

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0317

(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: 857601 2. Type of incident * OIL SPILL
 3. Name of Location FORCADOS TERMINAL SBM 2
 4. Name of nearest community OGULAGHA 5. State: DELTA 6. LGA BURUTU
 7. Type of Production facility/Installation SBM2 8. Asset owner/ District FORCADOS TERMINAL

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 25/8/2012
 b. Start date/time of investigation: 26/8/2012
 c. Investigation End date: 28/9/2012
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig
 e. 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,
 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) FAILED SUB-SEA HOSE
 f. Incident caused by:
 Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit	
Northing: <p style="text-align: center; font-size: 1.2em;">129356M</p>	Easting: <p style="text-align: center; font-size: 1.2em;">304419M</p>

*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) OFFSHORE

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]

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:

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					

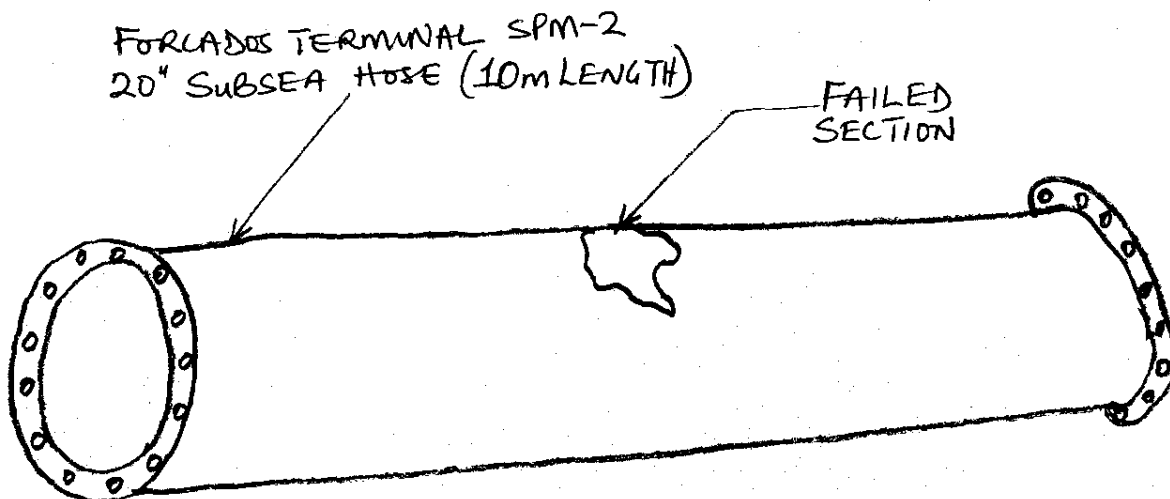
17. Fish/Nets/Ponds

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)



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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
	127812	305888
	127569	305115
	128011	304682
	128865	304814
	127720	306958
	127593	306076
	129754	304102
	128394	303963
	127478	304995
	126649	305732
	124416	309012
	121301	303372 709
	120781	315372

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 1832702 m²
- 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>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).
- Area (m²) occupied by pool of free phase oil NIL
 - Average Depth (m) of pool of free phase oil NOT APPLICABLE

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iii. Emulsification factor: NOT APPLICABLE

iv.

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

- i Area *(m²) covered by the oil: NIL
- 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: NOT APPLICABLE
- iv Soil type: NOT APPLICABLE
- v P_e (effective porosity of the soil): NOT APPLICABLE

iv.

Volume of infiltrated oil V_{inf} :	NIL	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: 1832702 m²
- ii. Table of average depth of oil on water based on coloration**

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004	/	/
Silvery	0.00008	20%	0.029323232
Slight Color	0.00015	20%	0.05498106
Bright Color	0.0003	40%	0.219924
Dull	0.001	20%	0.3665404
Dark	0.002	/	/
Black oil	0.1	/	/
Emulsion (30% Oil)	1	/	/
Percent Total		100%	Total Volume <u>0.67 m³</u>

iii.

