

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0409 856081

(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: 856081 2. Type of incident * OIL SPILL
 3. Name of Location 24" NKPOKU - BOMU PIPELINE
 4. Name of nearest community NONWA/KIRA 5. State: RIVERS 6. LGA TAI
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District NPE/PH

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 22ND AUGUST, 2012
 b. Start date/time of investigation: 23RD AUGUST, 2012
 c. Investigation End date: 23RD AUGUST, 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	
Northing: (m) SPI. 82015.742	Easting: (m) 531787.997

Mina Mid-belt.

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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 [,m]
- Farmlands [,m]
- Fish Farm/Pond [,m]
- Fishing net [,m]

Others (specify). **PALM TREES**

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

PALM TREES IMPACTED BY SPILL.

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

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

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
NONE WITHIN AREA OF IMPACT					

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	PALM TREES		✓		8 NO.	WITHIN
2	SOFT WOOD	✓			5 NO.	SPILL-IMPACTED REGION

17. Fish/Nets/Ponds

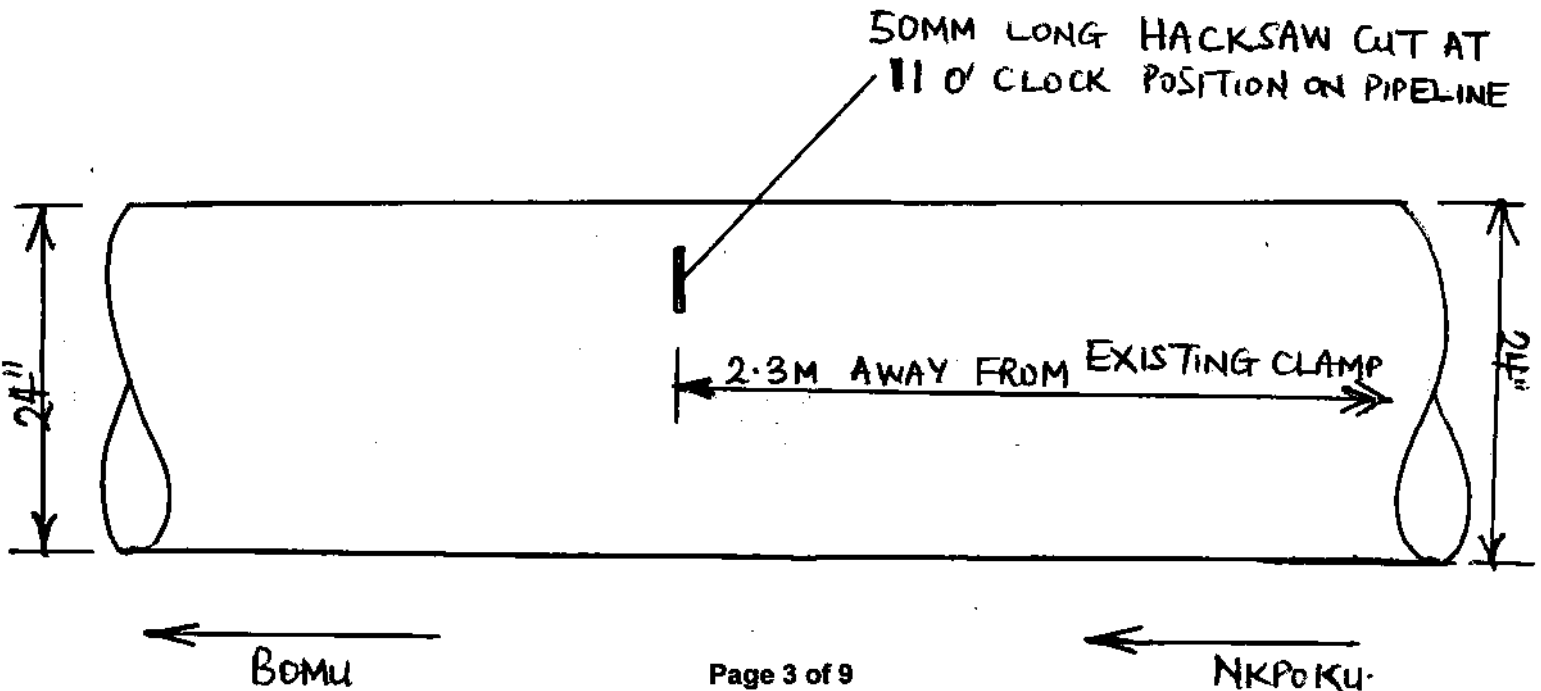
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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 24" NKPOKU - BOMU PIPELINE AT NONWA / KIRA SHOWING POSITION OF HACKSAW CUT.



