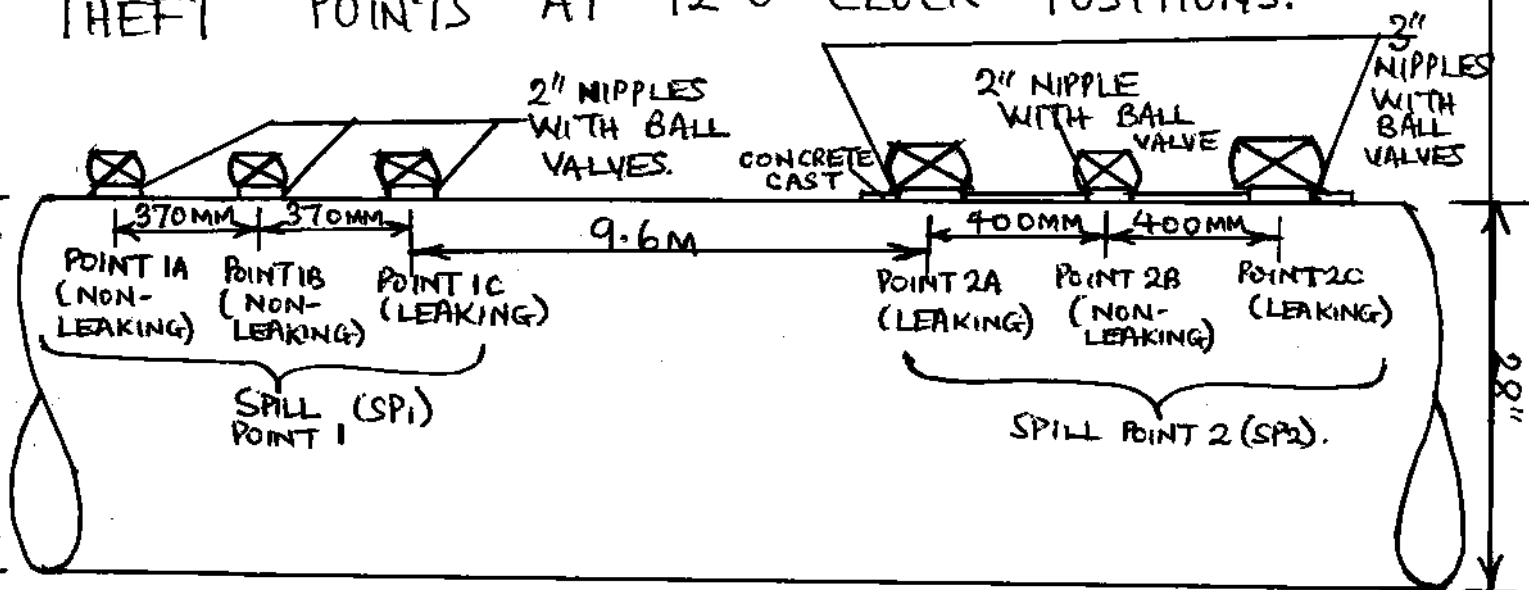
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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 ELELENWO SHOWING 6 NO. CRUDE OIL THEFT POINTS AT 12 O' CLOCK POSITIONS.



← Bomu

← NKPOKU

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F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

19. Impacted area boundary Coordinates (If more than 12 points, Attach as an appendix 2)

S/N	Northing	Easting
1.	92968.59m	513520.43m
2.	92974.69m	513542.01m
3.	92971.61m	513545.08m
4.	92968.55m	513538.91m
5.	92965.49m	513535.83m
6.	92845.53m	513609.53m
7.	92799.39m	513640.25m
8.	92722.21m	513693.14m
9.	92716.12m	513697.80m
10.	92710.17m	513701.69m
11.	92704.05m	513692.43m
12.	92713.28m	513686.29m
13.	92747.11m	513664.79m

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.23Ha
- Impact within SPDC R.O.W YES
- Impact outside R.O.W YES

21. Volume of oil recovered before completion of JIV ( $V_{recJ}$ ):

Recovered oil $V_{recJ}$	<u>NIL</u>	barrels
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20. Computation of the residual volume on site

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

- Area ( $m^2$ ) occupied by pool of free phase oil 400
- Average Depth (m) of pool of free phase oil 0.001

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iii. Emulsification factor: NIL

iv. 

