

**THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.**

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 959316 JIV report S/N: 0051

(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: 959316 2. Type of incident\* OIL SPILL  
 3. Name of Location 8" NKALI PIPELINE  
UMUEDEOKWARA  
 4. Name of nearest community (ODAGWA) 5. State: RIVERS 6. LGA ETCHE  
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 12TH APRIL, 2013  
 b. Start date/time of investigation: 13TH APRIL 2013 / 12:29 HOURS  
 c. Investigation End date: 13TH APRIL 2013 Actual investigation duration, days: ONE (1) DAY  
 d. Description of spill point environment  
 Firmed soil                       Loose soil                       Recently excavated area  
 Under water                       Swampy                       Exposed pipe surface  
 Well Platform (on Water)                       Drill Rig  
 e. Description of leak point (tick as applicable);  
 Drilled hole                       Hack saw cut                       Tear (\_\_\_\_\_),  
 Complete Rupture                       Inward dent,                       Well head tampering  
 Failed Weld-on illegal hot tap valve,  Failed Clamp                       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,  
 Bulging Outward                       Flare System/Bund wall failure                       Accidental 3<sup>rd</sup> party equipment  
 impact                       Valve Failure                       com unit failure                       Cold vent  
 Relief valve failure                       Others (specify) \_\_\_\_\_  
 f. Incident caused by:  
 Third party interference (Sabotage; crude theft; Line theft; Accidental 3<sup>rd</sup> party damage)  
 Operational                       Others (including Mystery spills) \_\_\_\_\_  
 g. Spill point coordinates

Measuring unit (m)	
Northing:  <p align="center"><u>109 221. 89</u></p>	Easting:  <p align="center"><u>522 150. 10</u></p>

\*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     Shoreline/Waterfront

i. Type of environment to which oil has spread:

- Land     Swamp     Water     River (identify) \_\_\_\_\_

ii. Weather condition

- Rain     Sunny     Dry     Wet     Windy     Hot     Cool

11. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [        ,m]
- Drinking water source [        ,m]
- Built up area [        ,m]
- Farmlands [ 60 ,m]
- Fish Farm/Pond [        ,m]
- Fishing net [        ,m]
- Others (specify). [        ,m]

12. Containment measures put in place;

- Booms     Trench     Dyke     Natural depression     Pit  
 Others: \_\_\_\_\_

13. Any pictures or video coverage?

[  ] [  ]

14. Was there any disruption to the investigation?

[  ] [  ]

