

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0222 810760

(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: 810760 2. Type of incident* OIL SPILL
 3. Name of Location 12" / MD RIVER 2 PIPELINE
 4. Name of nearest community ODAYWA 5. State: RIVERS 6. LGA ETCHE
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District NESP / PH2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24TH MAY 2012
 b. Start date/time of investigation: 05TH MAY 2012 : 12:30 HOURS
 c. Investigation End date: 05TH MAY 2012 : 16:00 HOURS

- d. Description of spill point environment
- | | | |
|---------------------------------------------------|------------------------------------------------|---------------------------------------------------------------|
| <input type="checkbox"/> Firmed soil | <input checked="" type="checkbox"/> Loose soil | <input checked="" type="checkbox"/> Previously 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"/> Rig |
- e. Description of leak point (tick as applicable);
- | | | |
|---------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Drilled hole | <input type="checkbox"/> Hack saw cut | <input type="checkbox"/> Explosive 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"/> 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"/> Outward dent | <input type="checkbox"/> Flare System/Bund wall failure | |
| <input type="checkbox"/> Valve Failure | <input type="checkbox"/> com unit failure | <input type="checkbox"/> Cold vent |
| <input type="checkbox"/> Relief valve failure | <input type="checkbox"/> Others (specify) _____ | |

- f. Incident caused by:
- | | | |
|--------------------------------------------------------------|--------------------------------------|----------------------------------------|
| <input checked="" type="checkbox"/> Third party interference | <input type="checkbox"/> Operational | <input type="checkbox"/> Mystery _____ |
|--------------------------------------------------------------|--------------------------------------|----------------------------------------|

g. Spill point coordinates

| Measuring unit | |
|---------------------------------------------------------------------------|--------------------------------------|
| Northing: SP ₁ = 108507.471 SP ₂ = 108504.405 | Easting: 523254.667 523251.581 |

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

12. Containment measures put in place;

- Booms Trench Dyke

Others: PIT

13. Any pictures or video coverage? [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 |
|-----|----------------------------|-------|--------|---------|----------|----------|
| | NONE WITHIN AREA OF IMPACT | | | | | |

17. Fish/Nets/Ponds

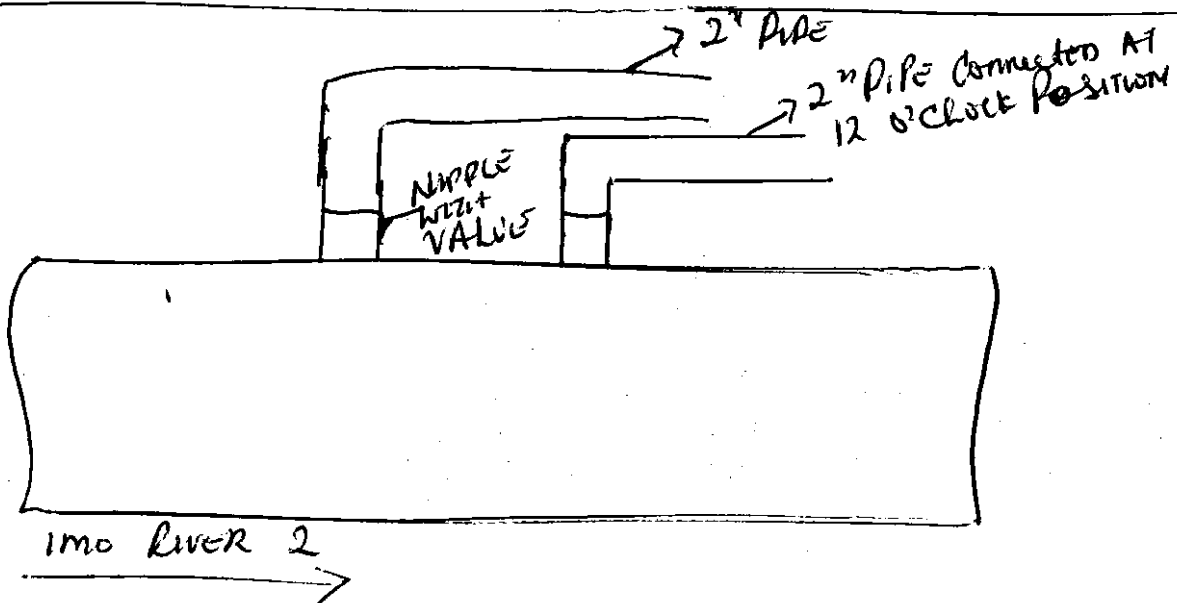
| S/N | Fish/Nets/Ponds | Description | Quantity/Size | Comments |
|-----|----------------------------|-------------|---------------|----------|
| | NONE WITHIN AREA OF IMPACT | | | |

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)*

12" IMO RIVER 2 PIPELINE AT ODAQUA SHOWING TWO ILLEGAL BUNKERING POINT CONNECTION 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)

| S/N | Northing | Easting |
|-----------------|------------|------------|
| SP ₁ | 108507.471 | 523254.667 |
| SP ₂ | 108504.405 | 523251.581 |
| P ₁ | 108504.387 | 523260.823 |
| P ₂ | 108516.630 | 523282.412 |
| P ₃ | 108519.702 | 523282.418 |
| P ₄ | 108507.477 | 523251.587 |
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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.02 Ha
- 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>0.57</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).
- i. Area (m²) occupied by pool of free phase oil NOT APPLICABLE
 - ii. Average Depth (m) of pool of free phase oil NOT APPLICABLE

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iii. Emulsification factor: Nil

iv.

