



**THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED**

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0358 - 871986

**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: NOT APPLICABLE

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
	NONE WITHIN AREA OF IMPACT				

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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

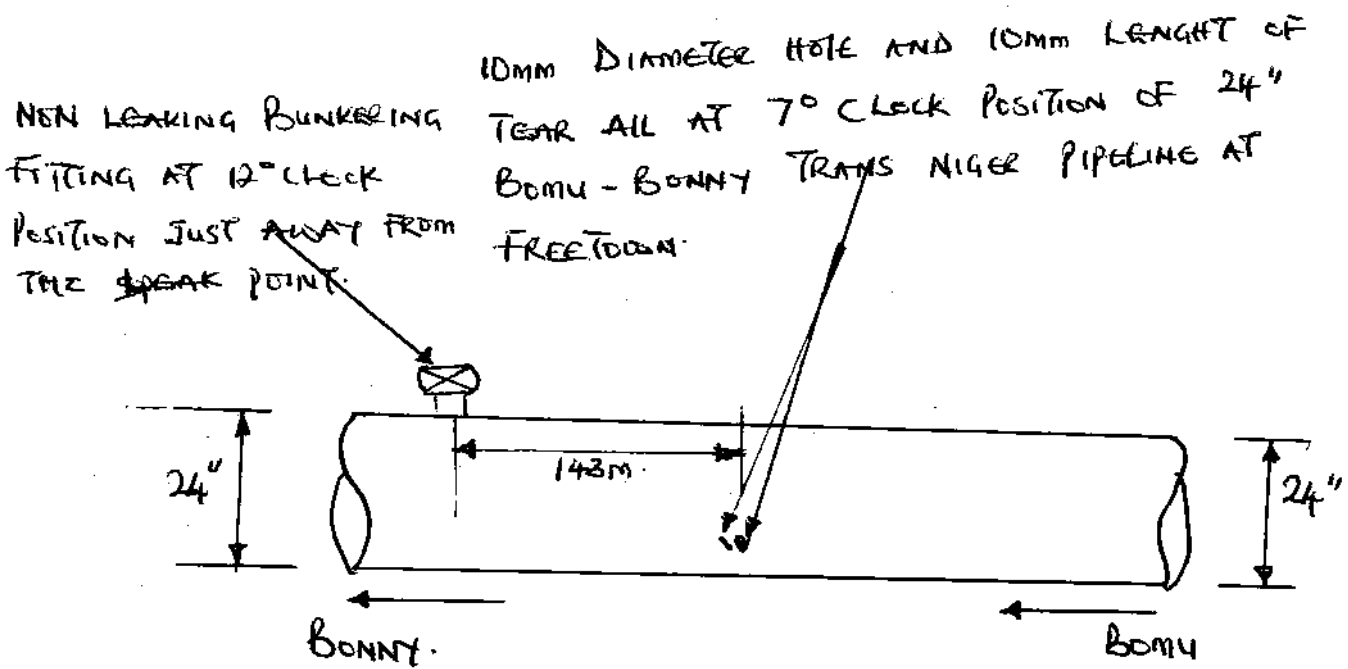
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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)

SHOWING A SECTIONAL VIEW OF LEAKAGE ON 24" BOMU - BONNY  
TRANS NIGER PIPELINE AT FREETOWN.





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iii. Emulsification factor: NIL

iv. **Volume of pool of free phase oil,  $V_{pool}$ :** NIL barrels

Computation of volume of infiltrated oil in the soil ( $V_{inf}$ ):

- i Area \*(m<sup>2</sup>) covered by the oil: 1796 m<sup>2</sup>
- 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: 0.504m
- iv Soil type: CLAY
- v  $P_e$  (effective porosity of the soil): 8%

iv. **Volume of infiltrated oil,  $V_{inf}$ :** 3.61 barrels

*Handwritten notes:*  
 Computation of volume of infiltrated oil  
 AT SPILL POINT =  
 AREA = 4m<sup>2</sup>  
 DEPT = 0.5m  
 PROBABILITY EFFECT = 8%  
 VOLUME = 1.0064 bbl

**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	
Bright Color	0.0003	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,  $V_{wat}$ :** NIL barrels

**22. Calculation of evaporated volume:**

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 40%

iii. **Volume of evaporated oil,  $V_{evap}$ :** 3.08 barrels

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**

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

$$V_{Est}(bbls) = 3.08 + NIL + (3.61 + 1.0064) + NIL + NIL = 7.70 \text{ BARRELS}$$

**24. Net Total Estimated Spilled Volume**

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

$$V_{Est}(bbls) = 7.70 \text{ BARRELS}$$

\*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 05/10/2012 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*

27. Appendix 1: Overview sketch of the site

