

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

0150

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 999138 JIV report S/N:

(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: 999138 2. Type of incident* OIL SPILL
 3. Name of Location 6" 081680 NORTH - OGALE PIPELINE
 4. Name of nearest community OGALE 5. State: RIVERS 6. LGA ELEME
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE EAST

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 29TH JUNE, 2013
 b. Start date/time of investigation: 3RD JULY, 2013 / 10:30AM
 c. Investigation End date: 3RD JULY, 2013 Actual investigation duration, days: ONE (1) DAY

d. Description of spill point environment

- | | | |
|---|--|---|
| <input type="checkbox"/> Firmed soil | <input checked="" type="checkbox"/> Loose soil | <input checked="" type="checkbox"/> Recently 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"/> Drill Rig |
- e. Description of leak point (tick as applicable);
- | | | |
|--|---|--|
| <input type="checkbox"/> Drilled hole | <input type="checkbox"/> Hack saw cut | <input type="checkbox"/> Tear (_____), |
| <input type="checkbox"/> Complete Rupture | <input type="checkbox"/> Inward dent, | <input type="checkbox"/> Well head tampering |
| <input checked="" type="checkbox"/> Failed Weld-on illegal hot tap valve, | <input type="checkbox"/> Failed Clamp | <input type="checkbox"/> Missing Pipeline/Flowline |
| <input checked="" 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"/> Bulging Outward | <input type="checkbox"/> Flare System/Bund wall failure | <input type="checkbox"/> Accidental 3 rd party equipment impact |
| <input type="checkbox"/> Relief valve failure | <input type="checkbox"/> Valve Failure | <input type="checkbox"/> com unit failure |
| | <input type="checkbox"/> Others (specify) _____ | <input type="checkbox"/> Cold vent |

f. Incident caused by:

- Third party interference (Sabotage ; crude theft ; Line theft ; Accidental 3rd party damage
 Operational Others (including Mystery spills) _____

g. Spill point coordinates

Measuring unit	
Northing: (m)	Easting: (m)
<u>90759.29</u>	<u>521364.33</u>

MINNA - MID BELI

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C. RISK ASSESSMENT

10. Type of environment:

- Land Swamp Water Seasonal swamp Shoreline/Waterfront

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Rain Sunny Dry Wet Windy Hot cool

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]

NONE SEEN WITHIN VICINITY

12. Containment measures put in place;

- Booms Trench Dyke Natural depression Pit
 Others: _____

13. Any pictures or video coverage? [N]

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

If yes give brief description:

NONE 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
1	PALM TREES	✓ (1)	—	✓ (2)	3	IMPACTED BY SPILL.

17. Fish/Nets/Ponds

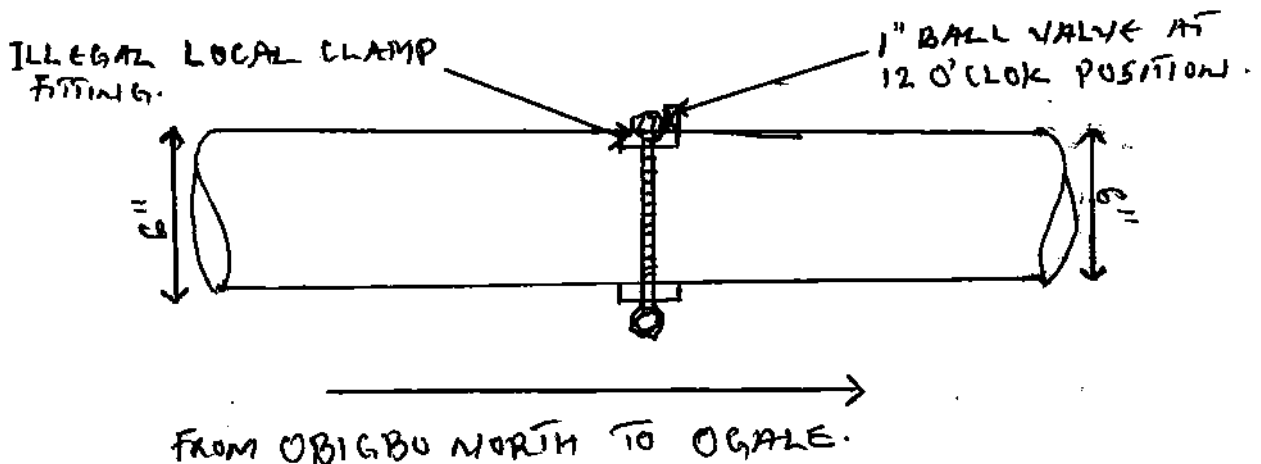
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
		NONE WITHIN AREA OF IMPACT		

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 6" OBIGBU NORTH - OGALE PIPELINE AT OGALE SHOWING POSITION OF CRUDE OIL THEFT POINT AT 12 O'CLOCK POSITION.