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

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

- i Area *(m²) covered by the oil: 200 m²
- ii Area of the pool of free phase oil in touch with soil: —
- iii Average Depth (m) below ground surface of infiltration of oil: 0.001
- iv Soil type: CLAY
- v P_e (effective porosity of the soil): 8%

iv.

| | | |
|----------------------------------------|------------|---------|
| Volume of infiltrated oil, V_{inf} : | <u>0.1</u> | barrels |
|----------------------------------------|------------|---------|

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 | |
| Silvery | 0.00008 | | |
| Slight Color | 0.00015 | | |
| Bright Color | 0.0003 | APPLICABLE | |
| 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>0.12</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
 ** Spill Factor from USCG FOG (2000 Edition)

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23. Gross Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 0.12 + Nil + 0.1 + Nil + 0.57 = 0.79 \text{ BARRELS}$$

24. Net Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 0.12 + Nil + 0.1 + Nil + 0.57 = 0.79 \text{ BARRELS}$$

*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 05/15/2012 at incident site by joint investigation representatives from

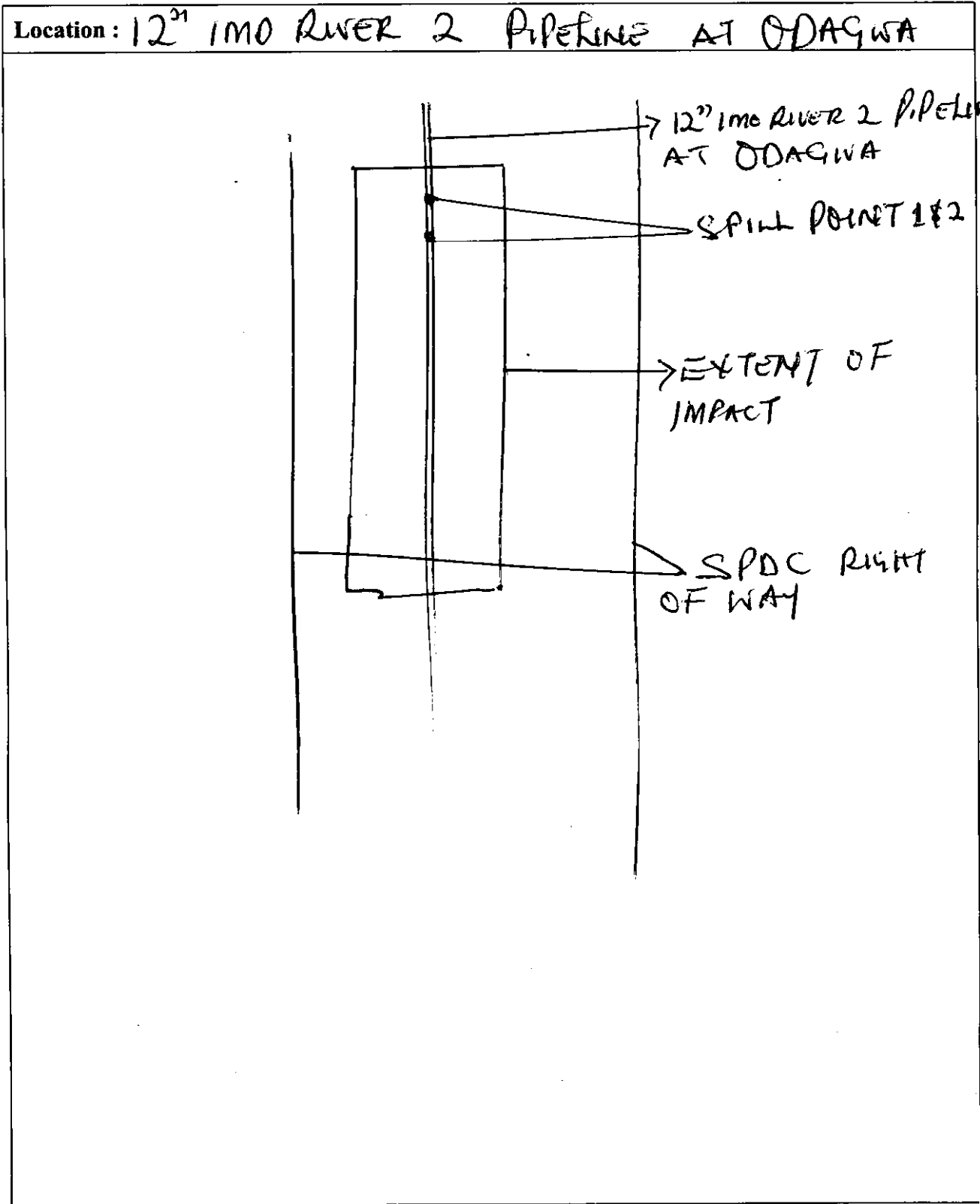
- Host Community
- Department of Petroleum Resources [DPR]: SEE ATTACHED
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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27. Appendix 1: Overview sketch of the site



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

| S/N | Northing | Easting |
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