

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0348 860000

(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: 860000 2. Type of incident * OIL SPILL
 3. Name of Location NEMBE 2 WELL 39 S FLOWLINE
 4. Name of nearest community KENKIAMABOGO 5. State: BAYELSA 6. LGA NEMBE
 7. Type of Production facility/Installation OIL FLOWLINE 8. Asset owner/ District NES2/NEMBE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 29TH AUGUST, 2012.
 b. Start date/time of investigation: 31ST AUGUST 2012, 12TH SEPTEMBER 2012 AND
 c. Investigation End date: 13TH SEPTEMBER 2012.
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Plateform (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

MID-BELI (MINNA)

Measuring unit <u>METERS</u>	
Northing: <div style="text-align: center; font-size: 24px;">49838.75</div>	Easting: <div style="text-align: center; font-size: 24px;">430420.03</div>

*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

- 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). **MANGROVE VEGETATION** 15 m

12. Containment measures put in place;

- Booms Trench Dyke

Others: NONE

13. Any pictures or video coverage? [Y] [N]

14. Was there any disruption to the investigation? [Y] [N]

If yes give brief description:

JOINT INVESTIGATION VISIT (JIV) ATTEMPTS ON 31ST AUGUST 2012 AND 12TH SEPTEMBER 2012 WERE INCONCLUSIVE AS A RESULT OF JOINT INVESTIGATION TEAM'S INABILITY TO ASCERTAIN ACTUAL CAUSE OF LEAK AND TRUE EXTENT OF IMPACTED AREA DUE TO HIGH TIDE.

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
NONE WITHIN AREA OF IMPACT						

17. Fish/Nets/Ponds

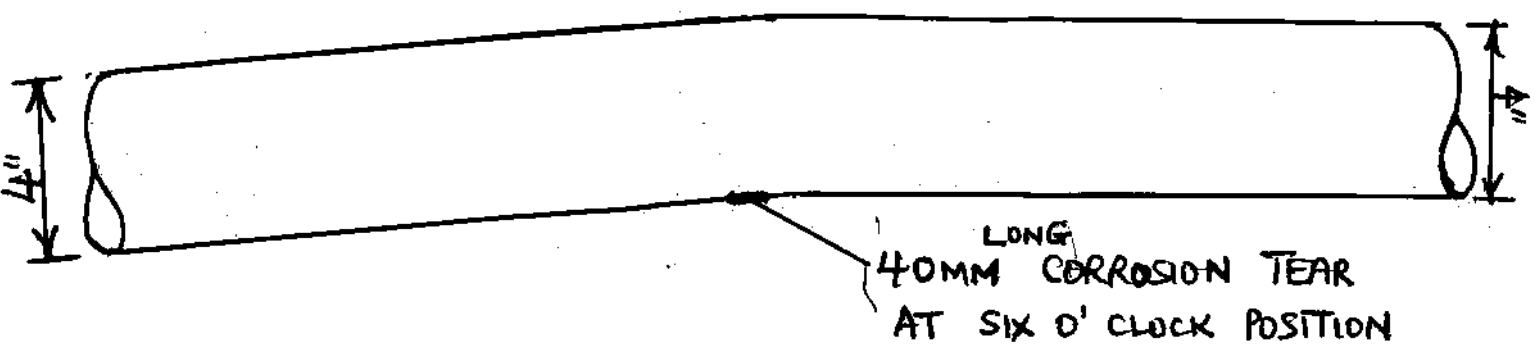
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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 NEMBE 2 WELL 39 S
 FLOWLINE AT KENKIAMABOGO SHOWING
 POSITION OF CORROSION TEAR.



→
 NEMBE 2
 WELL 39

→
 NEMBE 2
 FLOW STATION

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iii. Emulsification factor: NIL

iv.

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

COMPUTATION OF OIL-INFILTRATED VOLUME AT SPILL POINT:
AREA OF OIL-INFILTRATION = $1m^2$
DEPTH = $0.5m$
VOLUME = $1m^2 \times 0.5m \times 8\%$

- i. Area (m^2) covered by the oil: 19
- 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: 0.033
- iv. Soil type: CLAY
- v. P_c (effective porosity of the soil): 8%

VOLUME OF OIL-INFILTRATION OUTSIDE SPILL POINT = 0.32 BARREL

iv.

Volume of infiltrated oil: V_{inf}	<u>0.25 + 0.32 = 0.57</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**

8% (EFFECTIVE POROSITY OF CLAY SOIL)
X 6.29 =
0.25 BARREL.

	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

NOT APPLICABLE

iii.

Volume of oil on open water: V_{oil}	<u>NIL</u>	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 40%

iii.

Volume of evaporated oil: V_{evap}	<u>0.38</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%

*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	$= 0.38 + \text{NIL} + 0.57 + \text{NIL} + \text{NIL} = 0.95$
$V_{\text{Est}}(\text{bbbls}) = V_{\text{evap}}(\text{bbbls}) + V_{\text{wat}}(\text{bbbls}) + V_{\text{inf}}(\text{bbbls}) + V_{\text{pool}}(\text{bbbls}) + V_{\text{recj}}(\text{bbbls})$	
$V_{\text{Est}}(\text{bbbls}) =$	1 BARREL
24. Net Total Estimated Spilled Volume	$= 0.38 + \text{NIL} + 0.57 + \text{NIL} + \text{NIL} = 0.95$
$V_{\text{Est}}(\text{bbbls}) = V_{\text{evap}}(\text{bbbls}) + 0.6 * V_{\text{wat}}(\text{bbbls}) + V_{\text{inf}}(\text{bbbls}) + V_{\text{pool}}(\text{bbbls}) + V_{\text{recj}}(\text{bbbls})$	
$V_{\text{Est}}(\text{bbbls}) =$	1 BARREL

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

26 REPRESENTATIVES

This report was filled and signed on the <u>13/09/2012</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 type="checkbox"/> • Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

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27. Appendix 1: Overview sketch of the site

