

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0098 723263

(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: 723263 2. Type of incident* OIL SPILL
 3. Name of Location 16" SOUTH-FORCADOS TRUNKLINE AT OVIRI-OLOMU
 4. Name of nearest community OVIRI-OLOMU 5. State: DELTA 6. LGA UGHELLI SOUTH
 7. Type of Production facility/Installation TRUNKLINE 8. Asset owner/District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 05TH OCTOBER, 2011
 b. Date/Period of investigation: 8TH FEBRUARY 2012 AND 14TH FEBRUARY 2012 @ 1145HRS
 c. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig
 d. 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,
 External Corrosion Internal 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) _____
 e. Incident due to:
 Third party interference Operational Others (specify) _____

f. Spill point coordinates

Measuring unit	
Northing: <p style="text-align: center;">146693M</p>	Easting: <p style="text-align: center;">384029M</p>

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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 | [NIL ,m] |
| <input type="checkbox"/> Drinking water source | [NIL ,m] |
| <input type="checkbox"/> Built up area | [NIL ,m] |
| <input type="checkbox"/> Farmlands | [NIL ,m] |
| <input checked="" type="checkbox"/> Fish Farm/Pond | [20 ,m] |
| <input type="checkbox"/> Fishing net | [NIL ,m] |
| <input type="checkbox"/> Others (specify). | |

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

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
	NONE	WITHIN		AREA	OF IMPACT

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
01	MANGROVE	/	✓	✓	LOT	IMPACTED
02	RAPHIA PALM	/	/	✓	LOT	IMPACTED
/	/	/	/	/	/	/

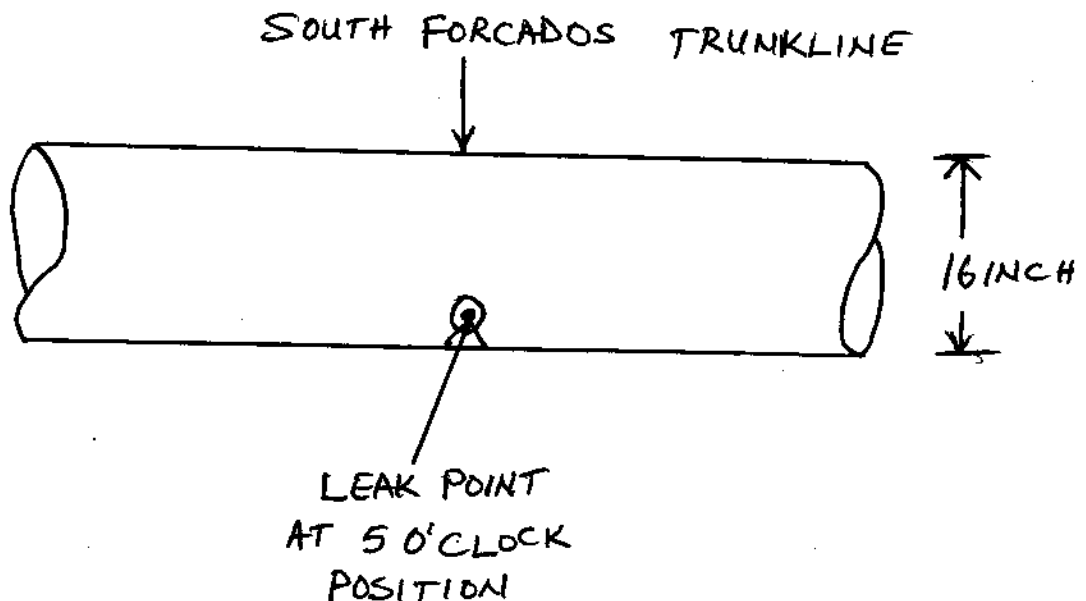
17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
01	FISH PONDS	/	07	IMPACTED
/	/	/	/	/

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

S/N	Others	Description	Quantity/Size	Comments
01	FISH TRAPS	/	20	IMPACTED
/	/	/	/	/

E. GRAPHIC DESCRIPTION OF LEAK POINT (Overview sketch of the site should be added as an appendix)



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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	146682	384036
2	146678	384023
3	146706	384020
4	146704	384039
5	146634	384029
6	146637	383982
7	146650	384003
8	146685	383981
9	146723	383971
10	146754	383993
11	146777	384011
12	146704	384007
13	146673	384055

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 12477.50 M²
- Impact within SPDC R.O.W 2808.77 M²
- Impact outside R.O.W 9668.73 M²

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

<u>VOLUME OF OIL STAINED LEAVES</u>	Recovered oil V _{rec,F}	<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 COVERED BY STAINED LEAVES = 9668.73 M²
- i. Area (m²) occupied by pool of free phase oil 2808.77
 - ii. Average Depth (m) of pool of free phase oil 0.002
 - iii. Emulsification factor: 60%

