

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0233810919

(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: 810919 2. Type of incident * OIL SPILL AND FIRE
 3. Name of Location 24th BOMU - BONNY PIPELINE
 4. Name of nearest community MOGHO 5. State: RIVERS 6. LGA CIOKANA
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District NESP/PH2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 5th MAY 2012
 b. Start date/time of investigation: 6th MAY 2012 : 11:45 HOURS
 c. Investigation End date: 6th MAY 2012 : 16:00 HOURS

- d. Description of spill point environment
- | | | |
|---|--|---|
| <input type="checkbox"/> Firmed soil | <input checked="" type="checkbox"/> Loose soil | <input checked="" type="checkbox"/> Previously excavated area |
| <input type="checkbox"/> Under water | <input type="checkbox"/> Swampy | <input type="checkbox"/> Exposed pipe surface |
| <input type="checkbox"/> Well Platform (on Water) | | <input type="checkbox"/> Rig |
- e. Description of leak point (tick as applicable);
- | | | |
|--|---|---|
| <input type="checkbox"/> Drilled hole | <input checked="" type="checkbox"/> Hack saw cut | <input type="checkbox"/> Explosive tear, |
| <input type="checkbox"/> Complete Rupture | <input type="checkbox"/> Inward dent, | <input type="checkbox"/> Well head tampering |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | | <input type="checkbox"/> Missing Pipeline/Flowline) |
| <input type="checkbox"/> Crude oil theft (illegal) bunkering) point, | | <input type="checkbox"/> Third party tampering with Clamp |
| <input type="checkbox"/> Third party tampering with valve setting, | | <input type="checkbox"/> Third party tampering with flange, |
| <input type="checkbox"/> Corrosion | <input type="checkbox"/> Saver-pit over flow, | <input type="checkbox"/> Surge vessel overflow |
| <input type="checkbox"/> Outward dent | <input type="checkbox"/> Flare System/Bund wall failure | |
| <input type="checkbox"/> Valve Failure | <input type="checkbox"/> com unit failure | <input type="checkbox"/> Cold vent |
| <input type="checkbox"/> Relief valve failure | <input type="checkbox"/> Others (specify) _____ | |

- f. Incident caused by:
- | | | |
|--|--------------------------------------|--|
| <input checked="" type="checkbox"/> Third party interference | <input type="checkbox"/> Operational | <input type="checkbox"/> Mystery _____ |
|--|--------------------------------------|--|

g. Spill point coordinates

Measuring unit	
Northing: SP ₁ = 71370mN SP ₂ = 71336mN	Easting: 534999mE 35005mE

*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 [Nil ,m]
 Drinking water source [Nil ,m]
 Built up area [Nil ,m]
 Farmlands [1< ,m]
 Fish Farm/Pond [Nil ,m]
 Fishing net [Nil ,m]
 Others (specify). [Nil ,m]

12. Containment measures put in place;

- Booms Trench Dyke

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 WITHIN AREA OF IMPACT</u>				

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	CASAVA	✓	✓		MANY	IMPACTED
	CORN	✓	✓		MANY	BY OIL AND
	OKRA	✓	✓		MANY	BURNED BY
	MELON	✓	✓		MANY	FIRE

