

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1302579 JIV report S/N: 00802

(Note: As practicable as possible the JIV report is to be signed in the field by all the participating parties)

A. GENERAL INFORMATION:

1. Spill incident Number: 1302579 2. Type of incident\* OIL SPILL  
3. Name of Location 4" OBELE - IBAA PIPELINE  
4. Name of nearest community IBAA (OMUEZE) State: RIVERS 6. LGA EMOHUA  
7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 6<sup>TH</sup> DECEMBER, 2014  
b. Start date/time of investigation: 6<sup>TH</sup> DECEMBER, 2014  
c. Investigation End date: 6<sup>TH</sup> DECEMBER, 2014 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                          |

Additional observations around the spill point:

e. Description of leak point (tick as applicable);

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Drilled hole                               | <input checked="" 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 type="checkbox"/> Failed Weld-on illegal hot tap valve,      | <input type="checkbox"/> Failed Clamp                   | <input type="checkbox"/> Missing Pipeline/Flowline                  |
| <input 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 <sup>rd</sup> party equipment |
| impact <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:

- ☒ Third party interference (Sabotage ☒, crude theft ☐; Line theft ☐; Accidental 3<sup>rd</sup> party damage ☐  
☐ Operational ☐ Others (including Mystery spills) \_\_\_\_\_

\*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire.

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g. Spill point coordinates

|  |                    |
|--|--------------------|
| Measuring unit <u>(m)</u> <u>Minna Mud belt.</u> |                    |
| Northings:                                       | Easting:           |
| <u>107221.69</u>                                 | <u>482546.18</u>   |
| <u>[Signature]</u>                               | <u>[Signature]</u> |

**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

|  |           |
|--|-----------|
| <input type="checkbox"/> Government reserved and designated protected area | [ Nil, m] |
| <input type="checkbox"/> Drinking water source                             | [ Nil, m] |
| <input type="checkbox"/> Built up area                                     | [ Nil, m] |
| <input checked="" type="checkbox"/> Farmlands                              | [ 24, m]  |
| <input type="checkbox"/> Fish Farm/Pond                                    | [ Nil, m] |
| <input type="checkbox"/> Fishing net                                       | [ Nil, m] |
| <input type="checkbox"/> Others (specify).                                 |           |

12. Containment measures put in place;

☐ Booms    ☐ Trench    ☐ Dyke    ☐ Natural depression    ☐ Pit    ☐ None  
☒ Others: NOT APPLICABLE

13. Any pictures or video coverage?

☒ [ N ]

14. Further response/repair initiated as at the time of JIV?

☒ [ N ]

If yes to item 14, give brief description:

REPAIR ON AFFECTED SECTION OF THE PIPELINE WAS DONE BY CLAMPING

15. Was there any disruption to the investigation?

[ Y ] ☒ [ N ]

If yes to item 15 give brief description:

NOT APPLICABLE.

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**D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL**

**16. Structures / Properties**

| S/N | Type of Structures | Description | Size | Number | Comments |
|-----|--------------------|-------------|------|--------|----------|
|     | NONE               | WITHIN      | AREA | OF     | IMPACT   |

**17. Crops/Economic Trees**

| S/N | Type of crops | Young  | Medium | Matured | Quantity | Comments |
|-----|---------------|--------|--------|---------|----------|----------|
|     | NONE          | WITHIN | AREA   | OF      | IMPACT   |          |

**18. Fish/Nets/Ponds**

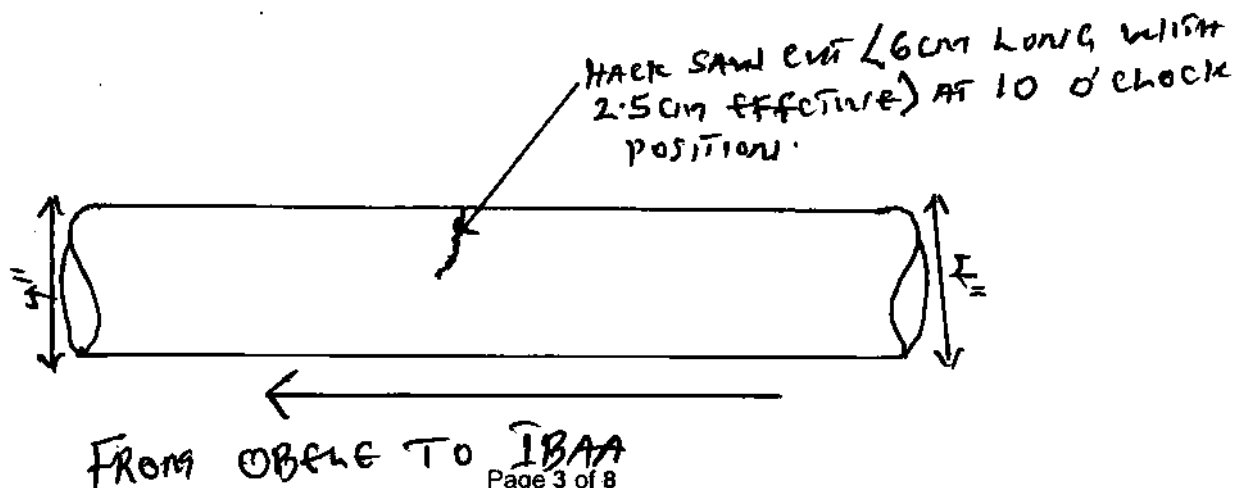
| S/N | Fish/Nets/Ponds | Description | Quantity/Size | Comments  |
|-----|-----------------|-------------|---------------|-----------|
|     | NONE            | WITHIN      | AREA          | OF IMPACT |