<u>AVERAGE THICKNESS OF OIL STAINS ON LEAVES [SIMILAR TO SLIGHT COLOR THICKNESS ON WATER, REFER TO PAGES 5 OF 9 & 7 OF 9.] = 1.5 x 10⁻⁷ M</u>	iv. Volume of pool of free phase oil. V _{pool} :	<u>14.13</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: NIL
- ii. Area of the pool of free phase oil in touch with soil: NIL
- iii. Average Depth (m) below ground surface of infiltration of oil: NOT APPLICABLE
- iv. Soil type: NOT APPLICABLE
- v. P_e (effective porosity of the soil): NOT APPLICABLE

iv. Volume of infiltrated oil. V_{inf}	<u>NIL</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 (m3)
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		
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 MEDIUM
- ii. E-Factor: 25%

iii. Volume of evaporated oil. V_{evap}	<u>4.71</u>	barrels
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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%

23. **Gross Total Estimated Spilled Volume** $V_{Est}(\text{bbls}) = V_{evap}(\text{bbls}) + V_{wat}(\text{bbls}) + V_{inf}(\text{bbls}) + V_{pool}(\text{bbls}) + V_{recd}(\text{bbls}) + 0.01(\text{bbls})$

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$V_{Est}(bbls) = 18.85 BBLs$
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls) + 0.01(BBLs)$
$V_{Est}(bbls) = 18.85 BBLs$

- *Calculation of the respective estimated volume is to be done using the new spill 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 <input type="checkbox"/>
B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>

26 Signatories

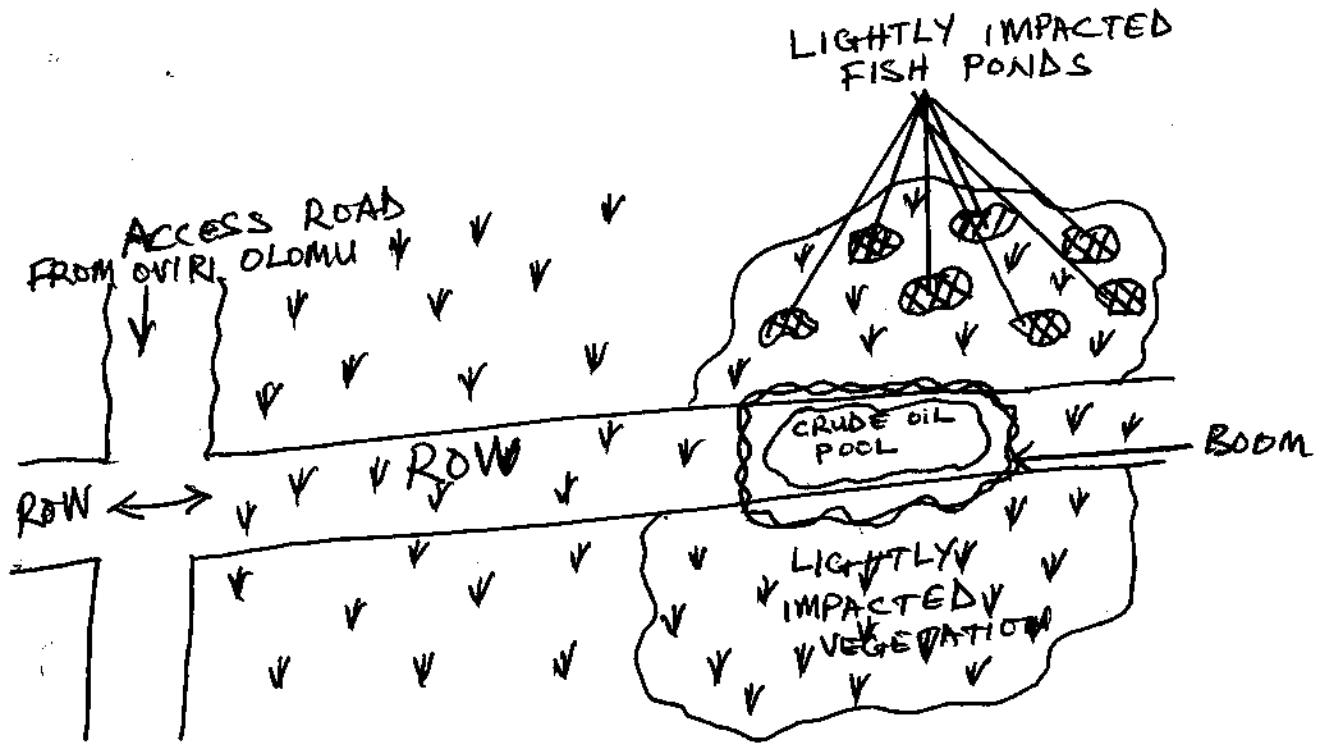
This report was filled and signed on the <u>14/02/2012</u> at incident site by joint investigation representatives from
<ul style="list-style-type: none">• Host Community <input checked="" type="checkbox"/>• Department of Petroleum Resources [DPR]: <input type="checkbox"/>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

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20. Appendix 1: Overview sketch of the site

Location: 16" SOUTH FORCADOS TRUNKLINE AT OVIRI-OLOMU



NOTE: AREA OF LIGHT IMPACT REFERS TO WEATHERED CRUDE OIL STAINED LEAF DROPPINGS ON NON-IMPACTED SOIL & POND SURFACES.

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21. Appendix 2: TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

S/N	Northing	Easting
14	146662	384064
15	146657	384081
16	146640	384118
17	146631	384103
18	146697	384070
19	146740	384097
20	146749	384118
21	146758	384098
22	146747	384083
23	146723	384072
24	146715	384045
25	146693	384029