

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0427 850357

(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: 850357 2. Type of incident \* OIL SPILL  
 3. Name of Location 8<sup>th</sup> UMUECHEM - NKPOKU PIPELINE  
 4. Name of nearest community UMUESELE 5. State: RIVERS 6. LGA ETCHE IKWERRE  
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District NESP/LAND

**B. INCIDENT INFORMATION:**

**9. Details of incident**

- a. Date of incident: 6<sup>th</sup> AUGUST 2012  
 b. Start date/time of investigation: 9<sup>th</sup> AUGUST 2012  
 c. Investigation End date: 9<sup>th</sup> 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 (M) <u>MINNA MID-BELT</u>	
Northing: SP1 : 107475.88 SP2 : 107574.21	Easting: 507136.87 507121.68

\*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

- |  |                    |
|--|--------------------|
| <input type="checkbox"/> Government reserved and designated protected area | [ <u>Nil</u> ,m]   |
| <input type="checkbox"/> Drinking water source                             | [ <u>Nil</u> ,m]   |
| <input type="checkbox"/> Built up area                                     | [ <u>Nil</u> ,m]   |
| <input type="checkbox"/> Farmlands   | [ <u>&lt;1</u> ,m] |
| <input type="checkbox"/> Fish Farm/Pond                                    | [ <u>Nil</u> ,m]   |
| <input type="checkbox"/> Fishing net                                       | [ <u>Nil</u> ,m]   |
| <input type="checkbox"/> 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 WITHIN AREA OF IMPACT</u>				

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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

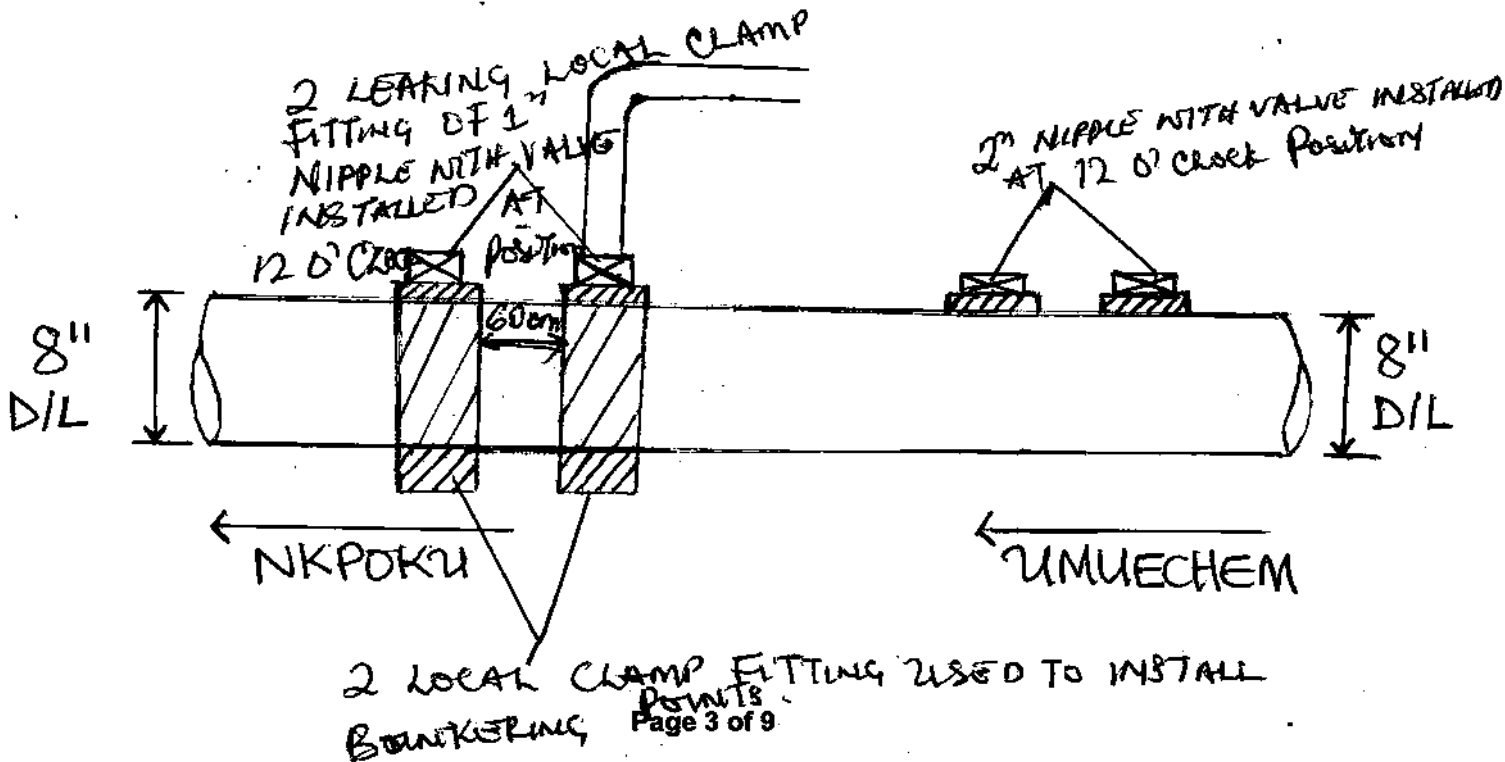
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE	WITHIN AREA OF IMPACT		

