

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0509

(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: 882025 2. Type of incident * OIL SPILL
 3. Name of Location OTUMARA WELL 20L FLOWLINE
 4. Name of nearest community UGBDEGUNGN 5. State: DELTA 6. LG WARRI - SOUTH WEST
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/ District NWSZ

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 20/10/2012
 b. Start date/time of investigation: 24/10/2012 AT 12 27 HRS
 c. Investigation End date: 24/10/2012

- d. Description of spill point environment
- | | | |
|---------------------------------------------------|--------------------------------------------|----------------------------------------------------|
| <input type="checkbox"/> Firmed soil | <input type="checkbox"/> Loose soil | <input type="checkbox"/> Previously excavated area |
| <input type="checkbox"/> Under water | <input checked="" 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 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 checked="" 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 type="checkbox"/> Third party interference | <input checked="" type="checkbox"/> Operational | <input type="checkbox"/> Mystery _____ |
|---------------------------------------------------|-------------------------------------------------|----------------------------------------|

g. Spill point coordinates

Measuring unit	
Northing: <div style="font-size: 2em; text-align: center;">182480m</div>	Easting: <div style="font-size: 2em; text-align: center;">301910m</div>

**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 [,m]
 Drinking water source [,m]
 Built up area [,m]
 Farmlands [00 ,m]
 Fish Farm/Pond [00 ,m]
 Fishing net [,m]
 Others (specify). [,m]

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

13. Any pictures or video coverage? [] []

14. Was there any disruption to the investigation? [] []

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
1	PLANTAIN	/	/	YES	24	/
2	MANGROVE	YES	/	/	LOT	/
3	PALM TREES	/	YES	/	1	/

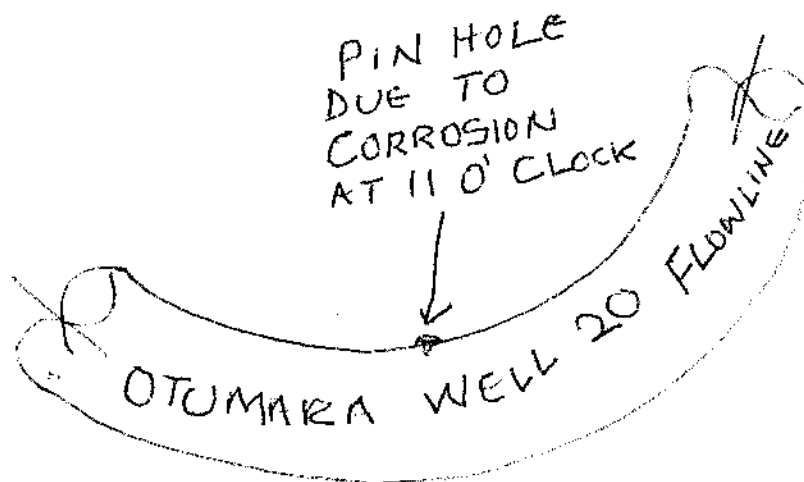
17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	POND	/	1	/
	PERGWINKLES	/	LOT	/
	CRABS	/	15	/

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
SP	182480	301913
1	182447	301899
2	182487	301902
3	182445	301944
4	182465	301968
5	182515	301894
6	182450	301900
7	182473	301919
8	182482	301920
9	182491	301924
10	182492	301919
11	182492	301924
12	182510	301891

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 2093.5 m²
- Impact within SPDC R.O.W 1788.1 m²
- Impact outside R.O.W 305.4 m²

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

Recovered oil V _{rec}	NIL	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 1938.5 m²
 - Average Depth (m) of pool of free phase oil 0.003 m

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iii. Emulsification factor: NOT APPLICABLE

iv.

Volume of pool of free phase oil. V_{pool} :	36.58
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 barrels

- b. Computation of volume of infiltrated oil in the soil (V_{inf}).
- i Area *(m²) covered by the oil: 155 M²
 - 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: 0.3 m
 - iv Soil type: CLAY
 - v P_c (effective porosity of the soil): 8%
- iv.

Volume of infiltrated oil. V_{inf} :	23.4
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 barrels

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		
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 m³</u>

NOT APPLICABLE

iii.

Volume of oil on open water. V_{wat} :	NIL
------------------------------------------	-----

 barrels

22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM
- ii. E-Factor: 15%

iii.

