

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO:

0416 - 902081

(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: 902081 2. Type of incident * OIL SPILL
 3. Name of Location OTAMIRI WELL 545 FLOWLINE
 4. Name of nearest community Umuechem 5. State: RIVERS 6. LGA ETCHE
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/ District NELI / P.H.I

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 6TH DECEMBER, 2012
 b. Start date/time of investigation: 8TH DECEMBER, 2012
 c. Investigation End date: 8TH DECEMBER, 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) _____
 f. Incident caused by:
☒ Third party interference ☐ Operational ☐ Mystery _____

g. Spill point coordinates

Measuring unit METER (MINNA MID-BEIT)

Northing: <div style="font-size: 2em; text-align: center;">114234.6</div>	Easting: <div style="font-size: 2em; text-align: center;">504459.2</div>
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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

<input type="checkbox"/> Government reserved and designated protected area	[NIL ,m]
<input type="checkbox"/> Drinking water source	[NIL ,m]
<input type="checkbox"/> Built up area	[NIL ,m]
<input type="checkbox"/> Farmlands	[2 ,m]
<input type="checkbox"/> Fish Farm/Pond	[NIL ,m]
<input type="checkbox"/> Fishing net	[NIL ,m]
<input type="checkbox"/> Others (specify).	

12. Containment measures put in place;

☒ Booms ☐ Trench ☐ Dyke

☐ Others: _____

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
	CASSAVA	✓	✓	NIL	(3x40)m	

17. Fish/Nets/Ponds

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

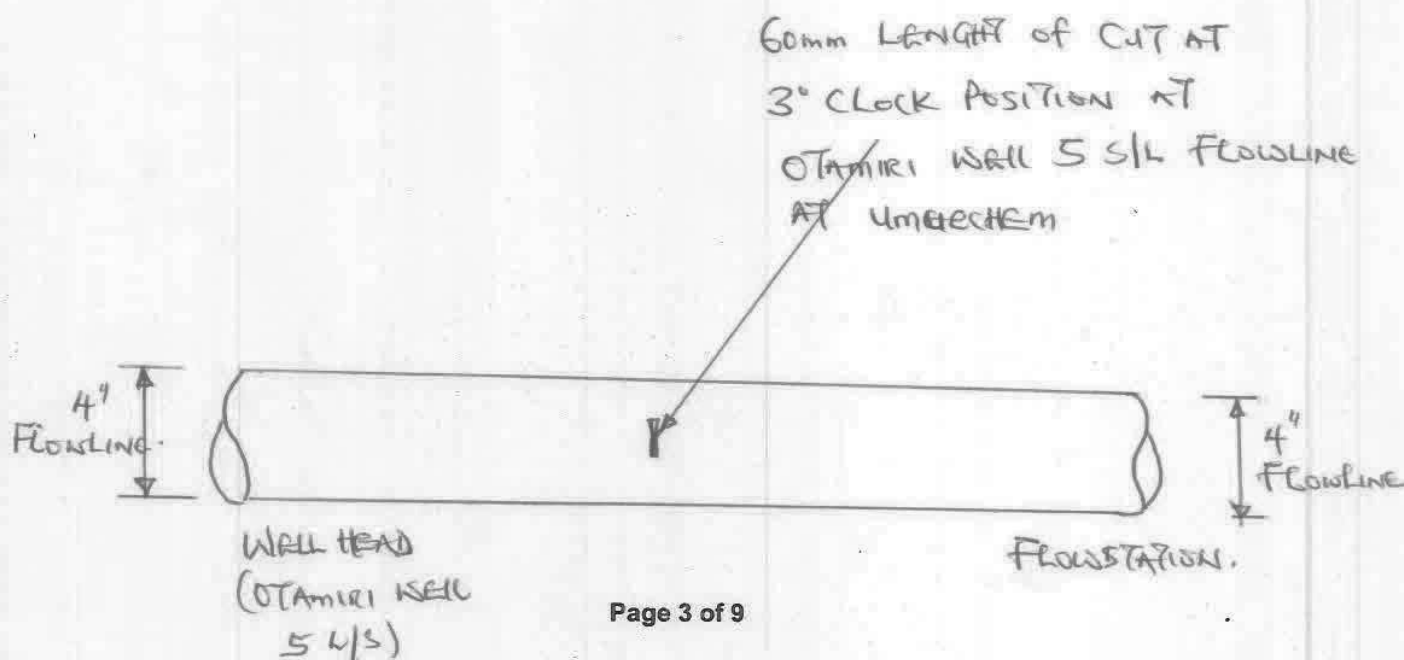
18. Others (Specify) i.e. Animal Traps

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)

SECTION OF OTAMIRI WELL S/Ls FLOWLINE AT Umuechem.

SHOWING HACKSAW CUT.



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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)

(MINNA MID BEIT)

S/N	Northings (METERS)	Easting METERS
	114234.23	504459.69
	114243.50	504441.15
	114244.21	504441.60
	114242.94	504440.65
	114233.10	504462.19
	114232.25	504461.66
	114253.25	504420.25
	114254.57	504421.18

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.004419
- Impact within SPDC R.O.W YES
- Impact outside R.O.W NO

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). 36m²
- Area (m²) occupied by pool of free phase oil 36m²
 - Average Depth (m) of pool of free phase oil 0.012m

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iii. Emulsification factor: 30%

iv.

Volume of pool of free phase oil. V_{pool} :	<u>1.90</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: 8m²
 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: 0.015m
 Soil type: CLAY
 P_e (effective porosity of the soil): 8%

iv.

Volume of infiltrated oil. V_{inf}	<u>0.06</u>	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		
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} :	<u>NIL</u>	barrels
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22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 15%

iii.

Volume of evaporated oil. V_{evap} :	<u>0.44</u>	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%

Computation of Spill Point
 Infiltrated oil.
 AREA = 2m²
 DEPT = 0.5m
 PE = 8%
 VOLUME = 2 x 0.5 x 0.08 = 0.08m³

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23. Gross Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 0.44 + NIL + (0.50 + 0.06) + 1.90 + NIL = 2.90 \text{ Barrels}$$

24. Net Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 3 \text{ Barrels}$$

*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 08/12/2012 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

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27. Appendix 1: Overview sketch of the site

