

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0201789675

(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: 789675 2. Type of incident * OIL SPILL
 3. Name of Location 8" ISIMIRI PIPELINE
 4. Name of nearest community OBIKPY 5. State: ABIA 6. LGA UKWA-WEST
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District SPDC PIPELINE-LAND

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 16TH MARCH 2012
 b. Start date/time of investigation: 20TH MARCH 2012 12:15 HOURS
 c. Investigation End date: 20TH MARCH 2012 15:00 HOURS
 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-BELT | |
|------------------------|--|---------------------|-------------|
| Northing: | | Easting: | |
| 525861.77 | | 97993.72 | <i>(Sm)</i> |
| 525862 | | 97993.66 | |
| 97993.72 | | 525861.77 | |
| 97993.66 | | 525862.02 | |
| 97993.58 | | 525862.31 | |
| 97993.52 | | 525862.65 | |

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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 [,m]
 Fish Farm/Pond [,m]
 Fishing net [,m]
 Others (specify). [,m]
- NOT APPLICABLE**

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]

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 |
|-----|----------------------------|-------|--------|---------|----------|----------|
| | NONE WITHIN AREA OF IMPACT | | | | | |

17. Fish/Nets/Ponds

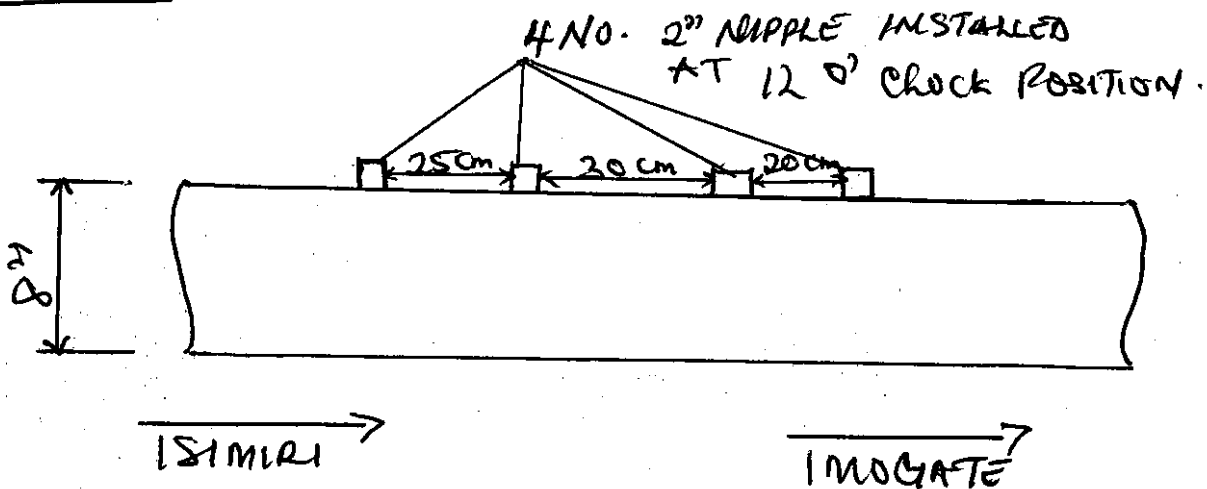
| S/N | Fish/Nets/Ponds | Description | Quantity/Size | Comments |
|-----|----------------------------|-------------|---------------|----------|
| | NONE WITHIN AREA OF IMPACT | | | |

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)*

A SECTION OF 8" ISIMIRI PIPELINE AT OBINKA SHOWING POSITIONS OF 4 NO. ILLEGAL BUNKERING FITTINGS AT 12 O'CLOCK POSITION.



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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 (METER) | Easting (METER) |
|-----|------------------|-----------------|
| 153 | 98021.34 | 525874.15 |
| 154 | 98018.27 | 525874.14 |
| 155 | 97996.78 | 525871.02 |
| 156 | 97987.52 | 525889.49 |
| 157 | 97984.46 | 525886.40 |
| 158 | 97984.51 | 525861.75 |
| 159 | 97981.42 | 525870.99 |
| 160 | 97984.54 | 525846.35 |
| 161 | 97993.82 | 525809.39 |
| 162 | 97999.86 | 525812.49 |
| 163 | 97996.84 | 525840.21 |
| 164 | 97996.80 | 525858.70 |
| | | |

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.10Ha
- 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 |
|-------------------------|------------|---------|

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 300
 - Average Depth (m) of pool of free phase oil 0.005

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iii. Emulsification factor: NIL

iv.

| | | |
|--|------------|---------|
| Volume of pool of free phase oil. V_{pool} : | <u>9.4</u> | barrels |
|--|------------|---------|

b. Computation of volume of infiltrated oil in the soil (V_{inf}).

i. Area *(m²) covered by the oil: 700

ii. Area of the pool of free phase oil in touch with soil: 300

iii. Average Depth (m) below ground surface of infiltration of oil: 0.005

iv. Soil type: CLAY

v. P_c (effective porosity of the soil): 8%

iv.

| | | |
|--------------------------------------|------------|---------|
| Volume of infiltrated oil. V_{inf} | <u>2.5</u> | barrels |
|--------------------------------------|------------|---------|

21. Computation of volume of oil on open water based on standard coloration.

i. Total area of oil on open water: _____

ii. Table of average depth of oil on water based on coloration**

| | Thickness (mm) | Percentage coverage | Volume (m3) |
|--------------------|----------------|---------------------|-----------------------------|
| Barely Visible | 0.00004 | <u>NOT</u> | |
| Silvery | 0.00008 | | |
| Slight Color | 0.00015 | | |
| Bright Color | 0.0003 | <u>APPLICABLE</u> | |
| 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 |
|--|------------|---------|

22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 15%

iii.

| | | |
|--|------------|---------|
| Volume of evaporated oil. V_{evap} : | <u>2.1</u> | 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.
 ** Sill Factor from USCG FOG (2000 Edition)

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23. Gross Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 2.1 + NUL + 2.5 + 9.4 + NUL = 14 \text{ BARRELS}$$

24. Net Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 2.1 + NUL + 2.5 + 9.4 + NUL = 14 \text{ BARRELS}$$

*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 20/03/2012 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: ⁰²⁰¹⁷⁸⁹⁶⁷⁵ 8" ISIMIRI PIPELINE AT ~~OBIAKPU~~ OBIAKPU

