

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0356-870661

(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: 870661 2. Type of incident * OIL SPILL
 3. Name of Location 4th OGBELLE - IBAA PIPELINE
 4. Name of nearest community IBAA 5. State: RIVERS 6. LGA EMOHIA
 7. Type of Production facility/Installation PIPELINE 8. Asset owner/ District NRSP/LAND

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24th SEPTEMBER, 2012
 b. Start date/time of investigation: 27th SEPTEMBER, 2012
 c. Investigation End date: 28th 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

(MINNA MID-RST)

Measuring unit <u>METER</u> Northing: <u>SP</u> <u>107605.623</u>	Easting: <u>492587.218</u>
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*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). PALM TREES PLANTATION 35m

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

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

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

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>NONE WITHIN AREA OF IMPACT</u>				

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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			

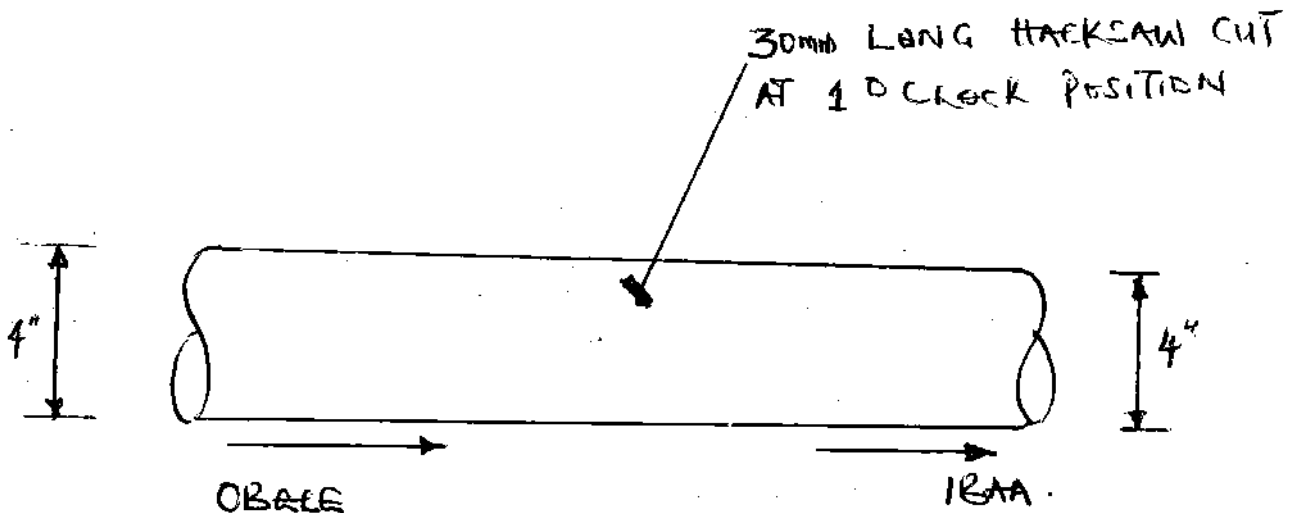
18. Others (Specify) i.e. Animal Traps

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 4" OBELE - IBAA PIPELINE AT IBAA.

SHOWING POSITION OF HACKSAW CUT.



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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)
BR1	107389.313	482169.6
BR2	107397.77	482173.796
BR6	107400.755	482207.697
BR7	107400.723	482220.022
BR8	107406.812	482241.607
BR9	107403.70	482257.005
BR26	107418.855	482337.156
BR25	107415.743	482352.555
BR24	107406.478	482371.018
BR21	107406.439	482386.424
BR23	107406.391	482404.912
BR35A	107464.638	482454.362
BR46	107535.237	482479.193

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.812075ha
- 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).
- Area (m^2) occupied by pool of free phase oil ~~100~~ 639.6
 - Average Depth (m) of pool of free phase oil 0.019

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iii. Emulsification factor: NIL

iv.

Volume of pool of free phase oil, V_{pool} :	76.6	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

*COMPUTATION OF VOLUME OF INFILTRATED OIL IN THE SOIL AROUND SPILL POINT.
 $V_s = A \times D \times P_e$
 $= 2m \times 1m \times 0.08$
 $= 0.16 \text{ m}^3$*

- i. Area *(m²) covered by the oil: 7.479.4 m²
- 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: 0.001m
- iv. Soil type: CLAY
 P_e (effective porosity of the soil): 8%

iv.