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

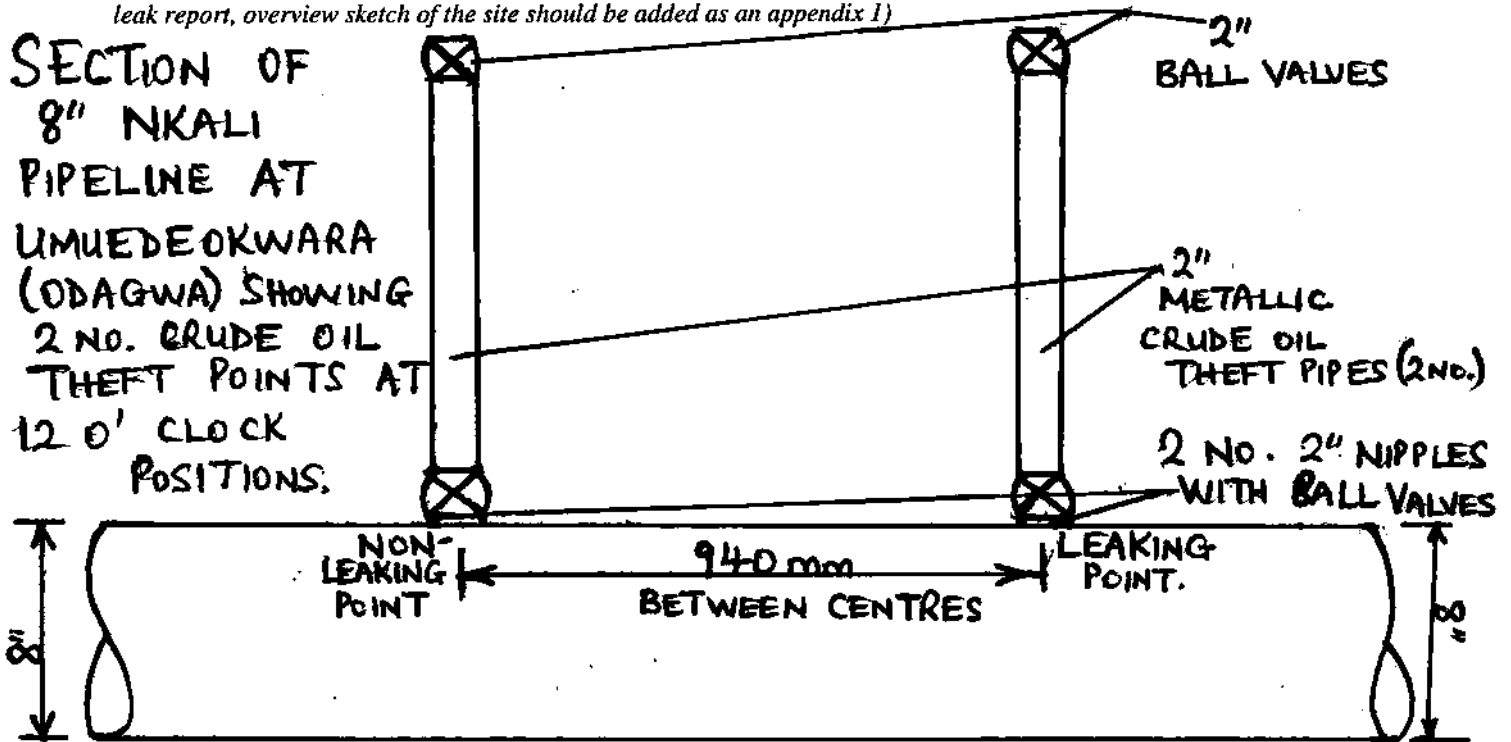
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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)

SECTION OF 8" NKALI PIPELINE AT UMUEDEOKWARA (ODAGWA) SHOWING 2 NO. CRUDE OIL THEFT POINTS AT 12 O' CLOCK POSITIONS.



→  
NKALI  
FLOWSTATION

→  
IMO RIVER II  
MANIFOLD.

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

19. Impacted area boundary Coordinates (If more, Print and attach as an appendix)

MINNA MID-BELT

S/N	Northing (m)	Easting (m)
WP237	109 219.29	522 156.32
WP238	109 219.31	522 147.08
WP239	109 222.40	522 149.38
WP240	109 222.40	522 155.53
WP241	109 234.66	522 150.19
WP242	109 246.95	522 150.22
WP243	109 246.95	522 147.14
WP244	109 243.89	522 144.05
WP245	109 246.97	522 137.90
WP246	109 246.98	522 134.82
WP247	109 246.99	522 128.66
WP248	109 250.09	522 113.26
WP249	109 256.23	522 119.43
WP250	109 250.08	522 119.42
WP251	109 250.05	522 134.82
WP252	109 256.15	522 156.40
WP253	109 253.08	522 156.39
WP254	109 240.80	522 153.29
WP255	109 234.65	522 153.28
WP256	109 228.50	522 159.42
WP257	109 222.36	522 156.33

G. INCIDENT INFORMATION:

20. Impacted Area Details

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

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

Recovered oil $V_{rec}$ :	<u>4</u>	Barrels
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22. Computation of estimated residual volume on site

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

- i. Area ( $m^2$ ) occupied by pool of free phase oil 318
- ii. Average Depth (m) of pool of free phase oil 0.014
- iii. Emulsification factor: NIL

iv. 

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<u>28</u>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil ( $V_{inf}$ ).