Volume of evaporated oil. V_{evap} :	10.58
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 barrels

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

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

$V_{Est}(bbls) =$ 71 BBLs

24. Net Total Estimated Spilled Volume

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

$V_{Est}(bbls) =$ 71 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

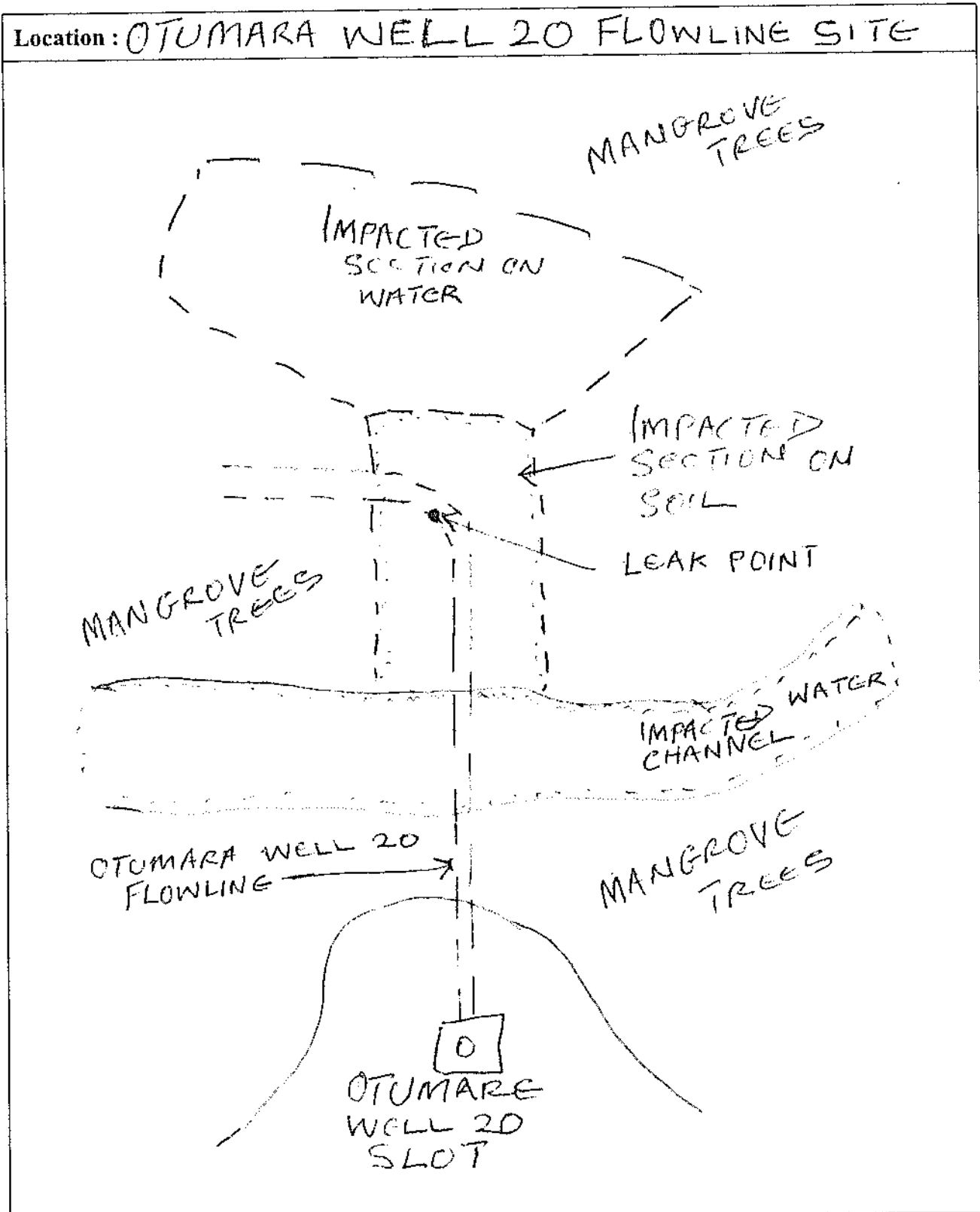
26 REPRESENTATIVES

This report was filled and signed on the 24/10/2012 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



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

S/N	Northing	Easting
13	182515	301894
14	182512	301904
15	182477	301950
16	182465	301968
17	182483	301912
18	182476	301906
19	182487	301902
20	182456	301930
	182452	301929
	182454	301947
	182445	301944
	182455	301936
	182506	301901
	182433	301930
	182440	301915
	182431	301937
	182457	301882