Volume of pool of free phase oil, $V_{pool}$ :	2.52	barrels
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b. Computation of volume of infiltrated oil in the soil ( $V_{inf}$ ).

- i Area \*(m<sup>2</sup>) covered by the oil: 1898
- ii Area of the pool of free phase oil in touch with soil: NIL
- iii Average Depth (m) below ground surface of infiltration of oil: 0.002
- iv Soil type: CLAY
- v  $P_c$  (effective porosity of the soil): 8%

iv. 

Volume of infiltrated oil, $V_{inf}$ <i>(TOTAL)</i>	0.6 + 0.91 + 1.91 = 3.42	barrels
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COMPUTATION OF VOLUME OF OIL INFILTRATION AT SPILL POINTS:  
SPILL POINT 1:-  
AREA = 1M<sup>2</sup>  
DEPTH = 1.2M  
VOLUME =

1 x 1.2 x 8%

(EFFECTIVE POROSITY OF CLAY SOIL) x 6.29 = 0.6 BARREL

SPILL POINT 2:- Silvery  
AREA = 1M<sup>2</sup>, Slight Color  
DEPTH = 1.8M Bright Color  
VOLUME =  
1 x 1.8 x 8% (EFFECTIVE POROSITY OF CLAY SOIL) x 6.29 = 0.91 BARREL

VOLUME OF OIL-INFILTRATION OUTSIDE IMMEDIATE SPILL POINT REGION = 1.91 BARRELS

21. Computation of volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: NIL
- ii. Table of average depth of oil on water based on coloration\*\*

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004	NOT APPLICABLE	
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001		
Dark	0.002		
Blackoil Emulsion (30% Oil)	0.1		
	1		
Percent Total		100%	Total Volume <u>NIL</u> bbl

iii. 

Volume of oil on open water, $V_{wat}$ :	NIL	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM
- ii. E-Factor: 15%

iii. 

Volume of evaporated oil, $V_{evap}$ :	1.05	barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Period Since Oil Spill	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

\*If area is not same as the total area of impact, please indicate in the overview sketch  
\*\* Spill Factor from USCG FOG (2000 Edition)

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<b>23. Gross Total Estimated Spilled Volume</b>		$= 1.05 + \text{NIL} + 3.42 + 2.52 + \text{NIL} = 6.99$
$V_{Est}(\text{bbls}) = V_{evap}(\text{bbls}) + V_{wat}(\text{bbls}) + V_{inf}(\text{bbls}) + V_{pool}(\text{bbls}) + V_{rec}(\text{bbls})$		
$V_{Est}(\text{bbls}) =$	<b>7 BARRELS</b>	
<b>24. Net Total Estimated Spilled Volume</b>		$= 1.05 + \text{NIL} + 3.42 + 2.52 + \text{NIL} = 6.99$
$V_{Est}(\text{bbls}) = V_{evap}(\text{bbls}) + 0.6 * V_{wat}(\text{bbls}) + V_{inf}(\text{bbls}) + V_{pool}(\text{bbls}) + V_{rec}(\text{bbls})$		
$V_{Est}(\text{bbls}) =$	<b>7 BARRELS</b>	

\*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 m3 to barrels is Total volume VT (m3) x 6.29  
 \*Emulsification factor for spill on water to consider is 60% of volume of oil.

