

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1021274 JIV report S/N: 0093

(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: 1021274 2. Type of incident\* OIL SPILL  
 3. Name of Location CRUDE OIL FOUND AROUND ETELEBOU WELLS 1 AND 2 WELLHEADS  
 4. Name of nearest community DGBOLOMA 5. State: BAYELSA 6. LGA YENAGOA  
 7. Type of Production facility/Installation NOT APPLICABLE. Asset owner/District NOT APPLICABLE

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 6TH AUGUST 2013  
 b. Start date/time of investigation: 12TH AUGUST 2013 (FIRST VISIT) / 12:39 HOURS  
 c. Investigation End date: 15TH AUGUST 2013 (SECOND VISIT) Actual investigation duration, days: TWO (2) DAYS  
 d. Description of spill-point environment  
 Firmed soil NOT  Loose soil  Recently excavated area  
 Under water APPLICABLE  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) NOT APPLICABLE

f. Incident caused by:

- Third party interference (Sabotage; crude theft; Line theft; Accidental 3<sup>rd</sup> party damage)  
 Operational  Others (including Mystery spills) HUMAN ERROR

g. Spill point coordinates

Measuring unit	
Northing:	Easting:
<u>NOT APPLICABLE</u>	<u>NOT APPLICABLE</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 (MARSHY)     Swamp     Water     Seasonal swamp     Shoreline/Waterfront

i. Type of environment to which oil has spread:

- Land     Swamp     Water (CREEK)     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]
- Fishing net [            ,m]

Others (specify). **PALM TREES**

**IMPACTED BY SPILL.**

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:

THE JOINT INVESTIGATION VISIT OF 12TH AUGUST 2013 WAS INCONCLUSIVE AS THE JOINT INVESTIGATION TEAM (J.I.T) WAS UNABLE TO CONCLUDE ON THE CAUSE OF SPILL DETERMINATION. DURING THE SECOND VISIT OF 15TH AUGUST 2013, SPILL CAUSE WAS DECIDED AS HUMAN ERROR.

**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
	<b>NONE WITHIN AREA OF IMPACT</b>				

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1.	PALM TREE			✓	2 No.	WITHIN
2.	SHRUBS	✓			5 No.	SPILL- IMPACTED REGION.

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)

NOT APPLICABLE



**APPENDIX A**

JIV\_OGBOLOMA\_1021274

**IMPACTED AREA COORDINATES (MINNA MID-BELT)**

<b>Name</b>	<b>Northing</b>	<b>Easting</b>
<b>TOTAL AREA IMPACTED (HEAVY IMPACT)</b>		
wp519	113778.01	432537.05
wp520	113790.32	432530.93
wp521	113774.9	432546.29
wp522	113780.94	432580.21
wp523	113777.84	432586.36
wp524	113783.97	432592.54
wp525	113759.32	432610.95
wp526	113756.27	432604.78
wp527	113737.77	432623.21
wp528	113707.14	432592.29
wp529	113731.8	432570.8
wp530	113741.06	432558.5
wp531	113762.61	432546.25
wp532	113756.48	432540.06
wp533	113768.82	432527.77
wp534	113768.81	432530.86
wp535	113787.26	432527.84
wp536	113778.07	432518.56
wp537	113808.85	432503.25
wp538	113818.09	432497.12
wp539	113827.34	432487.9
wp540	113821.2	432484.8
wp541	113793.64	432456.97
wp542	113787.49	432456.95
wp543	113778.2	432478.5
wp544	113747.38	432506.13
wp548	113738.71	432511.48
wp549	113745.18	432502.04
wp550	113775.51	432476.93
wp551	113786.2	432453.81
wp552	113794.4	432454.3
wp553	113821.5	432482.89
wp554	113828.46	432485.38
wp545	113836.57	432484.85
wp546	113824.25	432494.06
wp547	113809.07	432505.02
wp555	113781.97	432518.45
wp556	113789.43	432527.89

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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.41 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>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 4,030
- ii. Average Depth (m) of pool of free phase oil 0.019
- iii. Emulsification factor: 40%

iv. 

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<u>288.98</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: NOT APPLICABLE
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- iii. Soil type: OTHERS iv.  $P_e$  (effective porosity of the soil): NOT APPLICABLE
- v. Cause of spill: OTHERS vi. Oil type: BONNY LIGHT
- vii. Oil Residence time on site, day: 6 DAYS
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- ix. Estimated depth of infiltration around spill point: NOT APPLICABLE

x. 

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$ :	<u>NIL</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: NOT APPLICABLE iv.  $P_e$  (effective porosity of the soil): NOT APPLICABLE
- v. Cause of spill: NOT APPLICABLE vi. Oil type: NOT APPLICABLE
- 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: 105
- 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: 0.002
- iv. Soil type: CLAY
- v. P<sub>e</sub> (effective porosity of the soil): 8%

vi. Estimated Volume of infiltrated oil. At V <sub>inf</sub> :	<u>0.09</u>	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	<b>NOT APPLICABLE</b>	
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		

iii.	Percent Total 100%	Estimated Volume of oil on open water. V <sub>wat</sub> :	<u>NIL</u>	Barrels
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**24. Calculation of evaporated volume:**

- i. Estimated Volume available for evaporation within surface area: 289.06 BARRELS
- ii. E-Factor: 25%

iii.	Estimated Volume of evaporated oil. V <sub>evap</sub> :	<u>96.35</u>	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</b> <math>V_{est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls) =</math> <u>96.35 + NIL + 0.09 + 288.98 + NIL</u>  <math>\approx</math> <u>385.42</u></p> <p><b>Estimated Reported Volume**</b> <math>V_{rep}(bbls) =</math> <u>386 BARRELS.</u></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**

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 15/08/2013 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

