

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0004 695228 (B)

(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: 695228 2. Type of incident* SPILL
 3. Name of Location 14" OKOROKIA - RUMUEKPE PIPE LINE
 4. Name of nearest community IKARAMA 5. State: BAYELSA 6. LGA YENAGOA
 7. Type of Production facility/Installation OK PIPELINE 8. Asset owner/District NESP/LAND 2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 2ND AUGUST 2011
 b. Date/Period of investigation: 9TH 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) _____

e. Incident due to:

- Third party interference Operational Others (specify) _____

f. Spill point coordinates

Measuring unit <u>(m)</u> <u>MID-BELT</u>	
Northing: <u>127036.74</u>	Easting: <u>444332.64</u>

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire,

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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

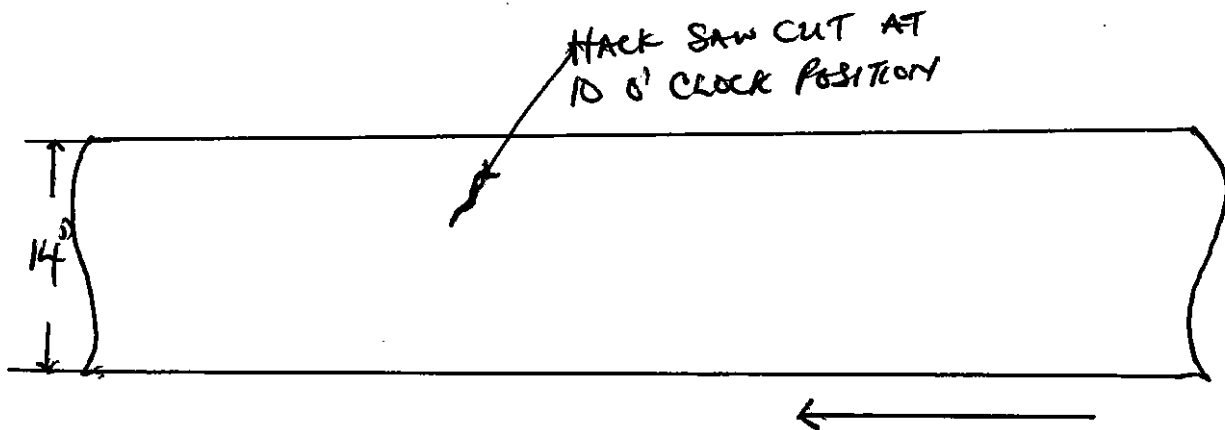
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE	WITHIN AREA OF IMPACT		

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 appendix1)

A SECTION OF 14" OKORDIA - RUMUERGE PIPELINE AT IKARAMA SITE 2 SHOWING HACK-SAW CUT AT 10 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)

S/N	Northing	Easting
1	127039.81	444335.74
2	127036.75	444335.75
3	127027.53	444329.56
4	127027.49	444332.61
5	127021.38	444344.94
6	126999.82	444332.59
7	126931.186	444347.93
8	126997.09	444444.056
9	127020.84	444532.82
10	126964.81	444502.05
11	126993.33	444383.53
12	126888.83	444455.74
13	126901.35	444461.57

G INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 1.55 Ha
- Impact within SPDC R.O.W 0.28 Ha
- Impact outside R.O.W 1.27 Ha

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 15398
- ii. Average Depth (m) of pool of free phase oil 0.007
- iii. Emulsification factor: _____

iv. Volume of pool of free phase oil. V_{pool} :	<u>9629</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: 146
- ii. Area of the pool of free phase oil in touch with soil: 15398
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0015
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>11.7</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>19.2</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 $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls) = 19.2 + Nil + 11.7 + 96.9 + Nil = 127.8$

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$V_{Est}(bbls) = 127.8 \text{ BARREL}$
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 19.2 + Nil + 11.7 + 96.9 + Nil = 127.8$
$V_{Est}(bbls) = 127.8 \text{ BARREL}$

*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 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 <u>09/08/2011</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

Location : 14" OKORDIA - RUMUKEFE PIPELINE AT IKARAMA. SITE 2