**25. 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
- B. Investigation of the incident site showed that there is residual impact on site requiring further works

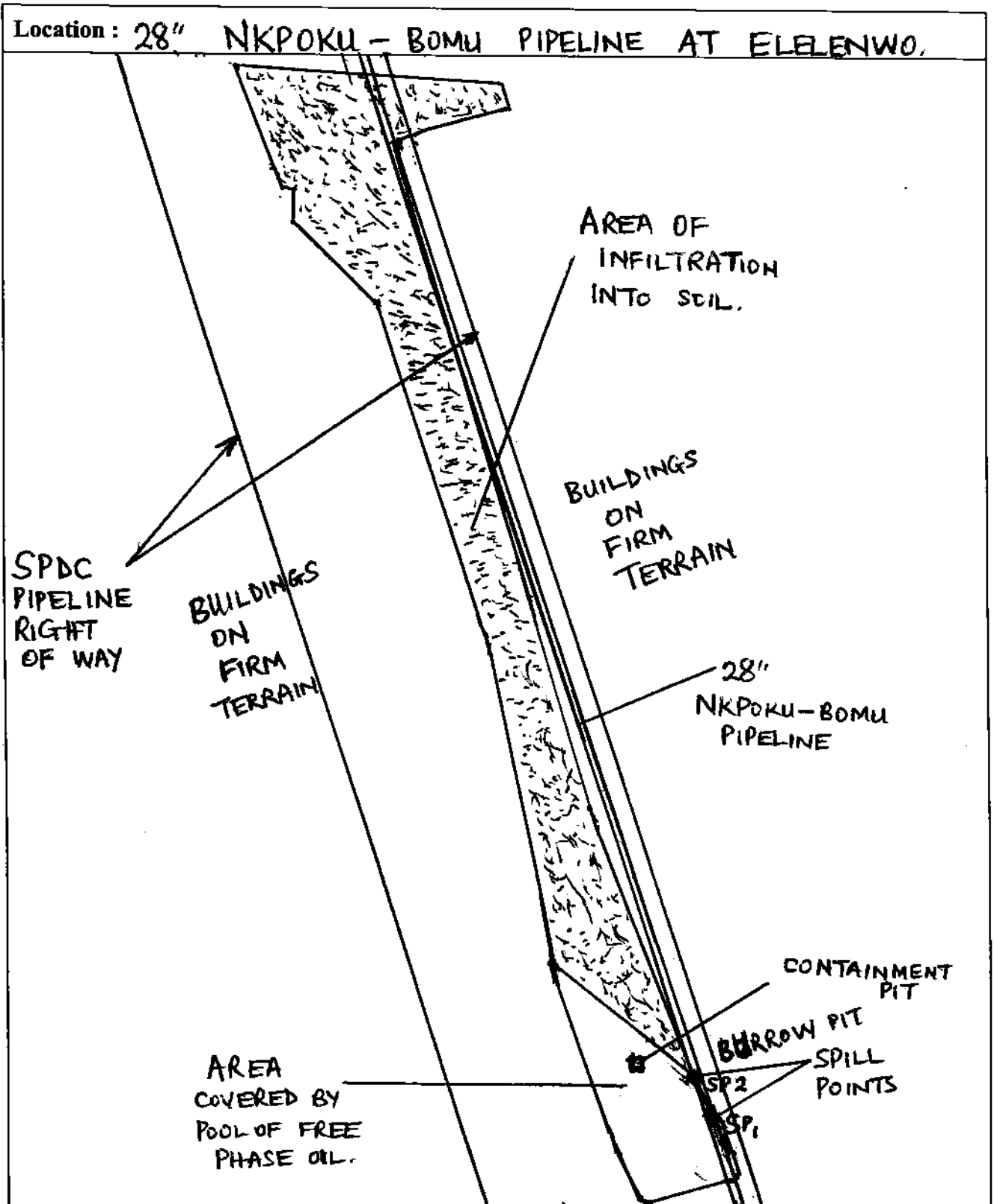
**26 REPRESENTATIVES**

This report was filled and signed on the 30/10/2012 at incident site 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]:

*Tick as applicable*

27. Appendix 1: Overview sketch of the site



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21. Appendix 2: TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

MINNA MID BELT

S/N	Northing	Easting
14.	92934.74m	513548.09m
15.	92950.13m	513535.79m
16.	92956.28m	513532.73m
17.	92956.29m	513529.64m

*[Signature]*