

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0106 716037

(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: 716037 2. Type of incident* SPILL
 3. Name of Location 6" OBIGBO NORTH - OGALE PIPELINE
 4. Name of nearest community OGALE 5. State: RIVERS 6. LGA ELEME
 7. Type of Production facility/Installation PIPELINE 8. Asset owner/District NESP /PH2

B. INCIDENT INFORMATION:

9. Details of incident

a. Date of incident: 21ST SEPTEMBER 2011
 b. Date/Period of investigation: 22ND SEPTEMBER 2011

c. Description of spill point environment

- | | | |
|---|--|---|
| <input type="checkbox"/> Firmed soil | <input checked="" type="checkbox"/> Loose soil | <input checked="" type="checkbox"/> Previously excavated area |
| <input type="checkbox"/> Under water | <input type="checkbox"/> Swampy | <input type="checkbox"/> Exposed pipe surface |
| <input type="checkbox"/> Well Platform (on Water) | | <input type="checkbox"/> Rig |

d. Description of leak point (tick as applicable);

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> Drilled hole | <input checked="" type="checkbox"/> Hack saw cut | <input type="checkbox"/> Explosive tear, |
| <input type="checkbox"/> Complete Rupture | <input type="checkbox"/> Inward dent, | <input type="checkbox"/> Well head tampering |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | | <input type="checkbox"/> Missing Pipeline/Flowline) |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point, | | <input type="checkbox"/> Third party tampering with Clamp |
| <input type="checkbox"/> Third party tampering with valve setting, | | <input type="checkbox"/> Third party tampering with flange, |
| <input type="checkbox"/> External Corrosion | | <input type="checkbox"/> Internal Corrosion |
| <input type="checkbox"/> Saver-pit over flow, | <input type="checkbox"/> Surge vessel overflow, | <input type="checkbox"/> Outward dent |
| <input type="checkbox"/> Flare System/Bund wall Failure | <input type="checkbox"/> Valve Failure | <input type="checkbox"/> com unit failure |
| <input type="checkbox"/> Cold vent | <input type="checkbox"/> Relief valve failure | <input type="checkbox"/> Others (specify) _____ |

e. Incident due to:

- Third party interference Operational Others (specify) _____

f. Spill point coordinates

Measuring unit (METER) <u>MINNA MID-BELT</u>	
Northing: <u>92331.68</u>	Easting: <u>521555.41</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 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). [,m]
- NOT APPLICABLE

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
	NONE WITHIN AREA OF IMPACT					

17. Fish/Nets/Ponds

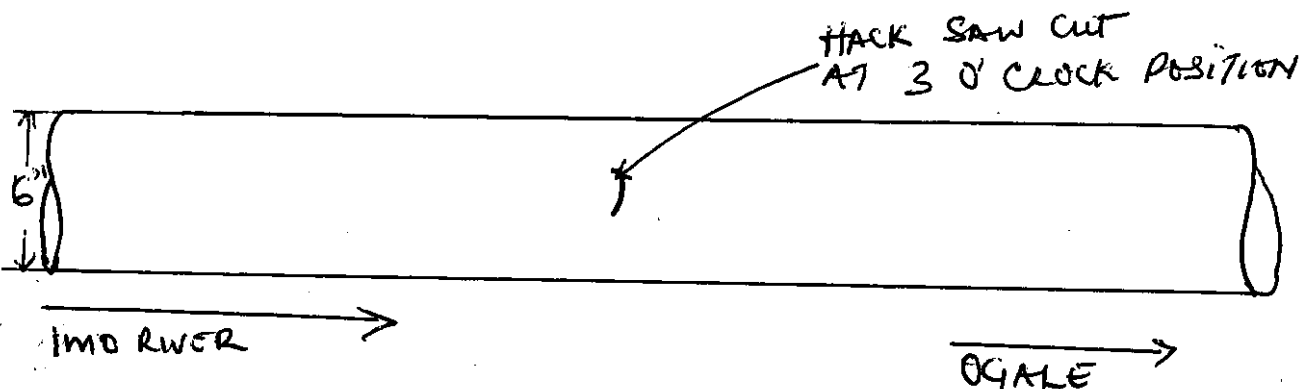
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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 (Overview sketch of the site should be added as an appendix)

A SECTION OF 6" ^{OBIGBO NORTH} ~~IMO RIVER~~ - OGALE PIPELINE AT OGALE
 SHOWING HACK SAW CUT AT 3 O'CLOCK POSITION



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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)

MINNA MID-BELT

S/N	Northing (METER)	Easting (METER)
Pt1	92330.92	521555.92 92
Pt2	92331.02	521554.94
Pt3	92332.04	521555.07
Pt4	92331.94	521555.96
$JIV \text{ AREA} = 1 \text{ m}^2 \text{ (SQUARE METER)}$		

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 1 m²
- Impact within SPDC R.O.W 1 m²
- Impact outside R.O.W NIL

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

Recovered oil V _{rec} :	<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 (m²) occupied by pool of free phase oil 1
- Average Depth (m) of pool of free phase oil 0.11
- Emulsification factor: NIL

iv. Volume of pool of free phase oil. V _{pool} :	<u>0.69</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: NUL
- ii. Area of the pool of free phase oil in touch with soil: 1 m^2
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.04
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>0.02</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: NUL
- ii. Table of average depth of oil on water based on coloration *

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004	<u>NOT</u>	
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001	<u>APPLICABLE</u>	
Dark	0.002		
Blackoil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>NUL</u> bbl

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

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%

iii. Volume of evaporated oil. V_{evap}	<u>0.24</u>	barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
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 $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 0.24 + NUL + 0.02 + 0.69 + NUL = 0.95 \text{ barrels}$

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$V_{Est}(bbls) = 0.95 \text{ BARRELS}$
24. <u>Net Total Estimated Spilled Volume</u> $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 0.24 + null + 0.02 + 0.69 + null = 0.95$
$V_{Est}(bbls) = 0.95 \text{ BARRELS}$

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

26 Signatories

This report was filled and signed on the <u>22/09/2011</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