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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)

Minna - Mid-belt

S/N	Northing (m)	Easting (m)
WP055	82052.670	531751.084
WP056	82031.112	531781.862
WP057	82037.250	531784.954
WP058	81969.516	531871.118
WP059	81969.533	531861.873
WP060	82015.726	531797.242
WP061	82009.605	531784.904
WP062	82018.825	531781.839
WP063	82021.891	531784.926
WP064	82024.952	531791.095
WP065	82018.808	531791.084
WP066	82015.742	531787.997

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.1046 ha
- Impact within SPDC R.O.W Yes
- Impact outside R.O.W No

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

Recovered oil V_{rec}	<u>5</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).

- i. Area (m^2) occupied by pool of free phase oil 200
- ii. Average Depth (m) of pool of free phase oil 0.021

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iii. Emulsification factor: NIL

iv.

Volume of pool of free phase oil, V_{pool} :	<u>26.42</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

COMPUTATION OF OIL-INFILTRATED VOLUME AT SPILL POINT:
AREA OF OIL-INFILTRATION AT SPILL POINT = $2M^2$,
DEPTH OF OIL-INFILTRATION = $2M$,
VOLUME = $2M^2 \times 2M \times 8\%$

i Area *(m^2) covered by the oil: 844
 ii Area of the pool of free phase oil in touch with soil: 186
 iii Average Depth (m) below ground surface of infiltration of oil: 0.009
 iv Soil type: CLAY
 v P_e (effective porosity of the soil): 8%
 iv.

Volume of infiltrated oil, V_{inf} (TOTAL)	<u>$2.01 + 4.66 = 6.67$</u>	barrels
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VOLUME OF OIL-INFILTRATION OUTSIDE SPILL POINT = 4.66 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**

(EFFECTIVE POROSITY OF CLAY SOIL) \times $6.29 =$

2.01 BARRELS.

	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		
Black oil	0.1		
Emulsion (30% Oil)	1		

Percent Total 100% Total Volume NIL bbl

iii.

Volume of oil on open water, V_{wat} :	<u>NIL</u>	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} :	<u>6.72</u>	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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23. Gross Total Estimated Spilled Volume		$= 6.72 + \text{NIL} + 6.67 + 26.42 + 5 = 44.81$
$V_{Est}(\text{bbls}) = V_{evap}(\text{bbls}) + V_{wat}(\text{bbls}) + V_{inf}(\text{bbls}) + V_{pool}(\text{bbls}) + V_{rej}(\text{bbls})$		
$V_{Est}(\text{bbls}) =$	45 BARRELS.	
24. Net Total Estimated Spilled Volume		$= 6.72 + \text{NIL} + 6.67 + 26.42 + 5 = 44.81$
$V_{Est}(\text{bbls}) = V_{evap}(\text{bbls}) + 0.6 * V_{wat}(\text{bbls}) + V_{inf}(\text{bbls}) + V_{pool}(\text{bbls}) + V_{rej}(\text{bbls})$		
$V_{Est}(\text{bbls}) =$	45 BARRELS.	

