

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0001 695405

(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: 695405 2. Type of incident* OIL SPILL / FIRE
 3. Name of Location 12" IMO RIVER - OGALE PIPELINE
 4. Name of nearest community KOMKOM 5. State: RIVERS 6. LGA OYIGBO
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District NESP/PH 2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 2ND AUGUST, 2011
 b. Date/Period of investigation: 4TH TO 7TH AUGUST, 2011.
 c. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy (SEASONAL) Exposed pipe surface
 Well Platform (on Water) Rig
 d. 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,
 External Corrosion Internal 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) NOT APPLICABLE
 e. Incident due to:
 Third party interference Operational Others (specify) NOT APPLICABLE

f. Spill point coordinates (MINNA MID-BELT)

Measuring unit M	
Northing:	Easting:
POINT 1 } 97144.58	POINT 1 } 523413.70
POINT 2 } —	POINT 2 } —
POINT 3 } 97141.51	POINT 3 } 523413.69
POINT 4 } —	POINT 4 } —
POINT 5 } 97215.24	POINT 5 } 523407.68
POINT 6 } —	POINT 6 } —
POINT 7 } 97233.68	POINT 7 } 523404.63
POINT 8 } 97236.75	POINT 8 } 523404.64
POINT 9 } 97239.82	POINT 9 } 523404.65

*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 (SEASONAL) Water River (identify) NOT APPLICABLE

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). NOT APPLICABLE

12. Containment measures put in place;

- Booms Trench Dyke

Others: NOT APPLICABLE

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
<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
1	PALM TREES	✓		✓	20	BURNT
2	RAFFIA PALM	✓		✓	5	FREE-STANDING TREES.

