

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0010 695228 (D)

(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: 695228 2. Type of incident* SPILL
 3. Name of Location 14" OKORDIA - RUMUERPE PIPELINE
 4. Name of nearest community IKARAMA 5. State: BAYELSA 6. LGA YENAGOA
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District NESP/LAND 2

B. INCIDENT INFORMATION:

9. Details of incident
 a. Date of incident: 2ND AUGUST 2011
 b. Date/Period of investigation: 13TH AUGUST 2011
 c. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy 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) _____
 e. Incident due to:
 Third party interference Operational Others (specify) _____

f. Spill point coordinates

| | |
|------------------------------------|-------------------------------|
| Measuring unit (m) <u>MID-BELT</u> | |
| Northing: <u>125 798.00</u> | Easting: <u>445 416.29</u> |

*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 [Nil ,m]
- Drinking water source [Nil ,m]
- Built up area [Nil ,m]
- Farmlands [>100 ,m]
- Fish Farm/Pond [Nil ,m]
- Fishing net [Nil ,m]
- Others (specify).

12. Containment measures put in place;

- Booms Trench Dyke

Others: NATURAL DEPRESSION

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 |
|-----|-----------------------------------|-------------|------|--------|----------|
| | <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 |
|-----|---------------|-------|--------|---------|----------|----------|
| | PALM TREES | | | ✓ | FWE | |
| | | | | | | |
| | | | | | | |

17. Fish/Nets/Ponds

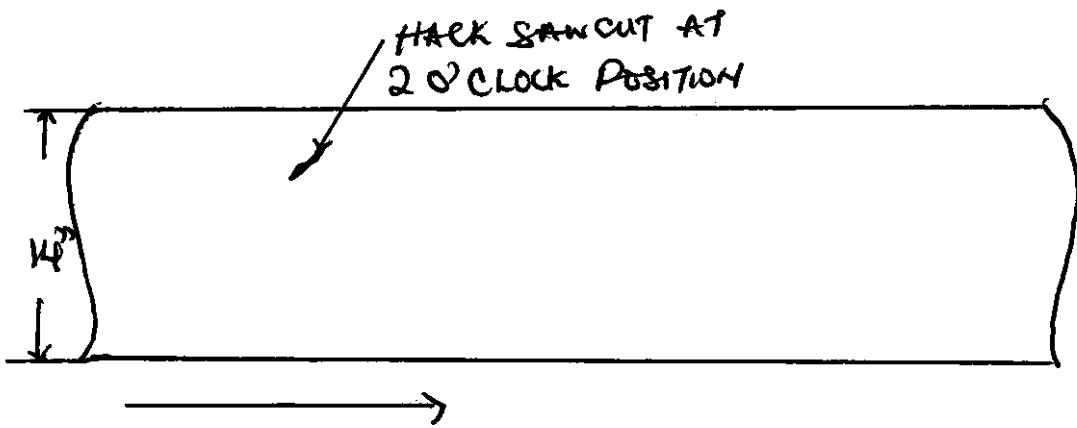
| S/N | Fish/Nets/Ponds | Description | Quantity/Size | Comments |
|-----|-----------------|-----------------------|---------------|----------|
| | NONE | WITHIN AREA OF IMPACT | | |
| | | | | |

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 appendix1)

A SECTION OF 14" OKORDIA - RUMUKEFE PIPELINE SHOWING
HACK SAW CUT AT 2 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)

| S/N | Northing | Easting |
|-----|-----------|-----------|
| 1 | 125804.13 | 445410.15 |
| 2 | 125797.99 | 445407.05 |
| 3 | 125797.94 | 445422.45 |
| 4 | 125788.74 | 445416.26 |
| 5 | 125776.44 | 445419.31 |
| 6 | 125797.92 | 445428.62 |
| 7 | 125831.69 | 445466.85 |
| 8 | 125951.14 | 445551.26 |
| 9 | 125932.39 | 445608.05 |
| 10 | 125836.40 | 445518.13 |
| 11 | 125740.53 | 445464.33 |
| 12 | 125741.23 | 445450.54 |
| 13 | 125677.88 | 445413.57 |

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 1.61 Ha
- Impact within SPDC R.O.W 0.10 Ha
- Impact outside R.O.W 1.51 Ha

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

| | | |
|--------------------------|-----------|---------|
| Recovered oil V_{recJ} | <u>MU</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 922
- Average Depth (m) of pool of free phase oil 0.009
- Emulsification factor: _____

| | | |
|--|-------------|---------|
| iv. Volume of pool of free phase oil. V_{pool} : | <u>52.2</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: 15185
- ii. Area of the pool of free phase oil in touch with soil: 922
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0015
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

| | | |
|--|--------------------|---------|
| iv. Volume of infiltrated oil. V_{inf} | <u>12.2 BARREL</u> | barrels |
|--|--------------------|---------|

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

- i. Total area of oil on open water: NULL
- 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>NULL</u> bbl |

| | | |
|---|-------------|---------|
| iii. Volume of oil on open water. V_{wat} : | <u>NULL</u> | barrels |
|---|-------------|---------|