*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 23/08/2012 at incident site by joint investigation representatives from

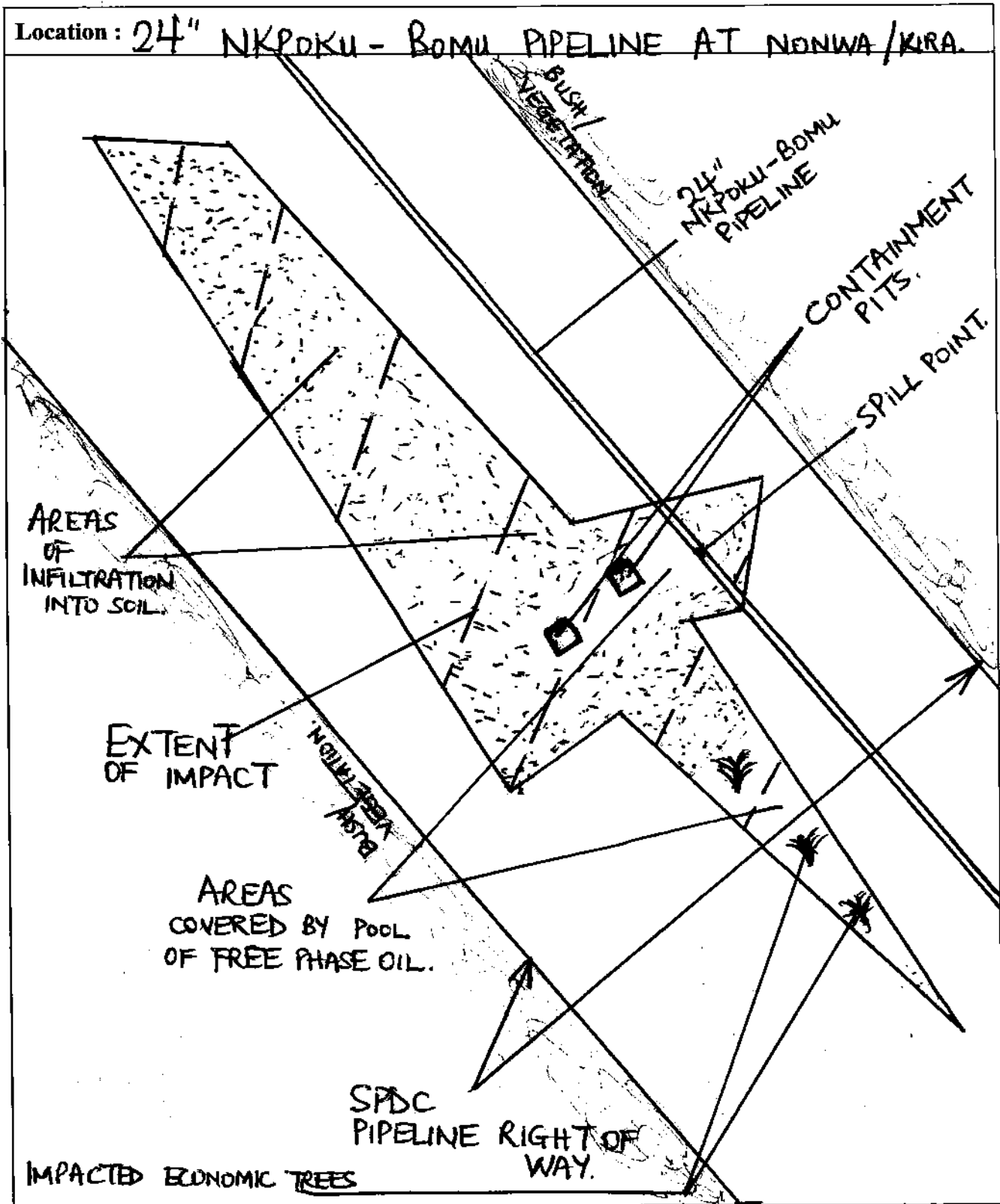
- Host Community
- Department of Petroleum Resources [DPR]: **DPR INCIDENT INVESTIGATION REPORT ATTACHED.**
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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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

S/N	Northing	Easting