**19. 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 4" OBELE - IBAA PIPELINE AT IBAA (OMMEZE) SHOWING POSITION OF HACK SAW CUT AT 10-11 O'CLOCK POSITION.





**ESTIMATION OF OIL SPILL VOLUME****A OIL SPILLED ONSHORE/OFFSHORE (Leak stopped at source)****Impacted Area Details**

Total Calculated Area of Impact

3,600.00 m<sup>2</sup>

i Impact within SPDC R.O.W

ii Impact outside SPDC R.O.W

**1 Volume of oil recovered before completion of JIV ( $V_{rec}$ )**

i Estimated Recovered oil (Net)

bbbls

Estimated Recovered oil (Net)  $V_{rec}$ 

0.00 bbbls

**2 Computation of estimated residual volume on site****a Computation of volume of free phase oil (on land or confined water body)**

i Total area occupied by pool of free phase oil

m<sup>2</sup>

ii Average depth of pool of free phase oil

m

iii Emulsification factor (If applicable, else 0%)

0%

Estimated Volume of pool of free phase oil,  $V_{pool}$ 0.00 m<sup>3</sup>Estimated Volume of pool of free phase oil,  $V_{pool}$ 

0.00 bbbls

**b Computation of estimated volume of infiltrated oil in the soil ( $V_{inf}$ )****1 Volume of infiltrated oil at spill point ( $V_{inf a}$ )**

i Total area covered by the oil (infiltration)

2.00 m<sup>2</sup>

ii Average depth of infiltration above leaking facility i.e. pipeline/flowline

1.500 m

iii Soil type

Silty or sandy clay

iv  $P_e$  (effective porosity of the soil)

12%

v Cause of spill

Third party interference

**vi Calculation of days for infiltration below the leaking point on pipeline or flowline**

| Incident Date  | JIV Date        | Days on Site |
|--|-----------------|--------------|
| 12/6/2014 14:30  | 12/6/2014 13:30 | 0            |
| If 'cause of spill' is operational, use 1 week as worst case scenario except where 'days on site' exceeds 7. |                 | 7            |

**Infiltration of oil types in various soil types vs time.**

| Soil type    | Approximate time to reach 1m depth below ground level |          |            |
|--------------|---|----------|------------|
|              | Sand  | Loam     | Clay       |
| Bonny Medium | 3 weeks   | 3 years  | > 10 years |
| Bonny Light  | 2 days  | 2 months | > 10 years |

vii Oil type

Bonny Medium

viii Average depth of infiltration below leaking facility i.e. pipeline/flowline

0.000 m

ix Total depth below ground surface of infiltration of oil

1.500 m

Estimated Volume of infiltrated oil,  $V_{inf a}$ 0.36 m<sup>3</sup>Estimated Volume of infiltrated oil,  $V_{inf a}$ 

2.28 bbbls

**2 Volume of infiltrated oil at second spill point [if applicable] ( $V_{inf b}$ )**

i Total area covered by the oil (infiltration)

m<sup>2</sup>

ii Average depth of infiltration above leaking facility i.e. pipeline/flowline

m

iii Soil type

- Select -

iv  $P_e$  (effective porosity of the soil)

0%

v Average depth of infiltration below leaking facility i.e. pipeline/flowline

0.000 m

vi Total depth below ground surface of infiltration of oil

0.000 m

Estimated Volume of infiltrated oil,  $V_{inf b}$ 0.00 m<sup>3</sup>Estimated Volume of infiltrated oil,  $V_{inf b}$ 

0.00 bbbls

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**3 Volume of infiltrated oil outside immediate spill point(s) region ( $V_{inf c}$ )**

i Total Area covered by the oil (infiltration)

3,598.00 m<sup>2</sup>

ii Total Area of the pool of free phase oil in touch with soil

m<sup>2</sup>

iii Soil type

Silty or sandy clay

iv  $P_e$  (effective porosity of the soil)