Appendix A

Impacted Area Coordinate		
6"Obigbo North-Ogale pipeline @ Ogale		
Incident No:999138		
Minna_mid belt		
Point	Easting(m)	Northing(m)
641	521358.28	90817.67
642	521364.44	90817.66
643	521364.41	90799.23
645	521367.51	90808.43
646	521373.67	90808.42
647	521389.00	90768.46
648	521413.65	90768.41
649	521410.54	90756.13
650	521376.64	90753.12
651	521361.20	90734.72
652	521355.04	90737.81
653	521348.87	90734.75
655	521348.90	90747.04
658	521336.57	90747.06
659	521302.68	90750.20
660	521296.52	90750.21
661	521296.50	90741.00
662	521293.42	90741.00
663	521287.19	90710.30
664	521287.18	90701.08
665	521284.09	90701.09
666	521281.01	90701.09
667	521281.03	90707.24
668	521274.87	90710.32
669	521274.88	90716.46
670	521277.96	90716.46
671	521281.08	90734.88
672	521287.24	90731.80
673	521290.35	90750.22
674	521287.29	90759.44
675	521284.25	90777.88
676	521287.33	90777.88
677	521287.30	90762.52
678	521290.38	90762.51
679	521293.47	90768.65
680	521296.55	90768.64
681	521296.55	90765.57
682	521293.45	90756.36
683	521305.77	90753.26
684	521308.85	90753.26
685	521318.09	90753.24

686	521333.50	90753.21
687	521345.83	90756.26
688	521342.78	90771.62
689	521336.62	90771.63
690	521333.55	90777.78
691	521324.31	90777.80
692	521327.39	90780.87
693	521333.56	90780.86
694	521348.97	90786.97

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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.374a
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W YES

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

Recovered oil V_{rec} :	<u>31</u>	Barrels
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22. Computation of estimated residual volume on site

a. Computation of estimated volume of pool of free phase oil (on land or confined water body).

- i. Area (m^2) occupied by pool of free phase oil 1,900
- ii. Average Depth (m) of pool of free phase oil 0.002
- iii. Emulsification factor: ✓

iv.

Estimated Volume of pool of free phase oil. V_{pool} :	<u>23.90</u>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil (V_{inf}).

1. Estimated Volume of infiltrated oil at spill point ($V_{inf a}$)

- i. Area* (m^2) of soil covered by the oil: 4
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1.5
- iii. Soil type: CLAY iv. P_e (effective porosity of the soil): 8%
- v. Cause of spill: IMPROPERLY INSTALLED vi. Oil type: BONNY MEDIUM
- vii. Oil Residence time on site, day: 4
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.0011m
- ix. Estimated depth of infiltration around spill point: 1.5011m

x.

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$:	<u>3.02</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ($V_{inf b}$)

- i. Area* (m^2) of soil covered by the oil: _____
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: _____
- iii. Soil type: _____ iv. P_e (effective porosity of the soil): _____
- v. Cause of spill: _____ vi. Oil type: _____
- vii. Oil Residence time on site, day: _____
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: _____
- ix. Estimated depth of infiltration around spill point: _____

Estimated Volume of infiltrated oil at spill point. $V_{inf b}$:	<u>NIL</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region ($V_{inf c}$)

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- i. Area (m²) of soil covered by the oil: 1796
- ii. Area (m²) of the pool of free phase oil in touch with soil: 1900
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0011
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%
- vi.

Estimated Volume of infiltrated oil. At V_{inf} :	<u>2.04</u>	barrels
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23. Computation of estimated 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 **Spill Factors from USCG FOG (2000 Edition)

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015	<u>NOT</u>	
Bright Color	0.0003		
Dull	0.001	<u>APPLICABLE</u>	
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

- iii.

Percent Total	100%	
Estimated Volume of oil on open water. V_{wat} :	<u>NIL</u>	Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 59.96
- ii. E-Factor: 15%
- iii.

Estimated Volume of evaporated oil. V_{evap} :	<u>10.58</u>	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

25. Net Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls)$

$= 10.58 + NIL + 5.06 + 23.90 + 31$

$= 70.54 \text{ BARRELS} \approx 71 \text{ BARRELS.}$

Estimated Reported Volume** $V_{rep}(bbls) =$ 71 BARRELS.

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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 Volume (m³) x 6.29; **Round up estimated volume to next whole number using the following rules:

- Any spill volume in excess of 1 bbl is rounded up to the next whole number.
- Any spill volume in less than 1 bbl is rounded up to the next 0.1 bbl.

Examples: Calculated volume = 15.3 bbl ----- Reported volume = 16 bbl
 Calculated volume = 0.35 bbl ----- Reported volume = 0.4 bbl
 Calculated volume = 0.01 bbl ----- Reported volume = 0.1 bbl.

Wherever this estimation tool is not applicable please refer to paragraph 6c (Deviations) of the JIV procedure to use appropriate steps for column estimation; record the calculation in a plain sheet of paper and attach to the JIV report.

26. 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 <input type="checkbox"/>
B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>

27. REPRESENTATIVES

This report was filled, agreed and signed on the 03/07/2013 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]:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings:

Tick as applicable

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28. Appendix 1: Overview sketch of the site

