

**THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.**

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1096138 JIV report S/N: 0362

*(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: 1096138 2. Type of incident\* OIL SPILL / FIRE  
 3. Name of Location 24" BEMU - BONNY TRANS NIGER PIPELINE  
 4. Name of nearest community MOGHO 5. State: RIVERS 6. LGA GOKANA  
 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: 31<sup>ST</sup> DECEMBER, 2013  
 b. Start date/time of investigation: 1<sup>ST</sup> JANUARY, 2014  
 c. Investigation End date: 1<sup>ST</sup> JANUARY, 2014 Actual investigation duration, days: ONE DAY  
 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>M</u> (MINNA MID - BRIT)	
Northing:  <u>70942.79MN</u>	Easting:  <u>535022.81ME</u>

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



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 109613F JIV report S/N: 0362

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
✓	CASSAVA	✓ FEW	—	—	FEW	—

17. Fish/Nets/Ponds

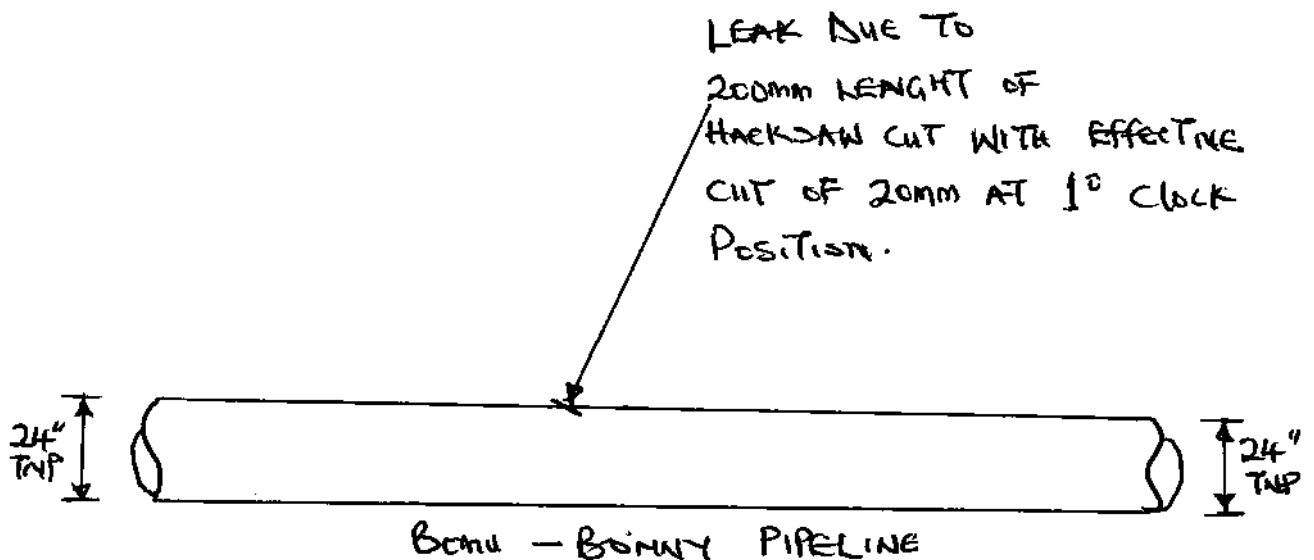
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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 TRANS NIGER PIPELINE AT MOGHO SHOW  
INCIDENT CAUSED BY THIRD PARTY INTERFERENCE



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

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1096138 JIV report S/N: 0362

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

(MINNA MID - Belt)

S/N	Northing (m)	Easting (m)
285	70936.65	535022.79
286	70939.72	535022.80
287	70939.71	535028.96
288	70945.86	535025.89
289	70945.86	535022.81
290	70958.15	535022.83
291	70958.16	535016.67
292	70933.57	535022.79

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.01 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>):

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1096138 JIV report S/N: 0362

Recovered oil $V_{rec}$ :	<u>5</u>	Barrels
---------------------------	----------	---------

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 25
- ii. Average Depth (m) of pool of free phase oil 0.015
- iii. Emulsification factor: 30%
- iv.

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<u>1.65</u>	barrels
-------------------------------------------------------------	-------------	---------

b. Computation of estimated volume of infiltrated oil in the soil ( $V_{int}$ ).

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

**NOTE**  
ESTIMATED VOLUME OF OIL BURNT-OFF BY FIRE FROM 1 PM, 31ST DECEMBER, 2013 TO 31ST DECEMBER 2013 16:56PM SAME DAY IS ASSUMED TO BE 25% OF THE CALCULATED VOLUME ON JIV DATE OF 1ST JANUARY, 2014  
 $9.54 \times 0.25 = 2.385$  BBLs  
 $= 3$  BARRELS

- Area\* ( $m^2$ ) of soil covered by the oil: 2m<sup>2</sup>
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 0.8m
- iii. Soil type: SILT iv.  $P_e$  (effective porosity of the soil): 21%
- v. Cause of spill: THIRD PARTY INTERFERENCE vi. Oil type: BONNY MEDIUM
- Oil Residence time on site, day: ONE DAY
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.0009m
- ix. Estimated depth of infiltration around spill point: 0.8009m

Estimated Volume of infiltrated oil at spill point $V_{inf a}$ :	<u>2.12</u>	barrels
------------------------------------------------------------------	-------------	---------

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: SILT iv.  $P_e$  (effective porosity of the soil): 21%
- v. Cause of spill: NIL vi. Oil type: BONNY MEDIUM
- 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
------------------------------------------------------------------	-----------------------	---------

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: 73m<sup>2</sup>
- 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: 0.0009m
- iv. Soil type: SILT
- v.  $P_e$  (effective porosity of the soil): 21%

Estimated Volume of infiltrated oil At $V_{inf c}$ :	<u>0.09</u>	barrels
------------------------------------------------------	-------------	---------

23. Computation of estimated volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: NIL

**THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.**

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1096138 JIV report S/N: 0362

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	WITHIN	
Bright Color	0.0003		
Dull	0.001	VICINITY	
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

	Percent Total	100%	
iii. 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: 386 BARRELS

ii. E-Factor: 15%

iii. Estimated Volume of evaporated oil, $V_{evap}$ :	<u>0.68</u>	Barrels
-------------------------------------------------------	-------------	---------

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  $V_{est}$  (bbls) =  $V_{evap}$  (bbls) +  $V_{wat}$  (bbls) +  $V_{inf}$  (bbls) +  $V_{pool}$  (bbls) +  $V_{reci}$  (bbls) =  $0.68 + 14 + 2.21 + 1.65 + 5 = 9.54$   
 $9.54 + 2.385 = 11.925$

Estimated Reported Volume\*\*  $V_{rep}$  (bbls) = 12 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  $m^3$  to barrels is  $Volume (m^3) \times 6.29$ ; \*\*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

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1096138 JIV report S/N: 0362

- B. Investigation of the incident site showed that there is residual impact on site requiring further works

27. REPRESENTATIVES

This report was filled, agreed and signed on the 01/01/2014 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: 24" BOMU - BONNY TRANS NIGER PIPELINE AT MOGHO

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1096138 JIV report S/N: 0362

