

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 9006419 JIV report S/N 0141

(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: 1006419 2. Type of incident\* OIL SPILL
- 3. Name of Location 28" BOMU - BONNY TRANS NIGER PIPELINE.
- 4. Name of nearest community BODO WEST. 5. State: RIVERS 6. LGA GOKANA
- 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE/SHELL

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 29<sup>TH</sup> JUNE, 2013
- b. Start date/time of investigation: 29<sup>TH</sup> JUNE 2013
- c. Investigation End date: 2<sup>ND</sup> JULY, 2013 Actual investigation duration, days: FOUR (4) DAYS
- d. Description of spill point environment
  - Firmed soil
  - Loose soil
  - Recently excavated area
  - Under water
  - Swampy
  - Exposed pipe surface
  - Well Platform (on Water)
  - Drill Rig
- e. Description of leak point (tick as applicable);
  - Drilled hole
  - Hack saw cut
  - Tear (\_\_\_\_\_)
  - Complete Rupture
  - Inward dent,
  - Well head tampering
  - Failed Weld-on illegal hot tap valve,
  - Failed Clamp
  - 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,
  - Bulging Outward
  - Flare System/Bund wall failure
  - Accidental 3<sup>rd</sup> party equipment impact
  - Valve Failure
  - com unit failure
  - Cold vent
  - Relief valve failure
  - 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) \_\_\_\_\_

g. Spill point coordinates

Measuring unit <u>METER</u> ( <u>MINNA MID-BEIT</u> )	
Northing:	Easting:
<u>64944.89</u>	<u>532660.64</u>

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**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 | [ | ,m] |           |
| <input type="checkbox"/> Drinking water source                             | [ | ,m] | NONE SEEN |
| <input type="checkbox"/> Built up area                                     | [ | ,m] |           |
| <input type="checkbox"/> Farmlands   | [ | ,m] | WITHIN    |
| <input type="checkbox"/> Fish Farm/Pond                                    | [ | ,m] | VICINITY. |
| <input type="checkbox"/> Fishing net                                       | [ | ,m] |           |
| <input type="checkbox"/> Others (specify).                                 | [ | ,m] |           |

12. Containment measures put in place;

- Booms      Trench      Dyke      Natural depression      Pit  
 Others: \_\_\_\_\_

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
	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

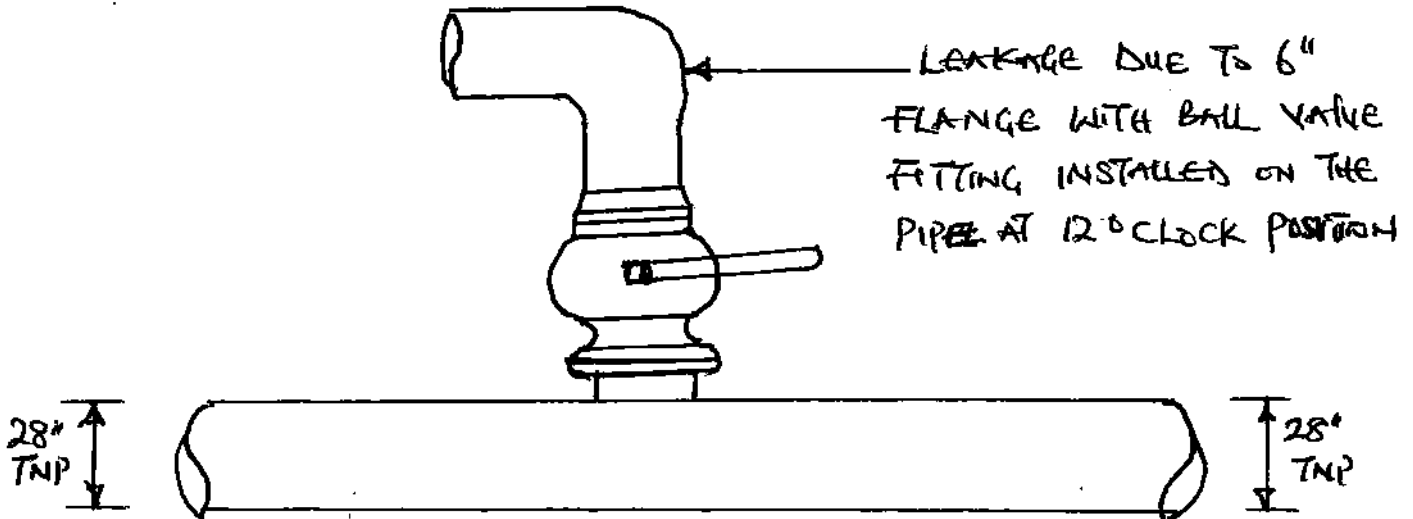
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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)