Volume of oil on open water V_{wat} :	4.22	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM FORCADOS BLEND @ ANOSORA
Geo ISME
- ii. E-Factor: 15% Dml's for cados
DBQ 28/09/12

iii.

Volume of evaporated oil V_{evap} :	0.74	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%

*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

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

$V_{Est}(bbls) =$ 4.96 BBLs

24. Net Total Estimated Spilled Volume

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

$V_{Est}(bbls) =$ 3.3 BBLs

*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

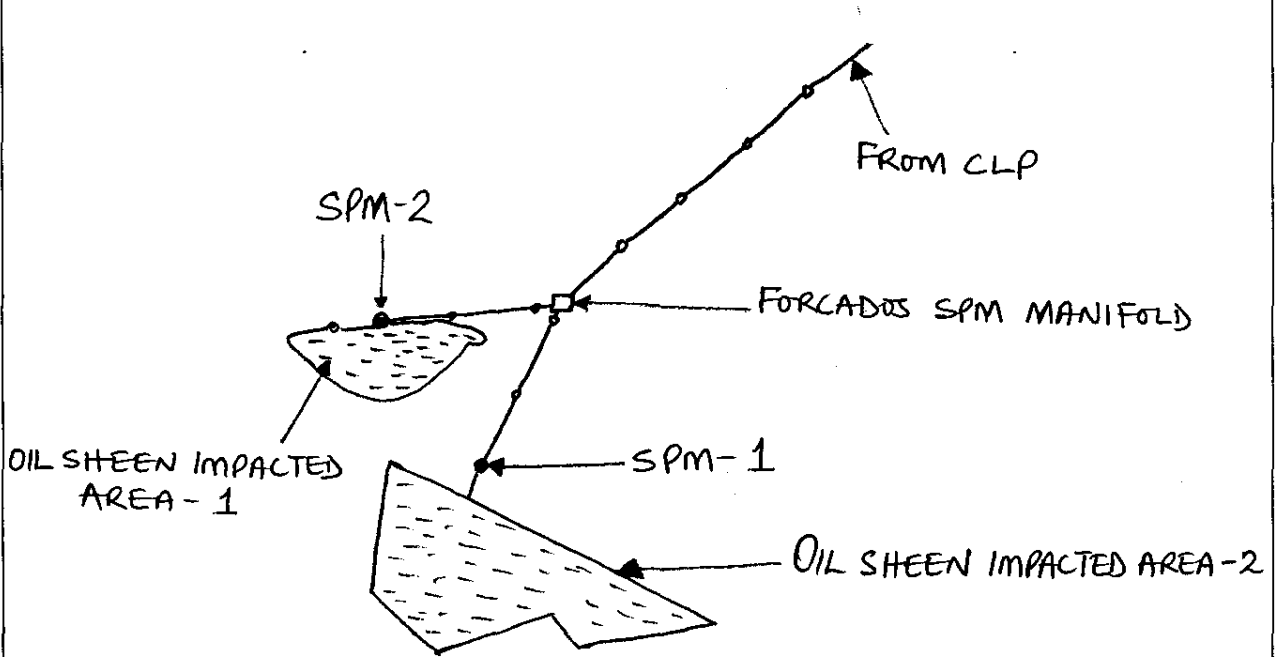
This report was filled and signed on the 28 / 09 / 2012 at incident site by joint investigation representatives from

- 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

Location: FORCADOS TERMINAL SPM-2 20" SUBSEA HOSE SPILL INCIDENT



SPM → SINGLE POINT MOORING
CLP → CRUDE LOADING PLATFORM

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

S/N	Northing	Easting
	124054	314217
	125181	312267
	125258	310296
	127658	307916
	129252	306333
	129838	305259
	128968	302579
	131428	305850
	131611	302743
	129873	302195