



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED
JOINT INVESTIGATION REPORT FOR INCIDENT NO: 671421

No. 00765

A. GENERAL INFORMATION:

1. Spill incident Number: 671421
2. Name of Location 24" NKPOKY - BOMU PIPELINE
3. Name of nearest community BIARA (OGONI)
4. State RIVERS LGA GOKANA
5. Type of Production facility/Installation PIPELINE Asset owner /District UIG/PINESP

B. INCIDENT INFORMATION:

6. Details of incident

- a. Date of incident 10TH JUNE, 2011
- b. Date/Period of investigation, 12TH JUNE, 2011
- c. Description of spill point environment

- | | | |
|--|---|---|
| <input type="checkbox"/> Firmed soil | [Y] <input checked="" type="checkbox"/> | [N] |
| <input type="checkbox"/> Loose soil | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Previously excavated area | [Y] <input checked="" type="checkbox"/> | [N] |
| <input type="checkbox"/> Under water | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Swampy | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Exposed pipe surface | [Y] | [N] <input checked="" type="checkbox"/> |

d. Description of leak point (tick as applicable);

- | | | |
|--|---|---|
| <input type="checkbox"/> Drilled hole, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Hack saw cut, | [Y] <input checked="" type="checkbox"/> | [N] |
| <input type="checkbox"/> Explosive tear, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Complete Rupture | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Inward dent, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Well head tampering | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Missing pipeline (flowline) | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Third party tampering with Clamp Bolt/Nut, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Third party tampering with valve setting, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Third party tampering with flange Nuts/bolts, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Corrosion, | [Y] | [N] <input checked="" type="checkbox"/> |
| Type: <u>NOT APPLICABLE</u> | | |
| <input type="checkbox"/> Saver-pit over flow, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Surge vessel overflow, | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Outward dent | [Y] | [N] <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Others (specify). <u>NOT APPLICABLE</u> | | |

THE INVESTIGATING TEAM

OBSERVED THAT THE SABOTAGE SPILL WAS ACCOMPANIED BY FIRE.

AFTER JOINT INVESTIGATION OF THE INCIDENT: SPILL WAS FOUND TO BE DUE TO THIRD PARTY INTERFERENCE.

e. Spill point coordinates

Northing: (MINNA MID-BRAC)

Easting:

77819.83M

535238.21M



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C. RISK/DAMAGE ASSESSMENT

7. Type of environment of spill site:

- Land ✓
- Swamp
- water

Type of environment of which oil has spread:

- Land ✓
- Swamp
- water

8. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [200 ,m]
- Drinking water source [200 ,m]
- Built up area [200 ,m]
- Farmlands [200 ,m]
- Fish Farm/Pond [200 ,m]
- Fishing net [200 ,m]
- Others (specify). NOT APPLICABLE

9. Containment measures put in place;

- Booms [Y] [N] ✓
- Trench [Y] ✓ [N]
- Dyke [Y] ✓ [N]
- Others: NOT APPLICABLE

10. Any pictures or video coverage? [Y] ✓ [N]

11. 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

A. Structures / Properties

S/N	Type of Structures	Description	Size	Number	Comments
	<u>NONE WITHIN AREA OF IMPACT</u>				



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B. Crops/Economic Trees

S/N	Types of crops	Young	Medium	Matured	Quantity	Comments
1.	CASSAVA	✓	✓	NIL	16m x 15m	

