



No. 01683

A. GENERAL INFORMATION:

1. Spill incident Number: 626696
2. Name of Location 28" BOMU - BONNY PIPELINE AT BODO WEST
3. Name of nearest community BODO CITY
4. State RIVERS LGA GOKANA
5. Type of Production facility/Installation PIPELINE Asset owner /District UIG/P/NESP

B. INCIDENT INFORMATION:

6. Details of incident

- a. Date of incident 24TH FEBRUARY, 2011
- b. Date/Period of investigation, 26TH FEBRUARY, 2011

c. Description of spill point environment

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

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

- | | | |
|--|---------|---------|
| <input type="checkbox"/> Drilled hole, | [Y] | [N] ✓ |
| <input type="checkbox"/> Hack saw cut, | [Y] | [N] ✓ |
| <input type="checkbox"/> Explosive tear, | [Y] | [N] ✓ |
| <input type="checkbox"/> Complete Rupture | [Y] | [N] ✓ |
| <input type="checkbox"/> Inward dent, | [Y] | [N] ✓ |
| <input type="checkbox"/> Well head tampering | [Y] | [N] ✓ |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | [Y] ✓ | [N] |
| <input type="checkbox"/> Missing pipeline (flowline) | [Y] | [N] ✓ |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point, | [Y] ✓ | [N] |
| <input type="checkbox"/> Third party tampering with Clamp Bolt/Nut, | [Y] | [N] ✓ |
| <input type="checkbox"/> Third party tampering with valve setting, | [Y] | [N] ✓ |
| <input type="checkbox"/> Third party tampering with flange Nuts/bolts, | [Y] | [N] ✓ |
| <input type="checkbox"/> Corrosion, | [Y] | [N] ✓ |
- Type: _____
- | | | |
|--|-------|---------|
| <input type="checkbox"/> Saver-pit over flow, | [Y] | [N] ✓ |
| <input type="checkbox"/> Surge vessel overflow, | [Y] | [N] ✓ |
| <input type="checkbox"/> Outward dent | [Y] | [N] ✓ |
| <input type="checkbox"/> Others (specify). _____ | | |

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

e. Spill point coordinates (MINNA MID-BELT)

Northing:
66618.547 m

Easting:
532888.157 m



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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 [,m]
- Drinking water source [,m]
- Built up area [,m]
- Farmlands [>500 ,m]
- Fish Farm/Pond [,m]
- Fishing net [,m]
- Others (specify). [,m]

9. Containment measures put in place;

- Booms [Y] [N]
- Trench [Y] [N
- Dyke [Y] [N
- Others: _____

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
	NONE WITHIN AREA OF IMPACT					

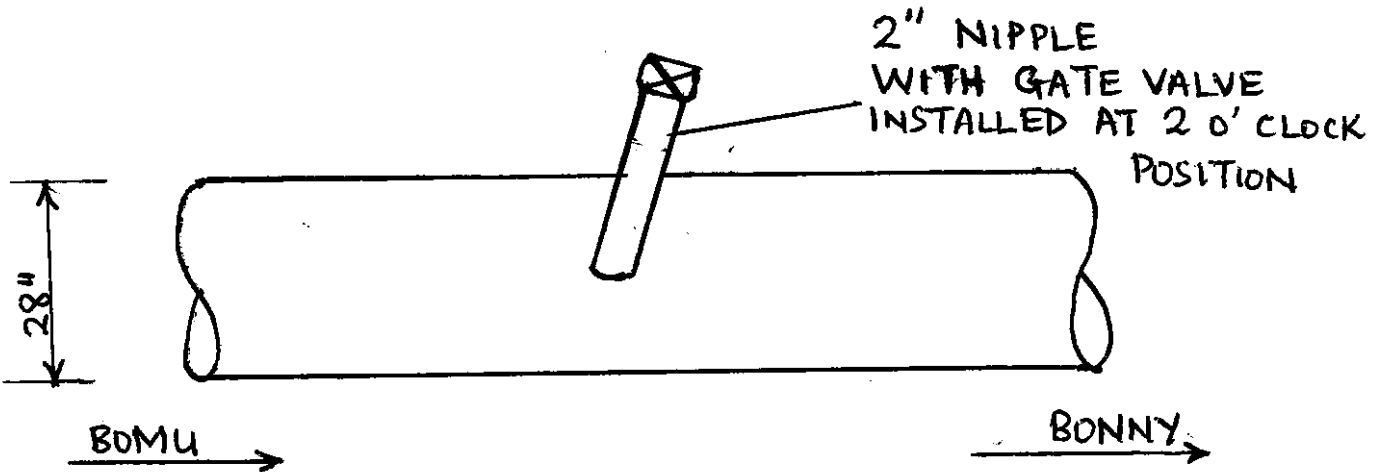
C. Fish/Nets/Ponds

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)



SECTION OF 28" BOMU-BONNY PIPELINE AT BODO-WEST SHOWING POSITION OF ILLEGAL BUNKERING CONNECTION.



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 626696

No 01593

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

E. Coordinates (SOME IMPACTED AREA BOUNDARY COORDINATES - MINNA MID-BELT)

S/N	Northing (m)	Easting (m)
926	66597.108	532854.626
928	66676.890	532901.000
932	66670.671	532944.14
933	66650.930	532913.109
935	66590.927	532876.191
943	66477.448	532777.360
945	66474.519	532804.415
946	66460.190	532820.791



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G. INCIDENT INFORMATION:

17 Impacted Area Details

- a. Total calculated area of impact 6833m² (0.68Ha)
- Impact within SPDC R.O.W 4836m² (0.48Ha)
 - Impact outside R.O.W 1997m² (0.20Ha)

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

Recovered oil V_{recj}:

75 (GROSS)	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).

- OIL SITTING ON THE SURFACE OF A PUDDLE.**
- i. Area (m²) occupied by pool of free phase oil 733
 - ii. Average Depth (m) of pool of free phase oil 0.003
 - iii.

Volume of pooled of free phase oil. V _{pool} :	13.8	barrels
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 - iv.

b. Computation of volume of infiltrated oil in the soil (V-3).

- i. Area (m²) covered by the oil: 4,800
- ii. Average Depth (m) below ground surface of infiltration of oil: 0.005
- iii. Soil type: CLAY
- iv. p_e (effective porosity of the soil): 8%
- v.

[REDACTED]	12.1	barrels
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A GROSS VOLUME OF 75 BARRELS WAS RECOVERED BEFORE THE JOINT INVESTIGATION VIA SKIMMER ON WATER.

EMULSIFICATION FACTOR WAS DISCOUNTED BOTH ON THIS FIGURE AND THE VOLUME OF SPILL ESTIMATED ON OPEN WATER TO ARRIVE AT THE TOTAL NET VOLUME OF SPILL.

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

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Colour	0.00015		
Bright Colour	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1	90%	0.12
Emulsion (30% Oil)	1	10%	0.13
Percent Total		100%	Total Volume

TOTAL AREA OF IMPACT ON OPEN WATER IS APPROXIMATELY 1,300m².

1.6	bbl
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Spill Factors from USCG FOG (2000 Edition)



Volume of oil on open water V_{wat}	1.6	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}	4.9	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 $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 4.9 + 1.6 + 12.1 + 13.8 + 75 = 107.4$

$V_{Est}(bbls) = 107.4$ BARRELS

10. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{vap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 4.9 + (0.6 * 1.6) + 12.1 + 13.8 + (0.6 * 75) = 76.8 = 77$

$V_{Est}(bbls) = 77$ 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 26 / 02 / 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