1. Estimated Volume of infiltrated oil at spill point ( $V_{inf a}$ )

- i. Area\* ( $m^2$ ) of soil covered by the oil: 1
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1.4
- iii. Soil type: SAND/MEDIUM iv.  $P_e$  (effective porosity of the soil): 25%
- v. Cause of spill: INTERFERENCE vi. Oil type: BONNY LIGHT
- vii. Oil Residence time on site, day: 1 DAY
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.5m
- ix. Estimated depth of infiltration around spill point: 1.9m

x. 

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$ :	<u>2.99</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ( $V_{inf b}$ )

- i. Area\* ( $m^2$ ) of soil covered by the oil: \_\_\_\_\_
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- iii. Soil type: \_\_\_\_\_ iv.  $P_e$  (effective porosity of the soil): \_\_\_\_\_
- v. Cause of spill: \_\_\_\_\_ vi. Oil type: \_\_\_\_\_
- vii. Oil Residence time on site, day: \_\_\_\_\_
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- ix. Estimated depth of infiltration around spill point: \_\_\_\_\_

Estimated Volume of infiltrated oil at spill point. $V_{inf b}$ :	<u>NIL</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region ( $V_{inf c}$ )

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- i. Area (m<sup>2</sup>) of soil covered by the oil: 5
- ii. Area (m<sup>2</sup>) of the pool of free phase oil in touch with soil: NIL
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.5
- iv. Soil type: SAND (MEDIUM)
- v.  $P_e$  (effective porosity of the soil): 25%
- vi. 

Estimated Volume of infiltrated oil. At $V_{inf}$ :	<b>3.93</b>	barrels
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**23. Computation of estimated 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 ( *\*\*Spill Factors from USCG FOG (2000 Edition)* )

	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	APPLICABLE	
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

- iii. 

Percent Total	100%
Estimated Volume of oil on open water. $V_{wat}$ :	<b>NIL</b>

Barrels

**24. Calculation of evaporated volume:**

- i. Estimated Volume available for evaporation within surface area: 38.92 BARRELS
- ii. E-Factor: 25%
- iii. 

Estimated Volume of evaporated oil. $V_{evap}$ :	<b>12.97</b>	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

<p><b>25. Net Estimated Spilled Volume <math>V_{Est}</math> (bbls) = <math>V_{evap}</math> (bbls) + <math>V_{wat}</math> (bbls) + <math>V_{inf}</math> (bbls) + <math>V_{pool}</math> (bbls) + <math>V_{rec}</math> (bbls) =</b></p> <p align="center"><b>12.97 + NIL + 6.92 + 28 + 4 = 51.9</b></p> <p><b>Estimated Reported Volume** <math>V_{rep}</math> (bbls) =</b></p> <p align="center"><b>52 BARRELS</b></p>
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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 m<sup>3</sup> to barrels is Volume (m<sup>3</sup>) x 6.29; \*\*Round up estimated volume to next whole number using the following rules:

- Any spill volume in excess of 1 bbl is rounded up to the next whole number.
- Any spill volume in less than 1 bbl is rounded up to the next 0.1 bbl.

Examples: Calculated volume = 15.3 bbl ----- Reported volume = 16 bbl  
 Calculated volume = 0.35 bbl ----- Reported volume = 0.4 bbl  
 Calculated volume = 0.01 bbl ----- Reported volume = 0.1 bbl.

Wherever this estimation tool is not applicable please refer to paragraph 6c (Deviations) of the JIV procedure to use appropriate steps for column estimation; record the calculation in a plain sheet of paper and attach to the JIV report.