12 %

v Average depth below ground surface of infiltration of oil

0.000 m

Estimated Volume of infiltrated oil,  $V_{inf c}$ 0.00 m<sup>3</sup>Estimated Volume of infiltrated oil,  $V_{inf c}$ 

0.00 bbls

**4 Volume of infiltrated oil outside immediate spill point(s) region (superficial impact,  $V_{inf d}$ )**

i Total Area covered by the oil (infiltration)

m<sup>2</sup>

ii Total Area of the pool of free phase oil in touch with soil

m<sup>2</sup>

iii Average depth below ground surface of infiltration of oil

0.000 m

Estimated Volume of infiltrated oil,  $V_{inf d}$ 0.00 m<sup>3</sup>Estimated Volume of infiltrated oil,  $V_{inf d}$ 

0.00 bbls

Estimated Total Volume of infiltrated oil,  $V_{inf}$ 0.38 m<sup>3</sup>Estimated Total Volume of infiltrated oil,  $V_{inf}$ 

2.28 bbls

**c Computation of volume of oil on open water based on standard coloration**

i Total area of oil on open water

m<sup>2</sup>

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

[Link to Coverage Visual Aid](#)

Spill Factors from USCG FOG (2000 Edition)

|                    | Thickness (mm) | Percentage coverage (%) | Volume (m3) |
|--------------------|----------------|-------------------------|-------------|
| Barely Visible     | 0.00004        |                         | 0.0000      |
| Silvery            | 0.00008        |                         | 0.0000      |
| Slight Color       | 0.00015        |                         | 0.0000      |
| Bright Color       | 0.0003         |                         | 0.0000      |
| Dull               | 0.001          |                         | 0.0000      |
| Dark               | 0.002          |                         | 0.0000      |
| Black oil          | 0.1            |                         | 0.0000      |
| Emulsion (30% Oil) | 1              |                         | 0.0000      |
| Percent Total:     |                | 0%                      | 0.0000      |

Estimated Volume of oil on open water,  $V_{wat}$ 0.00 m<sup>3</sup>Estimated Volume of oil on open water,  $V_{wat}$ 

0.00 bbls

**3 Calculation of evaporated volume**

| Evaporation Factors (E-Factor) for SPDC Crude oil |             |              |
|---|-------------|--------------|
| Residence time of spilled oil (days on site)      | Oil type    |              |
|   | Bonny Light | Bonny Medium |
| < 1 day   | 10%         | 5%           |
| 1-7 days  | 25%         | 15%          |
| > 7 days  | 40%         | 25%          |

i Was oil recovery before JIV completion done before JIV date?

No

ii Estimated volume available for evaporation

2.26 bbls

iii E-factor

5 %

Estimated Volume of evaporated oil,  $V_{evap}$ 

0.12 bbls

Net Total Estimated Spilled Volume,  $V_{Est}$ 

2.38 bbls

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**G. INCIDENT INFORMATION:**

**20. Impacted Area Details**

- Total calculated area of impact 0.36 HA
- 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>NIL</u> | Barrels |
|---------------------------|------------|---------|

Controlled recovery/evacuation from source with no impact to environment:

|            |         |
|------------|---------|
| <u>NIL</u> | Barrels |
|------------|---------|

|   |
|---|
| <p><b>22. Net Estimated Spilled Volume <math>V_{es}</math> (bbls)* =</b></p> <p align="center"><u>2.38 BARRELS</u></p> <p><b>Estimated Reported Volume** <math>V_{rep}</math> (bbls) =</b></p> <p align="center"><u>3 BARRELS</u></p> |
|---|

**\*Notes:**

- Volume estimation was done using an excel based tool. (see attached for details on the calculation)
- Reported spilled volume is an estimate

Write other relevant notes taken into consideration for estimating the spilled in the box below:

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  $m^3$  to barrels is Volume ( $m^3$ ) 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.

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**23. GENERAL STATUS OF THE SITE**

|  |
|--|
| A. Joint investigation of the incident site found that there is no residual impact after the initial response and JIT 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"/>   |

**24. REPRESENTATIVES**

|   |
|---|
| <p>This report was filled, agreed and signed by the following joint investigation representatives:</p> <ul style="list-style-type: none"><li>• Host Community: <input checked="" type="checkbox"/></li><li>• Department of Petroleum Resources [DPR]: <input type="checkbox"/></li><li>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/></li><li>• State Ministry of Environment [SME]: <input type="checkbox"/></li><li>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/></li><li>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/></li><li>• Signatories agree with reported findings: <input checked="" type="checkbox"/></li><li>• Separate DPR form has been filled out with same findings <input type="checkbox"/></li></ul> <p style="text-align: right;"><i>Tick as applicable</i></p> |
|---|



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25. Appendix 1: Overview sketch of the site