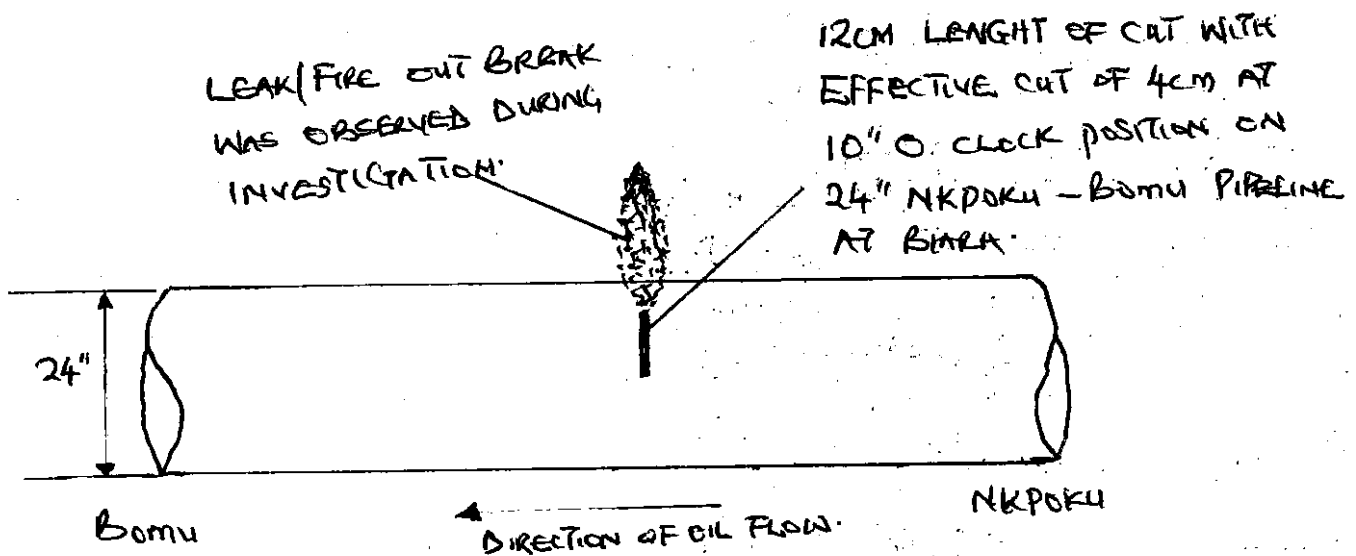
C. Fish/Nets/Ponds

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

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

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

E. GRAPHIC DESCRIPTION OF LEAK POINT (Details should be contained in leak repair report)





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G. INCIDENT INFORMATION:

17 Impacted Area Details

- a. Total calculated area of impact 0.03 Ha
 - Impact within SPDC R.O.W 0.03 Ha
 - Impact outside R.O.W NIL

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

Recovered oil V_{rec} :

165	barrels
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19. Computation of the residual volume on site

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

- i. Area (m^2) occupied by pool of free phase oil RECOVERED
- ii. Average Depth (m) of pool of free phase oil RECOVERED
- iii Volume of pooled of free phase oil V_{pool} : NOT APPLICABLE

"POOL OF OIL IN THE ENVIRONMENT WAS RECOVERED DURING INVESTIGATION PERIOD."

Volume of pooled of free phase oil V_{pool} :

	barrels
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iv.

b. Computation of volume of infiltrated oil in the soil (V_3).

- i. Area (m^2) covered by the oil: 300 m^2
- ii. Average Depth (m) below ground surface of infiltration of oil: 0.002 m
- iii. Soil type: CLAY
- iv. p_e (effective porosity of the soil): 8%

v. Volume of infiltrated oil V_3 :

0.30	barrels
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20. Computation of volume of oil on open water based on standard coloration.

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Colour	0.00015	NOT	
Bright Colour	0.0003		
Dull	0.001	APPLICABLE	
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
	Percent Total	100%	Total Volume

NIL bbl

Spill Factors from USCG FOG (2000 Edition)



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

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

Volume of evaporated oil V_{vap}	29.17	barrels
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Oil Type		Bonny Light	Bonny Medium
		E-Factor	E-Factor
Period Since Oil Spill	<1 day	10%	5%
	1-7 days	25%	15%
	>7 days	40%	25%

9. Gross Total Estimated Spilled Volume $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 29.17 + 0.30 + 165 = 194.47$ BARRELS

10. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{vap}(bbls) + 0.6*V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 194.47$ BARREL ≈ 195 BARRELS

- *Calculation of the respective estimated volume is to done using the new spill estimation software on site
- *Conversion of m3 to barrel is Total volume VT (m3) x6.29
- *Emulsification factor for spill on water to consider is 60% of volume of oil.

This report was filled and signed on the 12 / 06 / 20 11 at incident site by joint investigation representative 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