

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1005316 JIV report S/N: 0090

(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: 1005316 2. Type of incident* OIL SPILL
 3. Name of Location 20" RUMUEKPE - NKPOKU PIPELINE
 4. Name of nearest community IBAA 5. State: RIVERS 6. LGA EMOHUA
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 9TH JULY, 2013
 b. Start date/time of investigation: 12TH JULY, 2013 / 13:48 HOURS
 c. Investigation End date: 12TH JULY, 2013 Actual investigation duration, days: ONE (1) DAY.
 d. Description of spill point environment
 Firmed soil Loose soil Recently excavated area
 Under water ~~SEASONAL~~ 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 3rd 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 3rd party damage
 Operational Others (including Mystery spills) _____

g. Spill point coordinates

Measuring unit <u>(m)</u> <u>Minna - Mid belt</u>	
Northing: <u>SP</u> <u>105600.53mN</u>	Easting: <u>485765.05mE</u>

*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~~ ^{SEASONAL} Swamp
 Water
 Seasonal swamp
 Shoreline/Waterfront

i. Type of environment to which oil has spread:

- Land
 ~~Swamp~~ ^{SEASONAL} 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 [,m]
- Fish Farm/Pond [,m] **FISH POND IMPACTED BY SPILL.**
- 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? [Y] [N]

14. 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

15. Structures / Properties

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

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1.	COCOYAM	✓			12	WITHIN SPILL-IMPACTED REGION.
2.	PINEAPPLE		✓		15	
3.	PALM TREES			✓	5	

17. Fish/Nets/Ponds

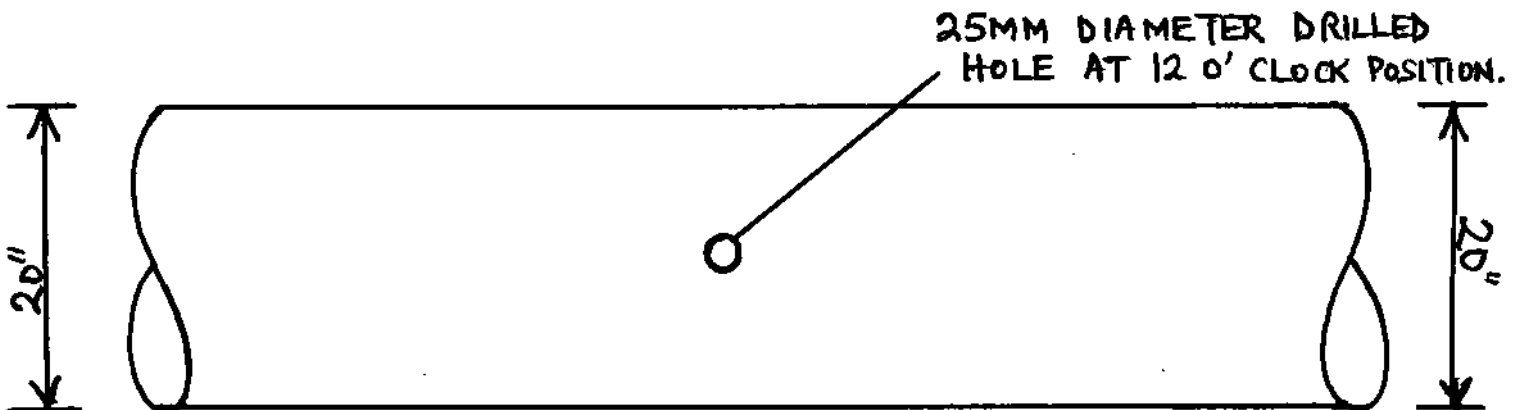
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
1	FISH POND	NATURAL	1 No.	WITHIN SPILL-IMPACTED REGION.

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

S/N	Others	Description	Quantity/Size	Comments
1	BIRD	HUMMING BIRD	1 No.	FOUND DEAD AND IMPACTED BY SPILL.

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)

PLAN SECTION OF 20" RUMUEKPE - NKPOKU PIPELINE AT IBAA SHOWING POSITION OF DRILLED HOLE.



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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)
WP 480	105606.73	485743.49
WP 482	105619.00	485749.69
WP 483	105625.12	485758.95
WP 484	105640.47	485765.15
WP 485	105649.67	485771.33
WP 486	105661.93	485783.69
WP 487	105674.178	485799.13
WP 488	105701.80	485811.52
WP 489	105723.24	485836.23
WP 490	105729.30	485870.13
WP 491	105591.38	485737.29
WP 492	105591.19	485814.32
WP 493	105566.75	485758.80
WPL 494	105429.83	485780.05
WPL 495	105426.65	485797.51
WPL 496	105435.65	485829.79
WPL 497	105435.65	485857.84
WPL 498	105435.12	485866.83
WPL 499	105438.29	485890.64
WPL 500	105465.81	485944.09
WPL 501	105492.80	485971.61
WPL 502	105497.56	485497.56
WPL 503	105593.87	485115.01
WPL 504	105683.83	485019.76
WPL 490	105708.17	485944.35
WPL 492	105512.91	485796.98
FR 1	105610.80	485765.23
FR 2	105633.02	485800.16
FR 3	105635.15	485880.06
FR 4	105597.57	485941.44
FR 5	105547.30	485908.64
FR 6	105495.44	485857.84

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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 6.805802 ha (6.81ha)
- 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>NIL</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 47,653
- ii. Average Depth (m) of pool of free phase oil 0.003
- iii. Emulsification factor: NIL

iv.

Estimated Volume of pool of free phase oil. V_{pool} :	<u>899.21</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: 2.5
- iii. Soil type: CLAY iv. P_e (effective porosity of the soil): 8%
- v. Cause of spill: THIRD PARTY INTERFERENCE vi. Oil type: BONNY MEDIUM
- vii. Oil Residence time on site, day: 3 DAYS
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.001m
- ix. Estimated depth of infiltration around spill point: 2.501m

x.

Estimated Volume of infiltrated oil at spill point: $V_{inf a}$:	<u>1.26</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: _____

NOT APPLICABLE

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 (m²) of soil covered by the oil: 20,405
- ii. Area (m²) of the pool of free phase oil in touch with soil: 100
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.001m
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%
- vi.

Estimated Volume of infiltrated oil. At V _{inf} :	8.48	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 ³)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

NOT APPLICABLE

- iii.

Percent Total	100%	
Estimated Volume of oil on open water. V _{wat} :	NIL	Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 908.95 BARRELS
- ii. E-Factor: 15%
- iii.

Estimated Volume of evaporated oil. V _{evap} :	160.4	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%

25. Net Estimated Spilled Volume V_{net}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 160.4 + NIL + 899.21 + 9.74 + NIL
≈ 1,069.35

Estimated Reported Volume V_{rep}(bbls)=** 1,070 BARRELS.

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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 m³ to barrels is Volume (m³) 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.

Whenever 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

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

27. REPRESENTATIVES

This report was filled, agreed and signed on the <u>12/07/2013</u> by joint investigation representatives from
• Host Community: <input checked="" type="checkbox"/>
• Department of Petroleum Resources [DPR]: <input type="checkbox"/>
• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>
• State Ministry of Environment [SME]: <input type="checkbox"/>
• Nigeria Police Force [NPF]: <input type="checkbox"/>
• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
• Signatories agree with reported findings: <input checked="" type="checkbox"/>
• Separate DPR form has been filled out with same findings <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

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28. Appendix 1: Overview sketch of the site

