

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0029 702517

(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: 702517 2. Type of incident* OIL SPILL
 3. Name of Location 12" ADIBAWA - OKORDIA PIPELINE
 4. Name of nearest community IKARAMA 5. State: BAYELSA 6. LGA YENAGOA
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District NESP/KOLOCREEK

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 21ST AUGUST, 2011
 b. Date/Period of investigation: 26TH AUGUST, 2011

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) NOT APPLICABLE

e. Incident due to:

- Third party interference Operational Others (specify) NOT APPLICABLE

f. Spill point coordinates (MINNA MID - BELT)

Measuring unit <u>M</u>	
Northing: <u>128250.15</u>	Easting: <u>444459.88</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) NOT APPLICABLE

ii. Weather condition

- Raining Sunny

11. Distance from the nearest sensitive habitat

- | | | | | |
|--|---|-----|-----|------------------------------------|
| <input type="checkbox"/> Government reserved and designated protected area | [| | ,m] | |
| <input type="checkbox"/> Drinking water source | [| | ,m] | |
| <input type="checkbox"/> Built up area | [| | ,m] | |
| <input checked="" type="checkbox"/> Farmlands | [| NIL | ,m] | FARMLAND PARTLY IMPACTED BY SPILL. |
| <input type="checkbox"/> Fish Farm/Pond | [| | ,m] | |
| <input type="checkbox"/> Fishing net | [| | ,m] | |
| <input type="checkbox"/> Others (specify). | [| | ,m] | |

12. Containment measures put in place;

- Booms Trench Dyke

Others: NATURAL DEPRESSION

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
1.	PLANTAIN		✓		10	FARMLAND VEGETATION PARTLY IMPACTED.
2.	CASSAVA	✓			15	
3.	PALM TREE			✓	1	

17. Fish/Nets/Ponds

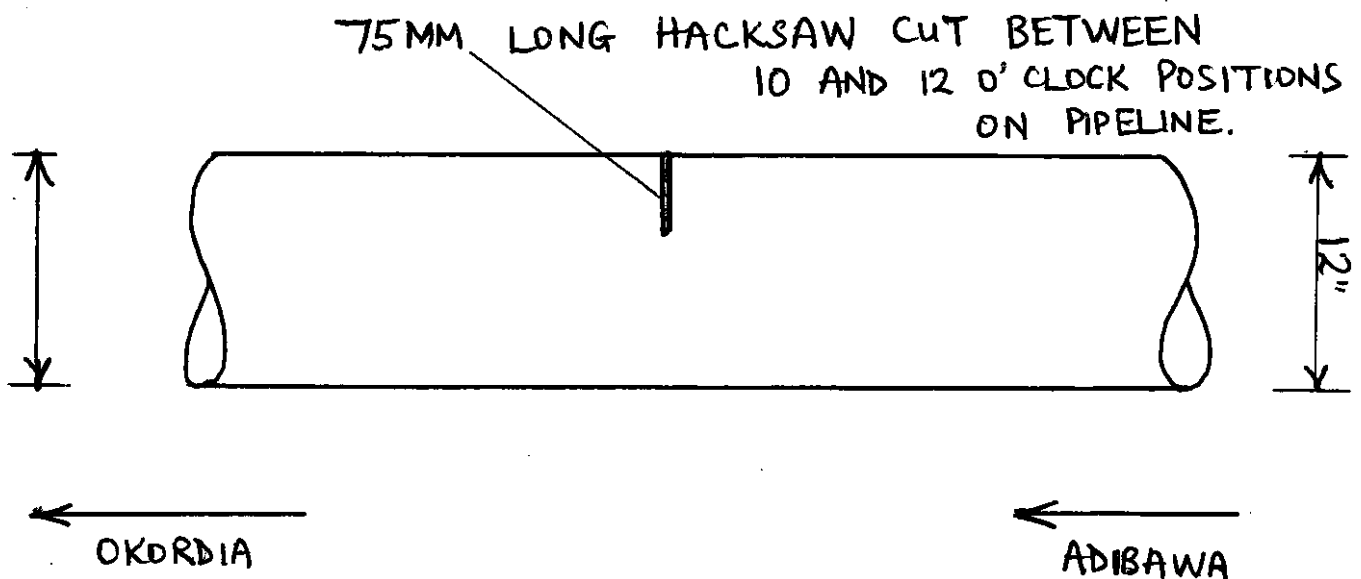
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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 1)

SECTION OF 12" ADIBAWA - OKORDIA PIPELINE AT IKARAMA 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)
217	128228.72	444435.06
218	128228.73	444431.98
219	128234.89	444428.92
212	128256.29	444462.88
215	128247.74	444467.13
213	128243.98	444468.99
214	128237.87	444456.66

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.04 Ha
- Impact within SPDC R.O.W 0.03 Ha
- Impact outside R.O.W 0.01 Ha

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

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).