17. Fish/Nets/Ponds

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

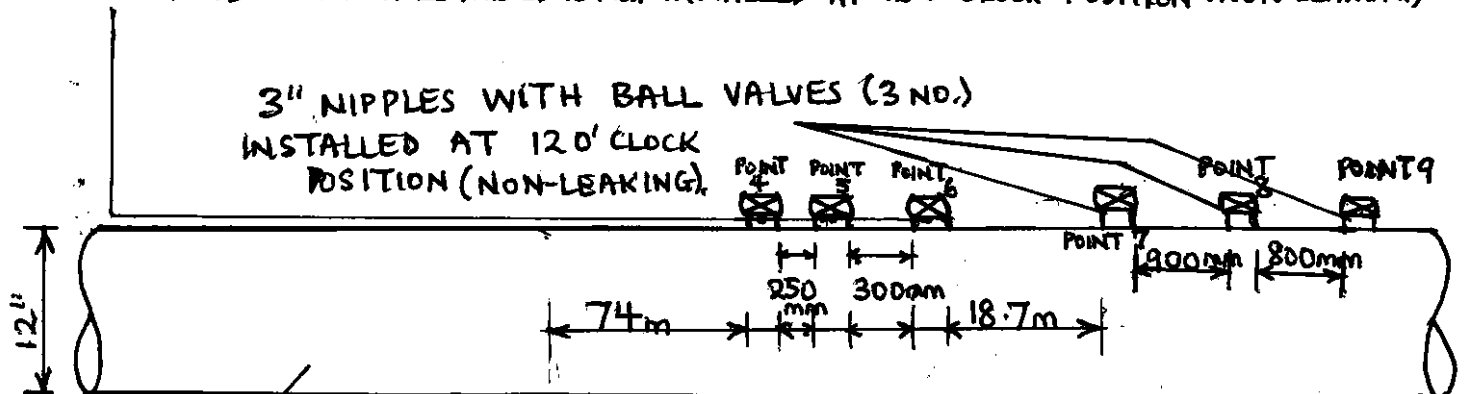
18. Others (Specify) i.e. Animal Traps

S/N	Others	Description	Quantity/Size	Comments
		NONE WITHIN AREA OF IMPACT		

E. GRAPHIC DESCRIPTION OF LEAK POINT (Overview sketch of the site should be added as an appendix 1)

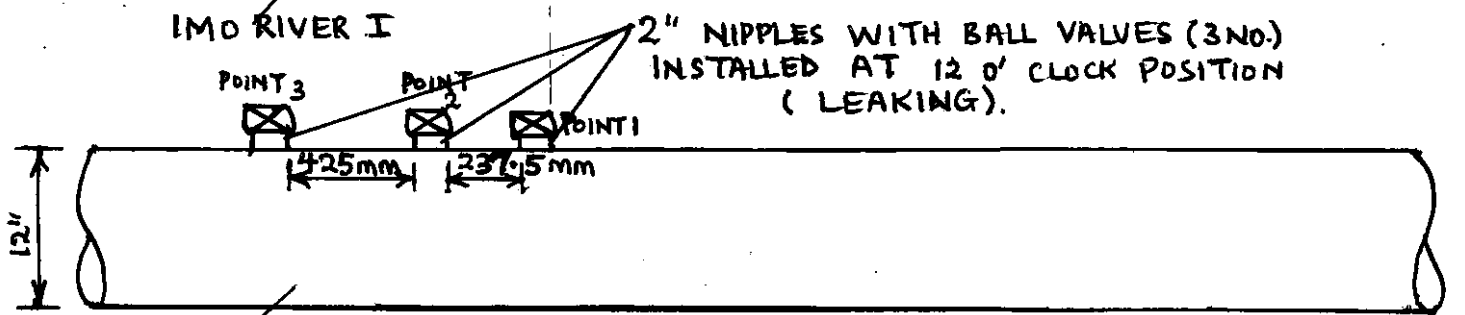
2" NIPPLES WITH BALL VALVES (3 NO.) INSTALLED AT 12 O' CLOCK POSITION (NON-LEAKING)

3" NIPPLES WITH BALL VALVES (3 NO.)
INSTALLED AT 12 O' CLOCK
POSITION (NON-LEAKING).



IMO RIVER I

2" NIPPLES WITH BALL VALVES (3 NO.)
INSTALLED AT 12 O' CLOCK POSITION
(LEAKING).



IMO RIVER II

← OGALE

← IMO RIVER

SECTION OF 12" IMO RIVER - OGALE PIPELINE AT KOM-KOM SHOWING LOCATIONS OF 9 NO. CRUDE OIL THEFT FITTINGS INSTALLED AT 12 O' CLOCK POSITIONS.

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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-BELT)

S/N	Northing (M)	Easting (M)
160	97110.64	523487.58
112	97131.49	523395.03
116	97214.93	523390.92 MISS
113	97254.84	523389.67
114	97255.81	523426.24
143	97239.78	523426.21
115	97216.89	523431.30 MISS
163	97202.90	523435.38
162	97181.38	523444.59
154	97159.87	523447.62
155	97150.64	523453.77
157	97135.27	523459.90

G. INCIDENT INFORMATION:

20. Impacted Area Details (FOR 9 NO. CRUDE OIL THEFT POINTS).

- Total calculated area of impact 0.66 Ha
- Impact within SPDC R.O.W 0.17 Ha
- Impact outside R.O.W 0.49 Ha

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

Recovered oil V_{recJ}	6	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 (m^2) occupied by pool of free phase oil 86
- Average Depth (m) of pool of free phase oil 0.001
- Emulsification factor: 0%

iv. Volume of pool of free phase oil. V_{pool} :	0.54	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

NOTE:
THE TOTAL AREA BURNT BY FIRE IS $6,555 m^2$.
THE AREA OF OIL BURNT IS ABOUT 45% OF $6,555 m^2$ = $2,950 m^2$.
THEREFORE, THE VOLUME OF OIL BURNT IS $2,950 \times 0.001m$ (AVERAGE OIL DEPTH) $\times 6.29$ = 18.56 BARRELS.

- i. Area (m^2) covered by the oil: 3605
- ii. Area of the pool of free phase oil in touch with soil (m^2): 0
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.003
- iv. Soil type: MEDIUM SAND
- v. P_e (effective porosity of the soil): 25%

iv. Volume of infiltrated oil. V_{inf}	17.01	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 NIL 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 MEDIUM
- ii. E-Factor: 15%

iii. Volume of evaporated oil. V_{evap}	7.43	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%

23. Gross Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 7.43 + NIL + 17.01 + 0.54 + 6 = 49.54$

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$V_{Est}(bbls) =$	49.5 BARRELS
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 7.43 + NIL + 17.01 + 0.54 + 6 = 49.54$	
$V_{Est}(bbls) =$	49.5 BARRELS

- *Calculation of the respective estimated volume is to be done using the new spill 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 <input type="checkbox"/> |
| B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/> |

26 Signatories

This report was filled and signed on the 07 / 08 / 20 11 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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20. Appendix 1: Overview sketch of the site

