

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0352/866164

(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: 866164 2. Type of incident * OIL SPILL
 3. Name of Location IMORIVER WELL 33L FLOWLINE
 4. Name of nearest community OWAZA 5. State: ABIA 6. LGA UKWU-WEST
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner: District NELI/PH2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 12TH SEPTEMBER, 2012
 b. Start date/time of investigation: 14TH SEPTEMBER, 2012
 c. Investigation End date: 14TH SEPTEMBER, 2012
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (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

Measuring unit		<u>Minna - (Mid belt) (m)</u>	
Northing: (m)		Easting:	
108301.346		526482.784	

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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: NATURAL CONTAINMENT

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
	<u>NOT APPLICABLE</u>				

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	NOT APPLICABLE					

17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NOT APPLICABLE			

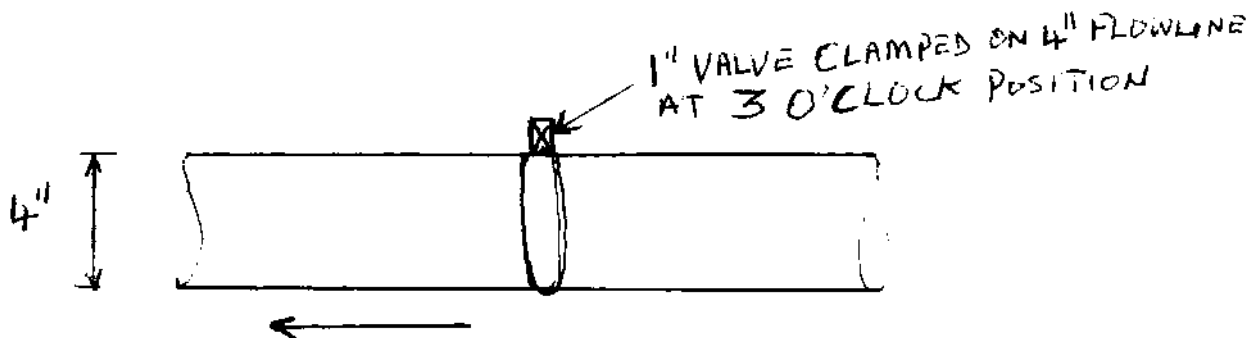
18. Others (Specify) i.e. Animal Traps

S/N	Others	Description	Quantity/Size	Comments
	NOT APPLICABLE			

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)*

A SECTION OF IMO RIVER WELL 33L FLOWLINE AT DWAZA SHOWING

1" VALVE CLAMPED ON THE 4" FLOWLINE 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 (m)	Easting (m)
WP139	108301.346	526482.794
WP140	108307.502	526476.635
WP142	108307.477	526488.957
WP143	108301.334	526488.445
WP141	108247.671	526479.710

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.008887 ha
- Impact within SPDC R.O.W Yes
- Impact outside 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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20. Computation of the residual volume on site

- a. Computation of volume of pool of free phase oil (on land or confined water body).
- i. Area (m^2) occupied by pool of free phase oil NIL
 - ii. Average Depth (m) of pool of free phase oil NIL

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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 VOLUME OF INFILTRATION OF SPILL POINT
 AREA = $1 m^2$
 DEPTH = $0.5 M$
 SOIL TYPE = CLAY
 POROSITY = 8%
1 x 0.5 x 0.08 x 6.29
=> 0.25 BARRELS

- i. Area *(m²) covered by the oil: 87.9
- 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: 0.003
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv.

Volume of infiltrated oil, V_{inf}	<u>0.25 + 0.13 = 0.38</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	NOT APPLICABLE	
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
	Percent Total	100%	Total Volume 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: 15%

iii.

Volume of evaporated oil, V_{evap} :	<u>0.07</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%

** 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

$$V_{\text{Est}}(\text{bbbls}) = V_{\text{evap}}(\text{bbbls}) + V_{\text{wat}}(\text{bbbls}) + V_{\text{int}}(\text{bbbls}) + V_{\text{pool}}(\text{bbbls}) + V_{\text{rec}}(\text{bbbls})$$

$$V_{\text{Est}}(\text{bbbls}) = 0.07 + \text{NIL} + 0.38 + \text{NIL} + \text{NIL} = 0.5 \text{ BBLS}$$

24. Net Total Estimated Spilled Volume

$$V_{\text{Est}}(\text{bbbls}) = V_{\text{evap}}(\text{bbbls}) + 0.6 * V_{\text{wat}}(\text{bbbls}) + V_{\text{int}}(\text{bbbls}) + V_{\text{pool}}(\text{bbbls}) + V_{\text{rec}}(\text{bbbls})$$

$$V_{\text{Est}}(\text{bbbls}) = 0.07 + \text{NIL} + 0.38 + \text{NIL} + \text{NIL} = 0.5 \text{ BBLS}$$

*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

B. Investigation of the incident site showed that there is residual impact on site requiring further works

26 REPRESENTATIVES

This report was filled and signed on the 14/04/2012 at incident site 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]:

Tick as applicable

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27. Appendix 1: Overview sketch of the site

