

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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1078673 JIV report S/N: 0354

(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: 1078673 2. Type of incident\* OIL SPILL  
 3. Name of Location 28<sup>th</sup> NKPOKU - BOMU PIPELINE  
 4. Name of nearest community 910 5. State: RIVERS 6. LGA TAI  
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District PIPELINE

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 28<sup>th</sup> NOVEMBER 2013  
 b. Start date/time of investigation: 27<sup>th</sup> NOVEMBER 2013: 11:30 Hours  
 c. Investigation End date: 29<sup>th</sup> NOVEMBER 2013 Investigation duration, days: 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                          |
- e. Description of leak point (tick as applicable);
- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Drilled hole                               | <input 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 checked="" 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                                   |
- 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 METERS MINNA (MID-BELT)

Northing:  <p align="center"><u>78544.39</u></p>	Easting:  <p align="center"><u>530227.69</u></p>
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\*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: 1078673 JIV report S/N: 0354

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

- Government reserved and designated protected area [            ,m]
- Drinking water source **NONE SEEN** [            ,m]
- Built up area **WITHIN VICINITY** [            ,m]
- Farmlands [            ,m]
- Fish Farm/Pond [            ,m]
- Fishing net [            ,m]
- Others (specify). [            ,m]

12. Containment measures put in place;

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

13. Any pictures or video coverage?

[ N ]

14. Was there any disruption to the investigation?

[ Y ]

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
	<b>NONE WITHIN AREA OF IMPACT</b>				

16. Crops/Economic Trees

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1078673 JIV report S/N: 0354

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	INDIAN BAMBPOO	✓	✓	✓		IMPACTED BY CURVE OIL

17. Fish/Nets/Ponds

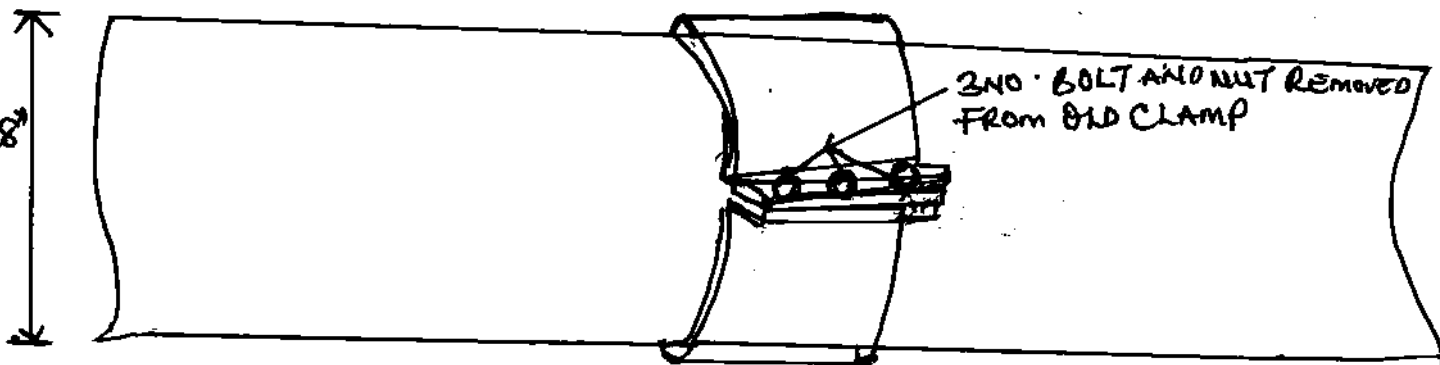
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE	WITHIN AREA OF		IMPACT

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)

A SECTION OF 28" NKPOTU - BOMU PIPELINE AT C10 SHOWING 3 NOS. BOLT AND NUT REMOVED FROM OLD CLAMP. (THIRD PARTY TAMPERING WITH CLAMP)



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: 1078673 JIV report S/N: 0354

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

S/N	Northing METERS	Easting METERS
ATTACHES FOR COORDINATES LISTING		

**G. INCIDENT INFORMATION:**

20. Impacted Area Details

- Total calculated area of impact 0.72 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>):

