

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0295 840178

(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: 840178 2. Type of incident * OIL SPILL
 3. Name of Location 28" NKPOKU - BOMU PIPELINE
 4. Name of nearest community G10 5. State: RIVERS 6. LGA TAI
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District UIC/P/NECP

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 11th JULY 2012
 b. Start date/time of investigation: 12th JULY 2012
 c. Investigation End date: 14th JULY 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: SP1 ⇒ 77409mN SP2 ⇒ 77252mN SP3 ⇒ 77695mN	Easting: 531570mE 531755mE 531219mE

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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 [Nil ,m]
- Drinking water source [Nil ,m]
- Built up area [Nil ,m]
- Farmlands [K2 ,m]
- Fish Farm/Pond [Nil ,m]
- Fishing net [Nil ,m]
- Others (specify).

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? [Y] []

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
	<u>NONE</u>	<u>WITHIN AREA OF IMPACT</u>			

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	Cassava	✓	—	—	FEW	

17. Fish/Nets/Ponds

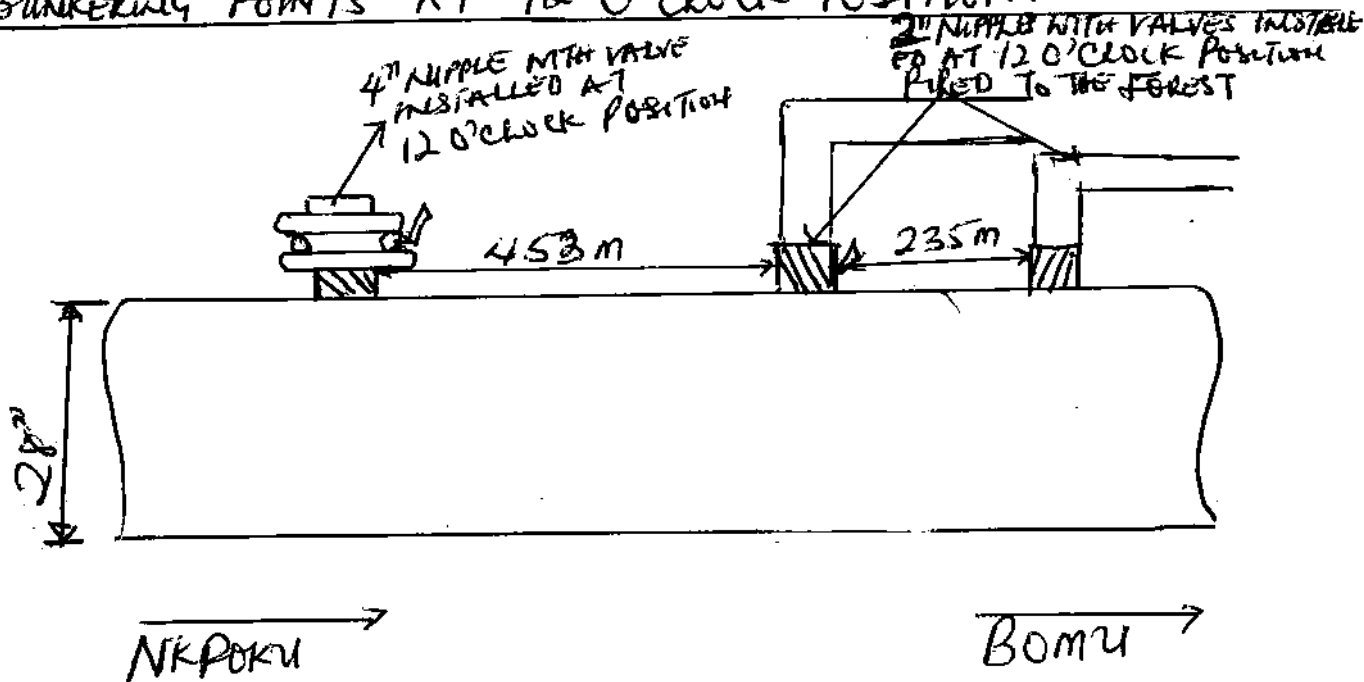
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE	WITHIN AREA OF IMPACT		

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)

A SECTION OF 28" NKPOKU-BOMU PIPELINE AT C110 SHOWING 3 NON LEGAL BUNKERING POINTS AT 12 O'CLOCK POSITION.



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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	77264 mN	531761 mE
2	77276 mN	531764 mE
3	77350 mN	531798 mE
4	77245 mN	531755 mE
5	77255 mN	531764 mE
6	77267 mN	531749 mE
7	77282 mN	531727 mE
8	77270 mN	531721 mE
9	77402 mN	531558 mE
10	77384 mN	531573 mE
11	77387 mN	531564 mE
12	77399 mN	531551 mE
13	77384 mN	531542 mE

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.076 Ha.
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

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

Recovered oil V_{rec}	<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 20 m
- Average Depth (m) of pool of free phase oil 0.04 m

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iii. Emulsification factor: NU

iv.