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)*

A SECTION OF 8" UMUECHEM - NKPOKU PIPELINE AT BOMBELE



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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)
WP818	107 561.93	507 118.57
WP819	107 580.38	507 109.37
WP820	107 617.26	507 103.29
WP821	107 632.62	507 106.41
WP822	107 623.37	507 118.71
WP823	107 598.78	507 124.82
WP824	107 586.50	507 121.71
WP825	107 571.13	507 124.75
WP827	107 503.53	507 133.85
WP829	107 488.19	507 124.57
WP831	107 488.20	507 121.49
WP832	107 491.28	507 115.33
WP833	107 537.29	507 146.25

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.26 Ha.
- Impact within SPDC R.O.W Yes
- Impact outside R.O.W Yes

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

Recovered oil $V_{rec}$	NU	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 600  $m^2$
- Average Depth (m) of pool of free phase oil 0.003 m

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iii. Emulsification factor: Nil

iv. 

Volume of pool of free phase oil, $V_{pool}$ :	<u>11.3</u>	barrels
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*COMPUTATION OF SPILL POINT INFILTRATION*  
 AREA =  $3.2 m^2$   
 DEPTH =  $1 m$   
 SOIL TYPE = CLAY  
 $3.2 \times 1 \times 0.08 \times 6.29$   
 $= 1.6$  BARRELS

b. Computation of volume of infiltrated oil in the soil ( $V_{inf}$ ):

i. Area \*(m<sup>2</sup>) covered by the oil: 2596.8

ii. Area of the pool of free phase oil in touch with soil: 600

iii. Average Depth (m) below ground surface of infiltration of oil: 0.003

iv. Soil type: CLAY

v.  $P_e$  (effective porosity of the soil): 8%

iv. 

Volume of infiltrated oil, $V_{inf}$ :	<u><math>3.9716 = 5.5</math></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: Nil
- ii. Table of average depth of oil on water based on coloration\*\*

	Thickness (mm)	Percentage coverage	Volume (m <sup>3</sup> )
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>Nil</u> 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 LIGHT
- ii. E-Factor: 25%

iii. 

Volume of evaporated oil, $V_{evap}$ :	<u>5.6</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**

