

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1069492 JIV report S/N: 0272

(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: 1069492 2. Type of incident\* OIL SPILL  
 3. Name of Location 28<sup>th</sup> BOMU - BONNY TRANS NIGER PIPELINE  
 4. Name of nearest community B- BERE 5. State: RIVERS 6. LGA GOKAMA  
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE/LAND

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 8<sup>th</sup> NOVEMBER 2013  
 b. Start date/time of investigation: 10<sup>th</sup> NOVEMBER 2013  
 c. Investigation End date: 11<sup>th</sup> NOVEMBER 2013 Actual investigation duration, days: TWO (2) 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 (M) <u>(MINNA MID-BERT)</u>	
Northing:  <u>76 162.45</u>	Easting:  <u>532 757.47</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] | NONE WITHIN |
| <input type="checkbox"/> Drinking water source                             | [      ,m] |             |
| <input type="checkbox"/> Built up area                                     | [      ,m] | SEEN WITHIN |
| <input type="checkbox"/> Farmlands                                         | [      ,m] | VICINITY.   |
| <input type="checkbox"/> Fish Farm/Pond                                    | [      ,m] |             |
| <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
<u>NONE WITHIN AREA OF IMPACT</u>					

16. Crops/Economic Trees

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S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
✓	CASSAVA	✓	✓		FEW	WITHIN AREA
✓	PINEAPPLE	2	-	3	FIVE (5)	OUTSIDE SPX
✓	COCOA YAM	6	-	4	TEN (10)	RIGHT OF WAY

17. Fish/Nets/Ponds

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

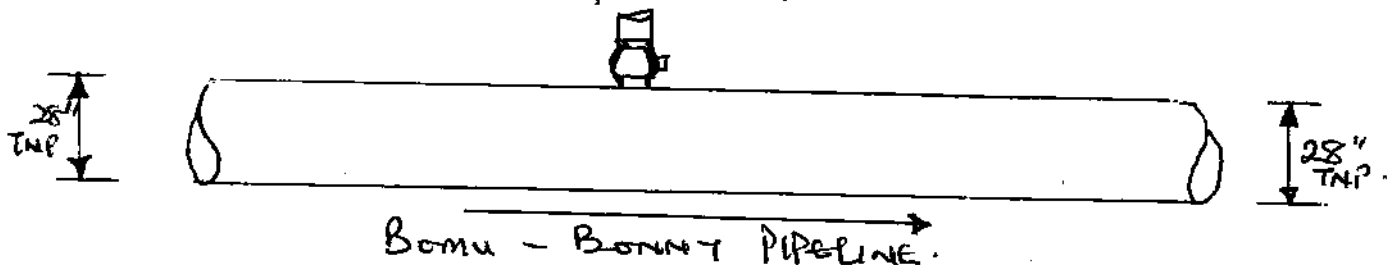
18. Others (Specify) i.e. Animal Traps

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 AT B-DEE  
DEE SHOWING BUNKERING FITTING (FAILED)

LEAK FROM A 2" FAILED  
 BALL VALVE INSTALLED AT  
 12° CLOCK POSITION ON 28"  
 Bomu - BONNY TRANS NIGER  
 PIPELINE AT B-DEE.



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

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

(MINNA MID-BERT)

S/N	Northing (m)	Easting (m)
WP739	76 159.38	532 757.47
WP740	76 162.46	532 754.39
WP741	76 165.52	532 760.56
WP742	76 165.52	532 757.48
WP743	76 165.93	532 760.84
WP744	76 156.29	532 766.71
WP745	76 162.45	532 760.56
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**G. INCIDENT INFORMATION:**

20. Impacted Area Details

- Total calculated area of impact 0.003 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<sub>rec</sub>):

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Recovered oil $V_{rec}$ :	<u>NIL</u>	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 160  $m^2$
- ii. Average Depth (m) of pool of free phase oil 0.01 m
- iii. Emulsification factor: 30%

iv.

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<u>7.04</u>	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: 2  $m^2$
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 m
- iii. Soil type: Silt iv.  $P_e$  (effective porosity of the soil): 21%
- v. Cause of spill: THIRD PARTY vi. Oil type: BONNY MEDIUM
- vii. Oil Residence time on site, day: TWO DAYS
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.0027 m
- ix. Estimated depth of infiltration around spill point: 1.0027 m

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$ :	<u>2.65</u>	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. $V_{inf b}$ :	<u>NOT APPLICABLE</u>	barrels
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3. E

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

- i. Area ( $m^2$ ) of soil covered by the oil: 12  $m^2$
- ii. Area ( $m^2$ ) of the pool of free phase oil in touch with soil: \_\_\_\_\_
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0027 m
- iv. Soil type: Silt
- v.  $P_e$  (effective porosity of the soil): 21%

vi.

Estimated Volume of infiltrated oil. At $V_{inf c}$ :	<u>0.64</u>	barrels
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**23. Computation of estimated volume of oil on open water based on standard coloration.**

Total area of oil on open water: NIL

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- 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	NONE	SEEN
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003	WITHIN	
Dull	0.001		
Dark	0.002	VICINITY.	
Black oil	0.1		
Emulsion (30% Oil)	1		

iii.	Percent Total	100%
	Estimated Volume of oil on open water. $V_{wat}$ :	NOT APPLICABLE
		Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 9.70 Barrels
- ii. E-Factor: 15%
- iii. 

Estimated Volume of evaporated oil. $V_{evap}$ :	<u>1.72</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%

<p>25. <u>Net Estimated Spilled Volume <math>V_{est}</math> (bbls) = <math>V_{evap}</math> (bbls) + <math>V_{wat}</math> (bbls) + <math>V_{inf}</math> (bbls) + <math>V_{pool}</math> (bbls) + <math>V_{rec}</math> (bbls) =</u>  <u><math>1.72 + NIL + 2.69 + 7.04 + NIL = 11.46</math></u>  <u>11.46 Barrels</u></p> <p><u>Estimated Reported Volume** <math>V_{rep}</math> (bbls) =</u>  <u>12 Barrels</u></p>
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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  $m^3$  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**

<p>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"/></p>
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B. Investigation of the incident site showed that there is residual impact on site requiring further works

27. REPRESENTATIVES

This report was filed, agreed and signed on the 11 / 11 / 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

28. Appendix 1: Overview sketch of the site

Location 2 BOMU - BOMNT TRANS NIGER PIPELINE AT B-DGRE

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