Volume of pool of free phase oil. V_{pool} :	<u>5.03</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i Area *(m²) covered by the oil: 740
- ii Area of the pool of free phase oil in touch with soil: 20
- iii Average Depth (m) below ground surface of infiltration of oil: 0.06
- iv Soil type: CLAY
- v P_c (effective porosity of the soil): 8%

iv.

Volume of infiltrated oil. V_{inf}	<u>2.29</u>	barrels
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21. Computation of volume of oil on open water based on standard coloration.

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

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

iii.

Volume of oil on open water. V_{wat}	<u>NU</u>	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%

iii.

Volume of evaporated oil. V_{evap}	<u>2.44</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

$$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls)$$

$$V_{Est}(bbls) = 2.44 + \text{NULL} + 2.29 + 5.03 + \text{NULL} = 9.76 \text{ BARRELS}$$

24. Net Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls)$$

$$V_{Est}(bbls) = 2.44 + \text{NULL} + 2.29 + 5.03 + \text{NULL} = 9.76 \text{ BARRELS}$$

*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

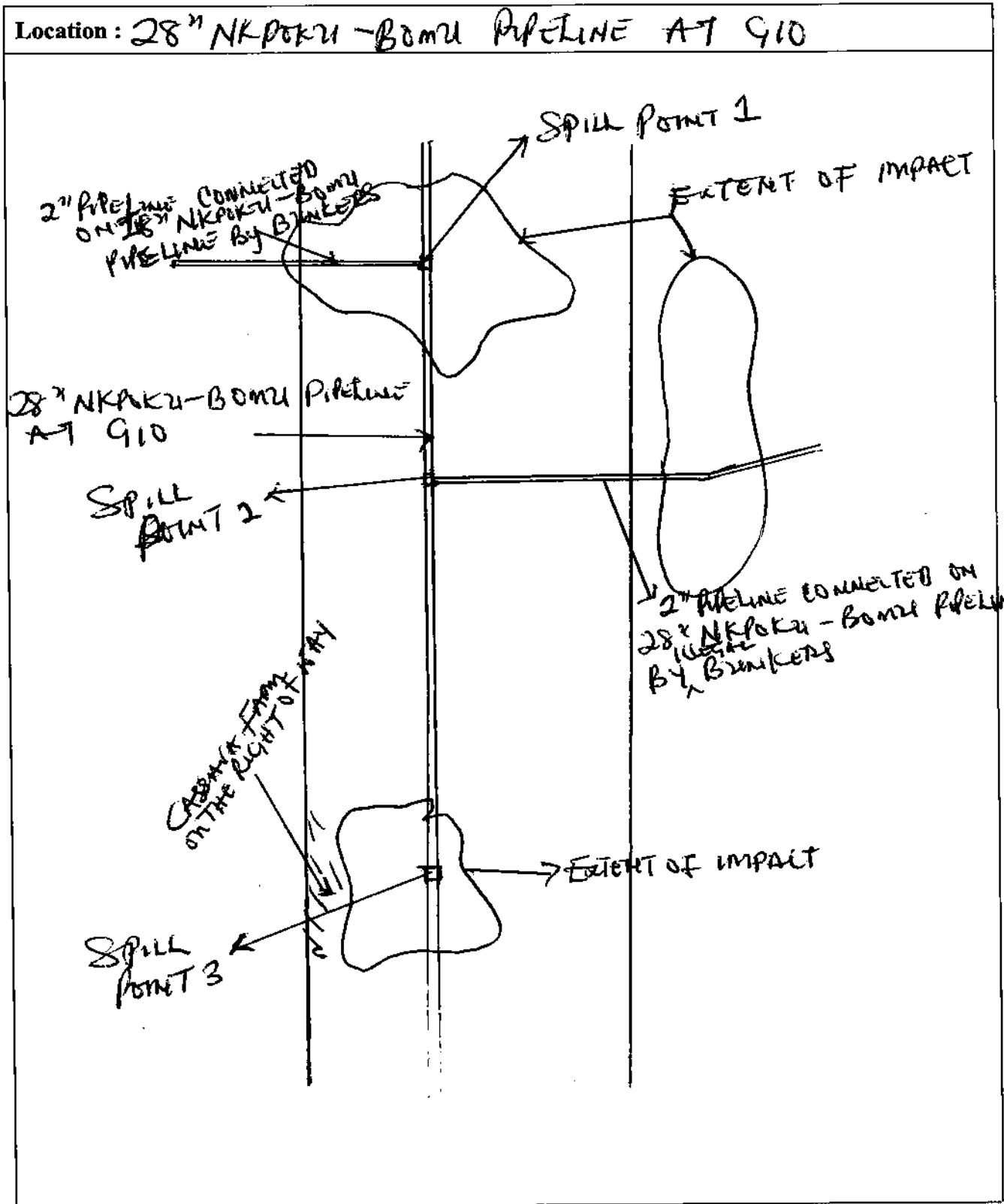
26 REPRESENTATIVES

This report was filled and signed on the 14/07/2012 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

S/N	Northing mN	Easting mE
14	77347mN	531502mE
15	77326mN	531468mE
16	77696mN	531223mE
17	77691mN	531223mE
18	77892mN	531215mE
19	77698mN	531216mE
20	77191mN	531329mE
21	77200mN	531283mE