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

$$V_{Est}(bbls) = 5.6 + NIL + 5.5 + 11.3 + NIL = 22.4 \text{ BARRELS}$$

**24. Net Total Estimated Spilled Volume**

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

$$V_{Est}(bbls) = 5.6 + NIL + 5.5 + 11.3 + NIL = 22.4 \text{ BARRELS}$$

\*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

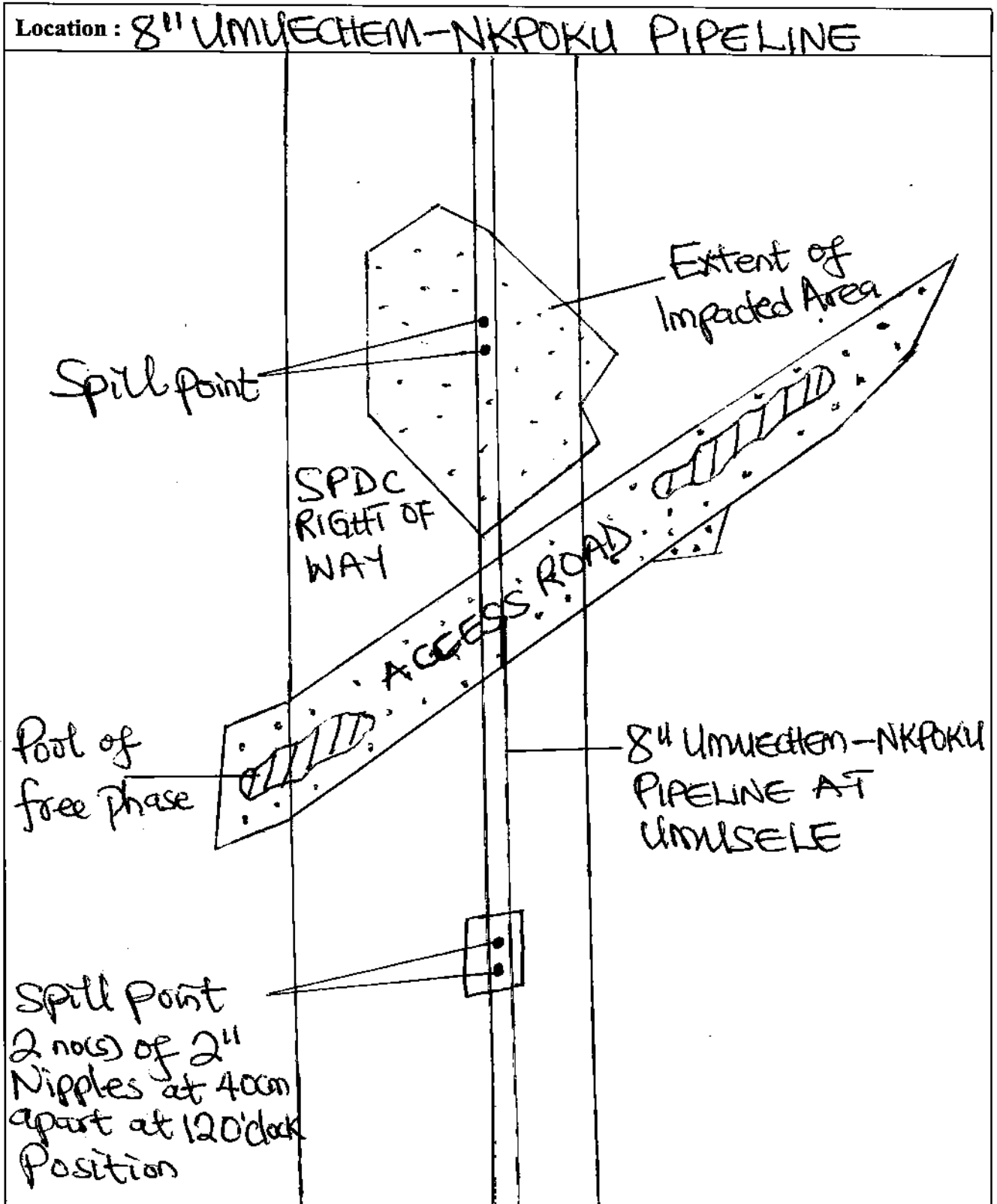
**26 REPRESENTATIVES**

This report was filed and signed on the 09 / 08 / 20 12 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 (m)	Easting (m)
WP834	107 607.84	507 195.70
WP835	107 712.11	507 276.03
WP836	107 702.91	507 269.85
WP837	107 638.49	507 226.58
WP838	107 623.16	507 214.22
WP839	107 598.62	507 198.76
WP840	107 589.39	507 204.90
WP841	107 589.39	507 201.82
WP842	107 592.49	507 192.58