SECTIONAL VIEW OF 28" BOMU - BONNY TRANS NIGER PIPELINE  
SHOWING 6" FLANGE WITH BALL VALVE FITTING INSTALLED



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F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

19. Impacted area boundary Coordinates (If more, Print and attach as an appendix)

(MINNA MID-BETT)

S/N	Northing (METERS)	Easting (METERS)
	64923.43	532639.03
	64960.27	532648.34
	64959.43	532667.29
	64922.81	532661.79
	64946.74	532658.11
	64943.88	532657.80
	64943.73	532662.40
	64946.42	532663.03
<p>TOTAL IMPACTED AREA = 850M<sup>2</sup></p>		

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**G. INCIDENT INFORMATION:**

**20. Impacted Area Details**

- Total calculated area of impact 0.08Ha
- 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 $V_{rec}$ :	<b>105</b>	Barrels
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**22. Computation of estimated residual volume on site**

a. Computation of estimated volume of pool of free phase oil (on land or confined water body).

- i. Area ( $m^2$ ) occupied by pool of free phase oil POOL OIL
- ii. Average Depth (m) of pool of free phase oil RECOVERED
- iii. Emulsification factor: \_\_\_\_\_

iv. 

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<b>NIL</b>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil ( $V_{inf}$ ).

1. Estimated Volume of infiltrated oil at spill point ( $V_{inf a}$ )

- i. Area\* ( $m^2$ ) of soil covered by the oil: 60m<sup>2</sup>
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1.7m
- iii. Soil type: CLAY      iv.  $P_e$  (effective porosity of the soil): 8%
- v. Cause of spill: THIRD PARTY      vi. Oil type: BONNY MEDIUM
- vii. Oil Residence time on site, day: THREE DAYS
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.6008m
- ix. Estimated depth of infiltration around spill point: 1.7008m

x. 

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$ :	<b>51.35</b>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ( $V_{inf b}$ )

- i. Area\* ( $m^2$ ) of soil covered by the oil: NIL
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NIL
- iii. Soil type: NIL      iv.  $P_e$  (effective porosity of the soil): NIL
- v. Cause of spill: NIL      vi. Oil type: NIL
- vii. Oil Residence time on site, day: NIL
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NIL
- ix. Estimated depth of infiltration around spill point: NIL

Estimated Volume of infiltrated oil at spill point. $V_{inf b}$ :	<b>NOT APPLICABLE</b>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region ( $V_{inf c}$ )

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- i. Area (m<sup>2</sup>) of soil covered by the oil: 0.08 Ha 740 m<sup>2</sup>
- ii. Area (m<sup>2</sup>) of the pool of free phase oil in touch with soil: NIL
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0008m
- iv. Soil type: CLAY
- v. P<sub>e</sub> (effective porosity of the soil): 8%
- vi. 

Estimated Volume of infiltrated oil. At V <sub>inf</sub> :	<u>0.31</u>	barrels
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**23. Computation of estimated 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 ( *\*\*Spill Factors from USCG FOG (2000 Edition)*

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004		
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		

**NONE SEEN WITHIN VICINITY.**

- iii. 

Percent Total	100%	
Estimated Volume of oil on open water. V <sub>wat</sub> :	<u>NIL</u>	Barrels

**24. Calculation of evaporated volume:**

- i. Estimated Volume available for evaporation within surface area: 51.66 Barrels
- ii. E-Factor: 15%
- iii. 

Estimated Volume of evaporated oil. V <sub>evap</sub> :	<u>9.12</u>	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

**25. Net Estimated Spilled Volume V<sub>Est</sub>(bbbls) = V<sub>evap</sub>(bbbls) + V<sub>wat</sub>(bbbls) + V<sub>inf</sub>(bbbls) + V<sub>pool</sub>(bbbls) + V<sub>recd</sub>(bbbls) = 9.12 + NIL + 51.66 + NIL + 105 = 165.77 Barrels**

**Estimated Reported Volume\*\* V<sub>rep</sub>(bbbls) = 165 ≈ 166 Barrels.**

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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<sup>3</sup> to barrels is Volume (m3) 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.

26. 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"/>

27. REPRESENTATIVES

This report was filled, agreed and signed on the 02/07/2013 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]:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings

Tick as applicable

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28. Appendix 1: Overview sketch of the site

Location: 28" Bony - BONNY TRANS NIGER PIPELINE AT BODO INLET.

