

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 991301 JIV report S/N: 0053

(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: 991301 2. Type of incident* OIL SPILL
 3. Name of Location 24th NEMBE CREEK PIPELINE
 4. Name of nearest community ADAMKURI 5. State: RIVERS 6. LGA BONNY
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident 2ND JUNE 2013
 a. Date of incident: ~~22ND MARCH 2013~~
 b. Start date/time of investigation: 3RD JUNE 2013: 11:45
 c. Investigation End date: 3RD JUNE 2013 Actual investigation duration, days: ONE 1 DAY
 d. Description of spill point environment
 Firmed soil Loose soil Recently excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Drill Rig
 e. Description of leak point (tick as applicable):
 Drilled hole Hack saw cut Tear (_____),
 Complete Rupture Inward dent, Well head tampering
 Failed Weld-on illegal hot tap valve, Failed Clamp 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,
 Bulging Outward Flare System/Bund wall failure Accidental 3rd party equipment
 impact Valve Failure com unit failure Cold vent
 Relief valve failure Others (specify) _____
 f. Incident caused by:
 Third party interference (Sabotage; crude theft; Line theft; Accidental 3rd party damage)
 Operational Others (including Mystery spills) _____

g. Spill point coordinates

Measuring unit (M)		<u>MINNA MID-BELT</u>	
Northing:		Easting:	
<u>57263.92</u>		<u>516028.50</u>	

SPILL POINT

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C. RISK ASSESSMENT

10. Type of environment:

- Land Swamp Water Seasonal swamp Shoreline/Waterfront

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Rain Sunny Dry Wet Windy Hot Cool

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). MAN GROVE

12. Containment measures put in place;

- Booms Trench Dyke Natural depression Pit
 Others: _____

13. Any pictures or video coverage? [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</u>	<u>WITHIN</u>		<u>AREA OF IMPACT</u>	

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	NON WITHIN AREA OF IMPACT					

17. Fish/Nets/Ponds

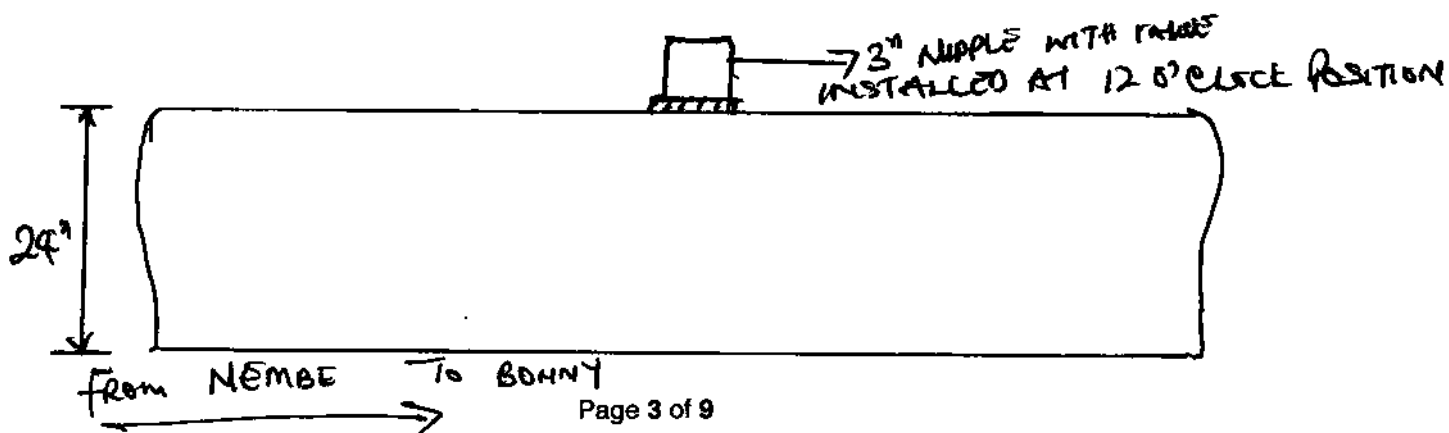
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NON WITHIN AREA OF IMPACT			

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

S/N	Others	Description	Quantity/Size	Comments
	NON 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)

A SECTION OF 24" NEMBE CREEK PIPELINE AT ADAMAKIRI SHOWING BRUDE TIGHT POINT INSTALLED AT 12 O'CLOCK POSITION.



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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.0559 Ha
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W YES

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

Recovered oil V_{rec} :	<u>NU</u>	Barrels
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22. Computation of estimated residual volume on site

a. Computation of estimated volume of pool of free phase oil (on land or confined water body).

- i. Area (m^2) occupied by pool of free phase oil 100 m^2
- ii. Average Depth (m) of pool of free phase oil 0.03
- iii. Emulsification factor: NU

iv.

Estimated Volume of pool of free phase oil. V_{pool} :	<u>18.87</u>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil (V_{in}).

1. Estimated Volume of infiltrated oil at spill point ($V_{inf a}$)

- i. Area* (m^2) of soil covered by the oil: 12
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1.5
- iii. Soil type: CLAY iv. P_e (effective porosity of the soil): 8%
- v. Cause of spill: THIRD PARTY INTERFERENCE vi. Oil type: BONNY LIGHT
- vii. Oil Residence time on site, day: ONE DAY 1
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.0003
- ix. Estimated depth of infiltration around spill point: 15003

x.

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$:	<u>9.06</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ($V_{inf b}$)

- i. Area* (m^2) of soil covered by the oil: NOT
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NOT
- iii. Soil type: NOT iv. P_e (effective porosity of the soil): NOT
- v. Cause of spill: APPLIED CABLE vi. Oil type: NOT
- vii. Oil Residence time on site, day: NOT
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NOT
- ix. Estimated depth of infiltration around spill point: NOT

Estimated Volume of infiltrated oil at spill point. $V_{inf b}$:	<u>NU</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region ($V_{inf c}$)

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- i. Area (m²) of soil covered by the oil: 447
- ii. Area (m²) of the pool of free phase oil in touch with soil: 100
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0003
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

vi.	Estimated Volume of infiltrated oil. At V _{inf} :	<u>0.02</u>	barrels
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23. Computation of estimated 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 **Spill Factors from USCG FOG (2000 Edition)

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004	NOT	
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001	APPLICABLE	
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

iii.	Percent Total	100%
	Estimated Volume of oil on open water. V _{wat} :	<u>NIL</u> Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 28.07
- ii. E-Factor: 25
- iii.

Estimated Volume of evaporated oil. V _{evap} :	<u>9.33</u>	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25% ✓	15%
	>7 days	40%	25%

25. Net Estimated Spilled Volume $V_{\text{net}}(\text{bbls}) = V_{\text{evap}}(\text{bbls}) + V_{\text{wat}}(\text{bbls}) + V_{\text{inf}}(\text{bbls}) + V_{\text{pool}}(\text{bbls}) + V_{\text{rec}}(\text{bbls}) = 9.33 + \text{NIL} + 9.14 + 18.67 + \text{NIL} = 37.34$
 $37.34 \approx 38 \text{ BARRELS}$

Estimated Reported Volume V_{rep}(bbls) = 28 BARRELS**

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28. Appendix 1: Overview sketch of the site

Location: 24" NEMBE CREEK PIPELINE AT ADAMAKURI