Volume of infiltrated oil, V_{inf}	3.76	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	NOT APPLICABLE	
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} :	NIL	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} :	14.34	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

$$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rej}(bbls)$$

$$V_{Est}(bbls) = 14.34 + ML + (3.76 + 1.01) + 76.6 = 95.71 \text{ BARRELS}$$

24. Net Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rej}(bbls)$$

$$V_{Est}(bbls) = 95.7 \text{ BARREL}$$

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

26 REPRESENTATIVES

This report was filed and signed on the 28 / 09 / 2012 at incident site by joint investigation representatives from

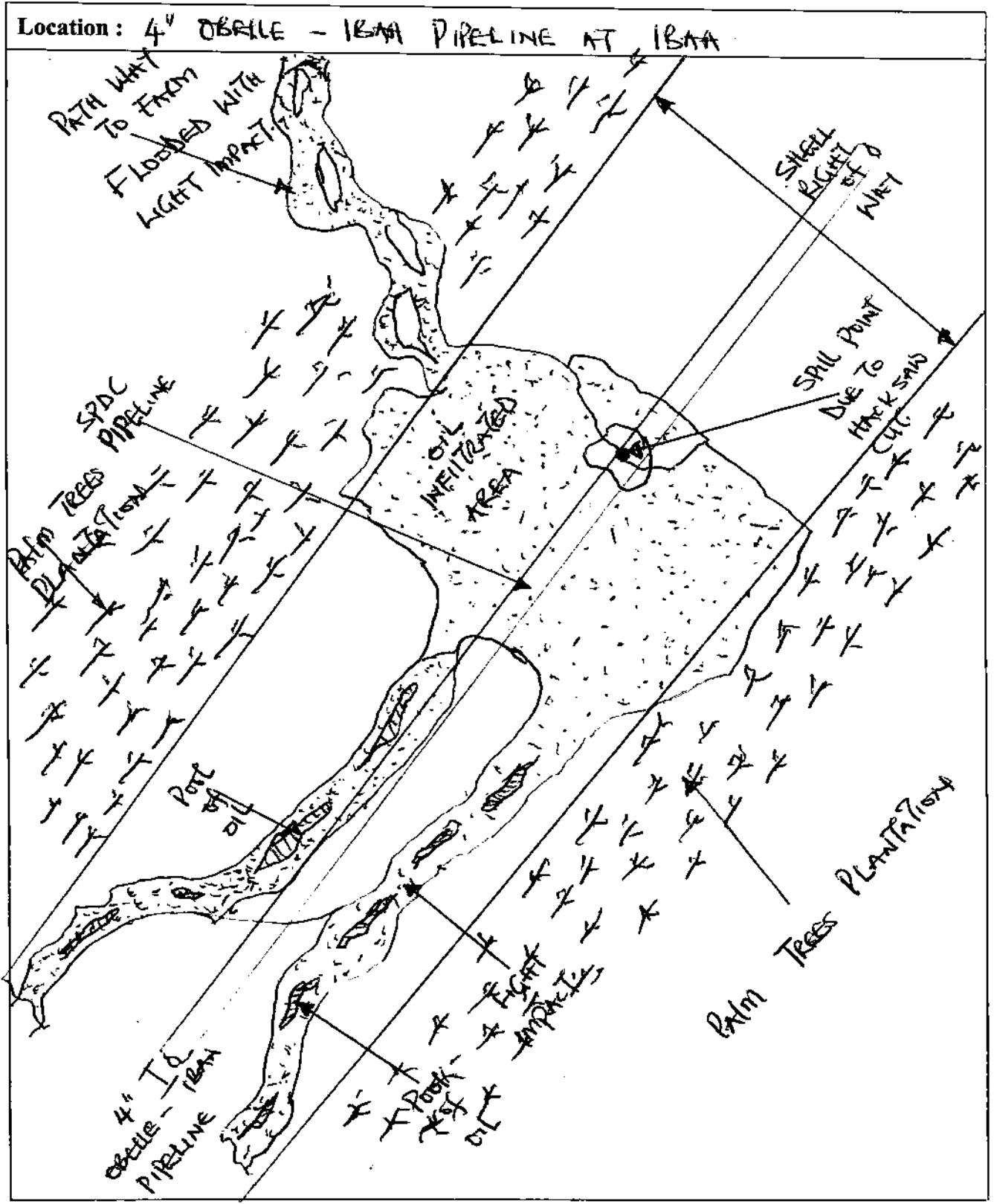
- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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27. Appendix 1: Overview sketch of the site



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

(MINNA MID-LET)

S/N	Northing (METRES)	Easting (METRES)
BR49	107608.711	482581.064
BR54	107617.936	482578.006
BR51	107614.816	482596.485
BR52	107356.814	482568.09
BR53	107359.941	482546.529
BR53	107359.941	482546.529
BR50	107605.639	482581.056
BR39	107535.229	482482.275
BR36	107467.678	482466.694
BR30	107394.110	482401.799
BR20	107403.414	482367.929
BR19	107412.671	482352.547
BR18	107415.791	482334.067
BR5	107385.353	482223.064
BR4	107382.337	482201.487
BR3	107385.457	482183.008
A1	107488.891	482580.755
A2	107362.966	482565.025
A3	107362.974	482561.944
A4	107488.899	482577.674