**26. GENERAL STATUS OF THE SITE**

<p>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 <input type="checkbox"/></p>
<p>B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/></p>

**27. REPRESENTATIVES**

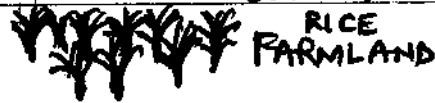
This report was filled, agreed and signed on the 13/04/2013 by joint investigation representatives from

- 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]:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings:

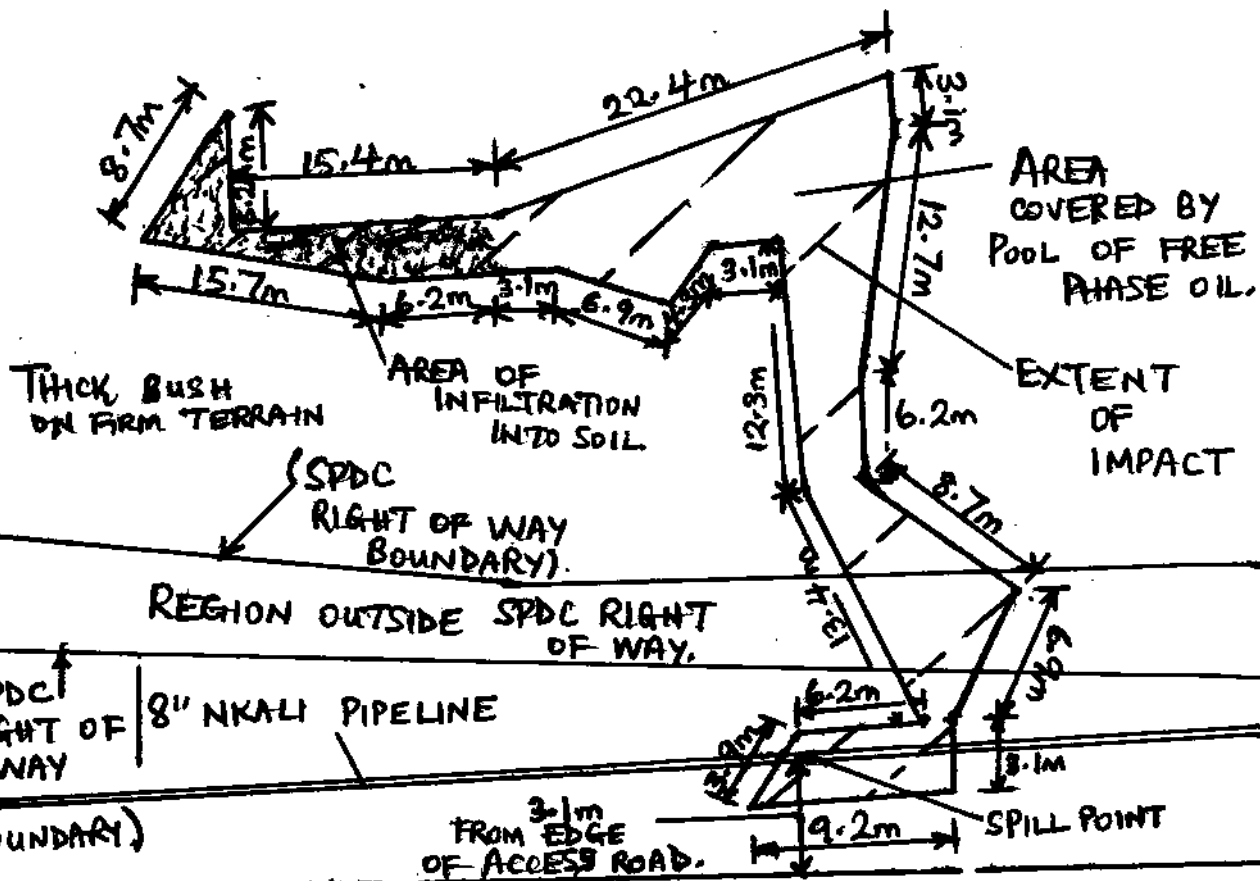
*Tick as applicable*

28. Appendix 1: Overview sketch of the site

Location: **8" NKALI PIPELINE AT UMUEDEKWARA (ODAGWA).**



THICK BUSH ON FIRM TERRAIN



ACCESS ROAD