**MINNA (MID-BELT)-1078673**

NAME	EAST	NORTH	REMARKS
SP	530227.687	78544.387	SPILL POINT
126	530237.73	78544.477	FREE PHASE CRUDE OIL IMPACT
127	530243.882	78538.323	FREE PHASE CRUDE OIL IMPACT
128	530234.626	78532.196	FREE PHASE CRUDE OIL IMPACT
129	530228.462	78532.207	FREE PHASE CRUDE OIL IMPACT
130	530222.304	78535.29	FREE PHASE CRUDE OIL IMPACT
131	530222.298	78532.218	LIGHT IMPACT
132	530228.49	78547.566	LIGHT IMPACT
133	530234.67	78556.77	LIGHT IMPACT
134	530219.267	78559.869	LIGHT IMPACT
135	530209.982	78538.384	LIGHT IMPACT
136	530200.726	78532.258	LIGHT IMPACT
137	530166.747	78489.316	LIGHT IMPACT
138	530172.894	78480.09	LIGHT IMPACT
139	530179.075	78489.293	LIGHT IMPACT
140	530169.812	78480.095	LIGHT IMPACT
141	530237.735	78547.549	LIGHT IMPACT
142	530246.975	78544.46	LIGHT IMPACT
143	530064.689	78292.913	LIGHT IMPACT
144	530058.531	78295.996	LIGHT IMPACT
145	530067.787	78302.123	LIGHT IMPACT
146	530012.113	78191.643	LIGHT IMPACT
142a	530244.29	78545.2	CONTAINMENT PITS 1
142b	530247.05	78547.2	CONTAINMENT PITS 1
142c	530248.95	78544.98	CONTAINMENT PITS 1
142d	530246.52	78543.07	CONTAINMENT PITS 1
143a	530238.26	78549.85	CONTAINMENT PITS 2
143b	530240.38	78547.73	CONTAINMENT PITS 2
143c	530236.46	78545.2	CONTAINMENT PITS 2
143d	530234.56	78547.09	CONTAINMENT PITS 2
147	530228.42	78563.27	LIGHT IMPACT
148	530192.19	78477.91	LIGHT IMPACT
149	530155.72	78412.32	LIGHT IMPACT
150	530118.42	78361.52	LIGHT IMPACT
151	530062.06	78320.25	LIGHT IMPACT
152	530019.2	78260.72	LIGHT IMPACT
153	530003.32	78221.82	LIGHT IMPACT
154	529996.97	78146.42	LIGHT IMPACT
155	530012.06	78145.62	LIGHT IMPACT
156	530110.22	78327.13	LIGHT IMPACT
157	530144.08	78380.04	LIGHT IMPACT
158	530177.42	78436.14	LIGHT IMPACT
159	530211.29	78482.17	LIGHT IMPACT
160	530191.71	78488.52	LIGHT IMPACT
161	530186.95	78494.35	LIGHT IMPACT

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1078673 JIV report S/N: 0354

Recovered oil $V_{rec}$	<u>NULL</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 7200
- ii. Average Depth (m) of pool of free phase oil 0.0005m
- iii. Emulsification factor: NULL
- iv.

Estimated Volume of pool of free phase oil	<u>22.64</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: 1.5  $m^2$
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 0.5m
- iii. Soil type: SAND (MEDIUM)  $P_e$  (effective porosity of the soil): 25%
- v. Cause of spill: INTERFERENCE vi. Oil type: BONNY LIGHT
- vii. Oil Residence time on site, day: 1 DAY
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.5m
- ix. Estimated depth of infiltration around spill point: 1m

Estimated volume of infiltrated oil at spill point	<u>2.36</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: NOT
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NOT
- iii. Soil type: NOT iv.  $P_e$  (effective porosity of the soil): NOT
- v. Cause of spill: NOT vi. Oil type: NOT
- vii. Oil Residence time on site, day: APPROX 15
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NOT
- ix. Estimated depth of infiltration around spill point: NOT

Estimated volume of infiltrated oil at second spill point	<u>NULL</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: 60  $m^2$
- ii. Area ( $m^2$ ) of the pool of free phase oil in touch with soil: 0
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.5m
- iv. Soil type: SAND MEDIUM
- v.  $P_e$  (effective porosity of the soil): 25%
- vi.

Estimated Volume of infiltrated oil at	<u>47.18</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: NULL

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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1078673 JIV report S/N: **0354**

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	<b>NOT APPLICABLE</b>	
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		

iii.	Percent Total	100%	Estimated Volume of oil on open water, $V_{wat}$	<u>Nil</u>	Barrels
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24. Calculation of evaporated volume:

i. Estimated Volume available for evaporation within surface area: 22.64 + 49.54 BARRELS = 72.18

ii. E-Factor: 25%

iii.	Estimated Volume of evaporated oil, $V_{evap}$	<u>24.06</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, $V_{net}$ (bbls) = <u>96.24</u> $\approx$ <b>97 BARRELS</b>
Estimated Reported Volume** $V_{rep}$ (bbls) = <b>97 BARRELS</b>

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  $Volume (m3) \times 6.29$ ; \*\*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: 1078673 JIV report S/N: 0354

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 03/12/2013 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 :



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1078673 JIV report S/N: 0354