- i. Area (m^2) occupied by pool of free phase oil 300
- ii. Average Depth (m) of pool of free phase oil 0.013
- iii. Emulsification factor: NIL

iv. Volume of pool of free phase oil. V_{pool} :	<u>24.53</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: 100
- 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: 0.019
- iv. Soil type: CLAY
- v. P_c (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>0.96</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	NOT APPLICABLE	
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: 15%

iii. Volume of evaporated oil. V_{evap}	<u>4.5</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 $V_{Est}(bbls) = V_{cvap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 4.5 + NIL + 0.96 + 24.53 + NIL = 29.99$

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$V_{Est}(bbls) =$	30 BARRELS
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls) = 4.5 + NIL + 0.96 + 24.53 + NIL = 29.99$	
$V_{Est}(bbls) =$	30 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

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| 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 26/08/2011 at incident site by joint investigation representatives from

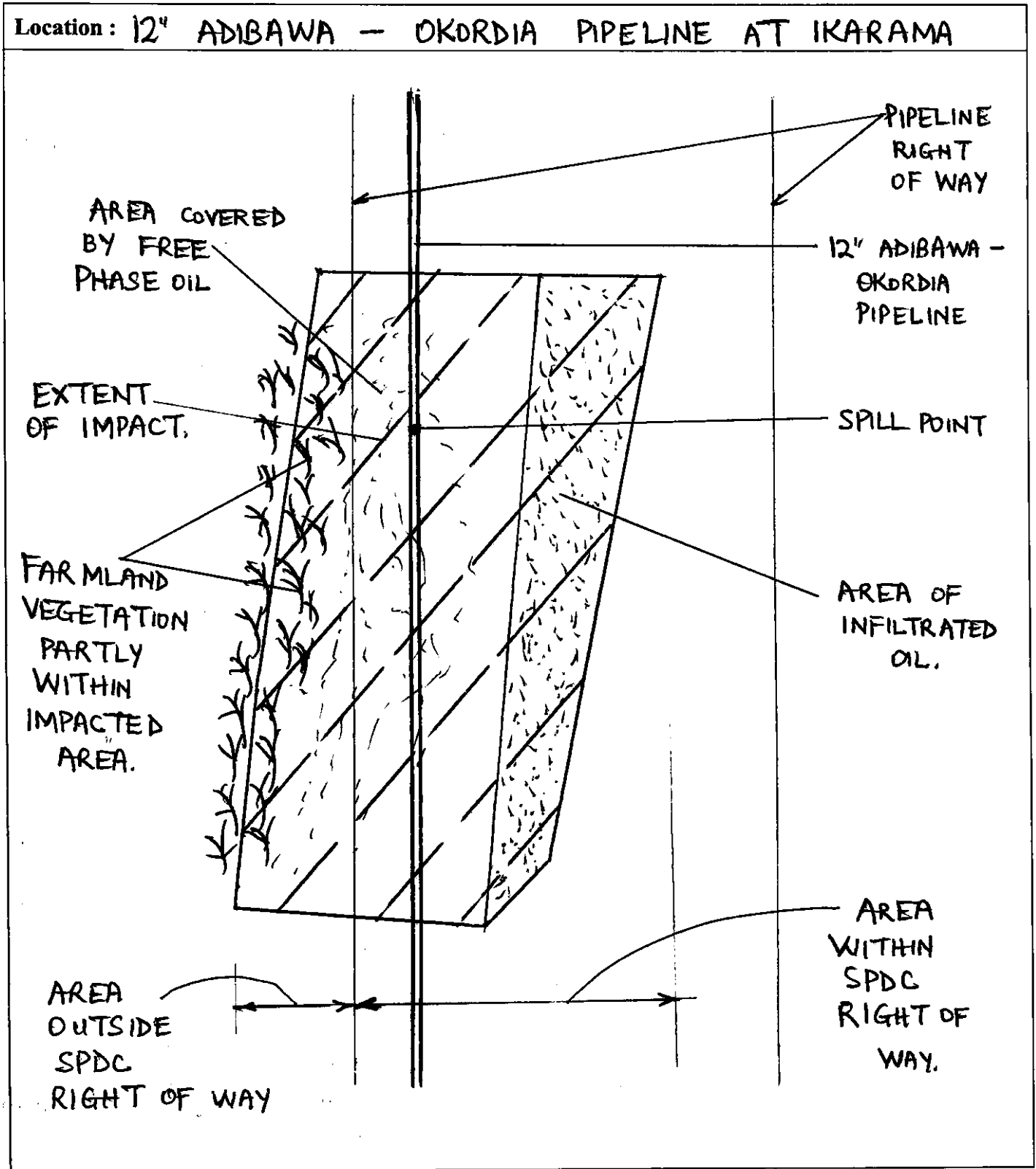
- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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20. Appendix 1: Overview sketch of the site



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

S/N	Northing	Easting