22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM
- ii. E-Factor: 25%

| | | |
|---|-------------|---------|
| iii. Volume of evaporated oil. V_{evap} : | <u>21.5</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% |

23. Gross Total Estimated Spilled Volume. $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 21.5 + NULL + 12.2 + 52.2 + NULL = 85.9$

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| |
|---|
| $V_{Est}(bbls) = 85.9 \text{ BARRELS}$ |
| 24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls) = 21.5 + Nil + 12.2 + 52.2 + Nil = 85.9$ |
| $V_{Est}(bbls) = 85.9 \text{ BARRELS}$ |

*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

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| 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

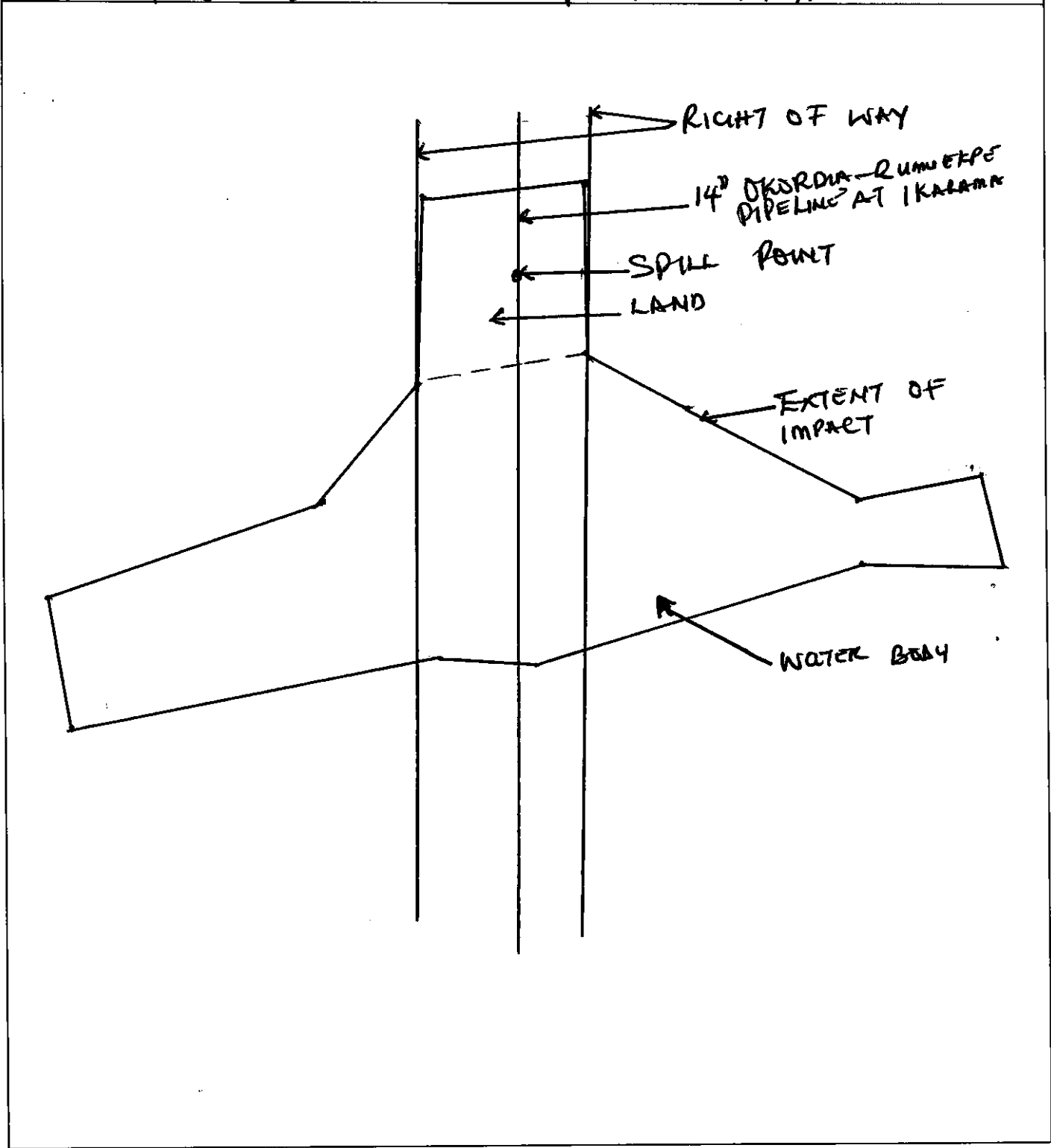
| |
|--|
| This report was filled and signed on the <u>13 / 08 / 20 11</u> at incident site by joint investigation representatives from |
| <ul style="list-style-type: none">• Host Community <input checked="" type="checkbox"/>• Department of Petroleum Resources [DPR]: <input type="checkbox"/>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/> |
| <i>Tick as applicable</i> |

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20. Appendix 1: Overview sketch of the site

Location: 14" OKORDIA - RUMUEKPE PIPELINE AT IKARAMA



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

| S/N | Northing | Easting |
|-----|-----------|-----------|
| 14 | 125695.02 | 445356.06 |
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