17. Fish/Nets/Ponds

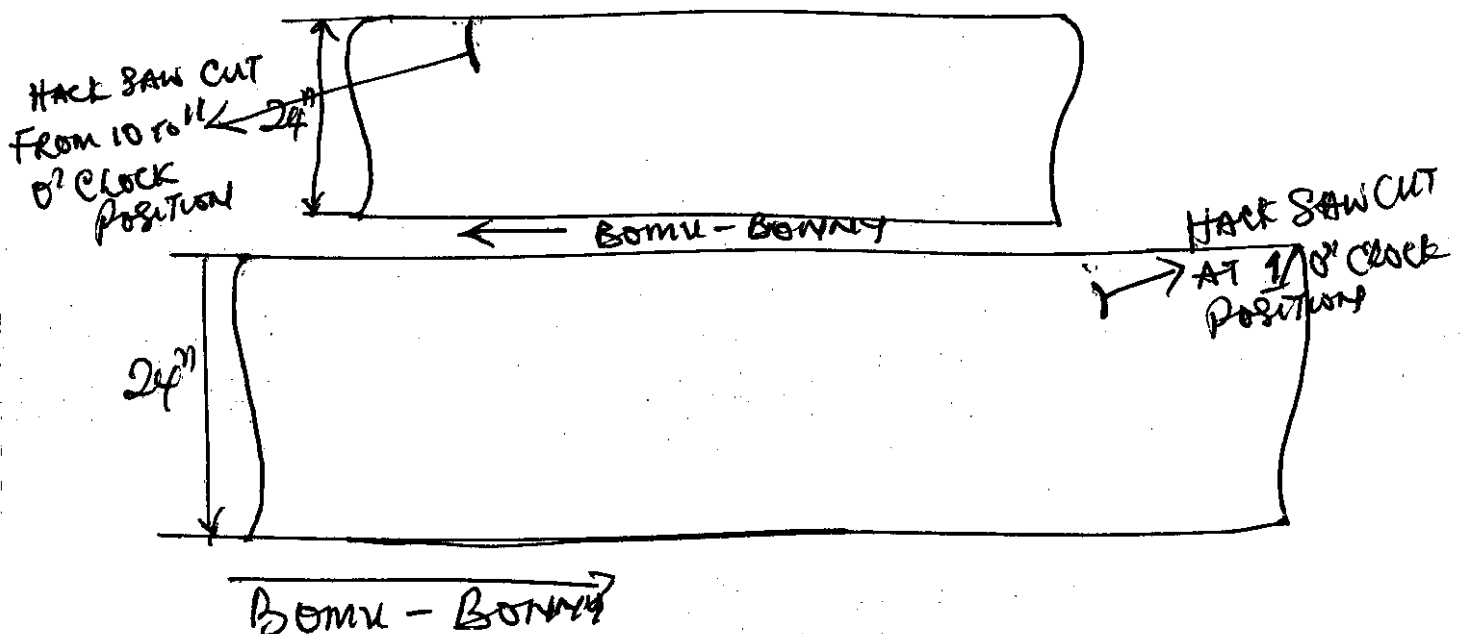
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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)*

A SECTION OF 24" BOMU-BONNY PIPELINE AT MOGHO SHOWING HACK SAW CUT AT TWO DIFFERENT PLACE ON THE PIPELINE



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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
SP ₁	71369.792	534998.879
P ₂	71372.842	535011.212
P ₃	71360.561	535008.109
P ₄	71363.654	534995.786
P ₅	71345.219	534998.836
P ₆	71345.192	535014.246
P ₇	71323.685	535017.291
P ₈	71325.789	534998.804
P ₉	71332.943	534992.651

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.06 Ha
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

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

Recovered oil V_{rec}	<u>27</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 16 m^2
- ii. Average Depth (m) of pool of free phase oil 0.2

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iii. Emulsification factor: NIL

iv.

Volume of pool of free phase oil, V_{pool} :	20.13	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area *(m²) covered by the oil: 584
- ii. Area of the pool of free phase oil in touch with soil: 16
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.005
- iv. Soil type: MEDIUM SAND
- v. P_e (effective porosity of the soil): 20%

iv.

Volume of infiltrated oil, V_{inf} :	3.77	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} :	NIL	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%

iii.

Volume of evaporated oil, V_{evap} :	16.97	barrels
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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

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

$$V_{Est}(bbls) = 16.97 + NU + 3.77 + 20.13 + 27 = 67.87 \text{ BARRELS}$$

24. Net Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 16.97 + NU + 3.77 + 20.13 + 27 = 67.87 \text{ BARRELS}$$

*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 filled and signed on the 06 / 08 / 20 / 12 at incident site by joint investigation representatives from

- Host Community
- Department of Petroleum Resources [DPR]: See Attached
- 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

