

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 981052 JIV report S/N: 0164

(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: 981052 2. Type of incident\* OIL SPILL  
 3. Name of Location 6" ADIBAWA NORTH-EAST (ADNE) FLOWLINE (TEST LINE)  
 4. Name of nearest community BISENI 5. State: BAYELSA 6. LGA YENAGOA  
 7. Type of Production facility/Installation OIL FLOWLINE 8. Asset owner/District LANDO

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 22ND MAY, 2013  
 b. Start date/time of investigation: 23RD MAY 2013 (FIRST VISIT), 27TH MAY, 2013 (SECOND VISIT)  
 c. Investigation End date: 7TH AUGUST 2013 (FOURTH VISIT) Actual investigation duration, days: FOUR (4) DAYS 31ST JULY 2013 (THIRD VISIT)  
 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	Manna MID BELT
Northing: (m)  <del>450859.63</del> 134397.09	Easting: (m)  450859.63

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

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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  
(CREEK)       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 [            ,m]
  - Built up area [            ,m]
  - Farmlands [            ,m]
  - Fish Farm/Pond [            ,m]
  - Fishing net [            ,m]
  - Others (specify). [            ,m]
- NONE SEEN  
WITHIN  
IMMEDIATE  
VICINITY

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? [  ] [ N ]

If yes give brief description:

JOINT INVESTIGATION ATTEMPTS ON THE 23RD AND 27TH<sup>OF</sup> MAY 2013 WERE TERMED INCONCLUSIVE AS THE JOINT INVESTIGATION TEAM WAS UNABLE TO CONCLUDE ON THE DETERMINATION OF THE CAUSE OF SPILL. THIS WAS DECIDED ON THE THIRD VISIT OF 31ST JULY 2013 WHEN GOVERNMENT REGULATORS RULED THAT IT WAS DUE TO A FAILED CLAMP.

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						

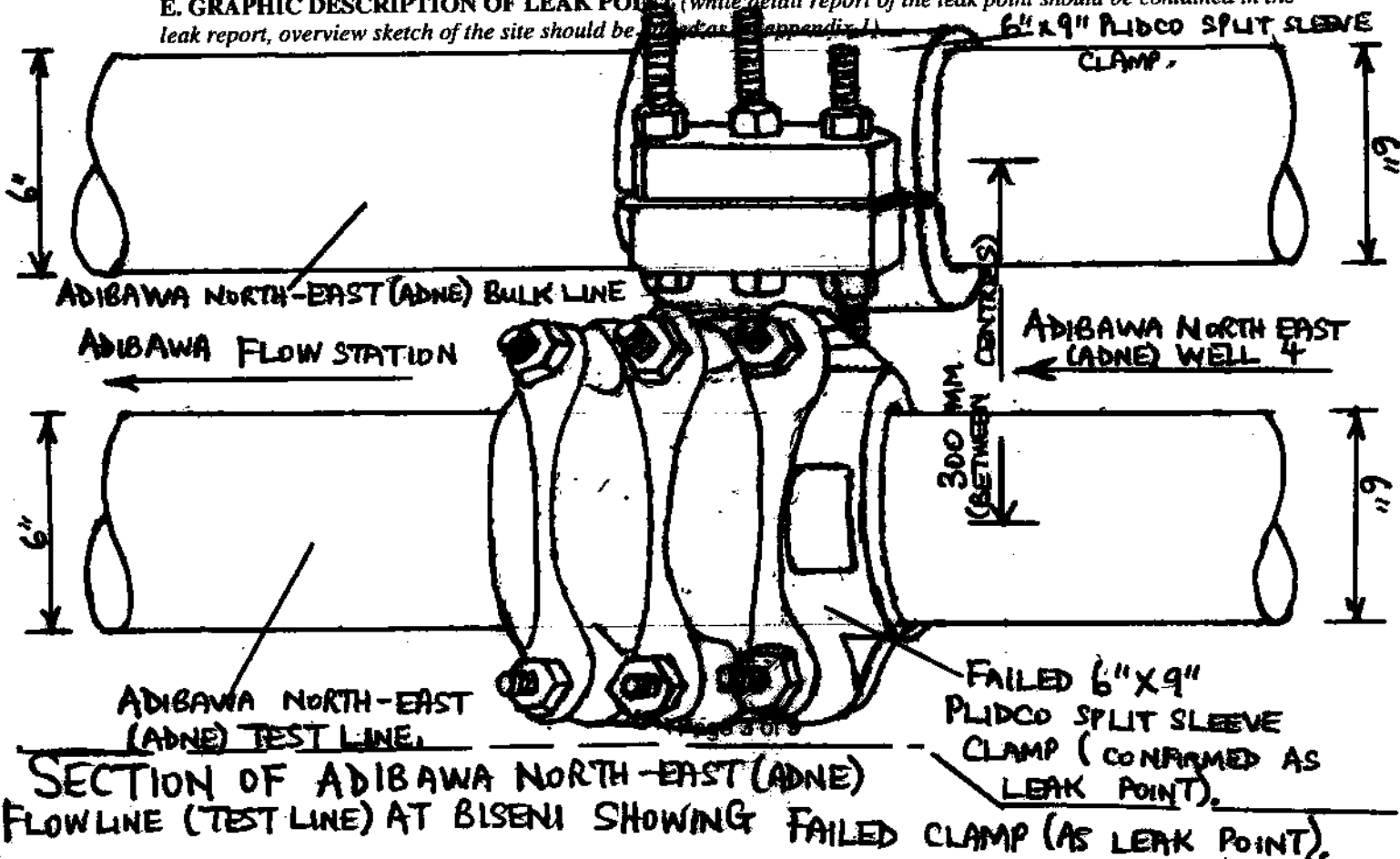
17. Fish/Nets/Ponds

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 attached as appendix 1)



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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)

*MUNNA MAU BELI*

S/N	Northing (m)	Easting (m)
1	134372.261	450936.574
2	134372.29	450927.332
3	134387.712	450908.898
4	134397.018	450881.202
5	134387.809	450878.092
6	134392	450872
7	134405	450882
8	134395	450913
9	134380	450929
10	134379	450938
11	134405	450882
12	134392	450872
13	134390.95	450856.538
14	134415.523	450859.696
15	134392	450872
16	134375.615	450847.248
17	134427.863	450844.332
18	134415.523	450859.696
19	134390.95	450856.538

**NOTES:**

- Investigation on day 1 (23rd May 2013) was inconclusive due to disagreement on cause of spill.
- JIT agreed to attribute clamp failure as cause of spill on third visit (31st July 2013) to site.
- Area mapping of the impacted area was carried out on 23rd May 2013, however, community insisted that more area has been impacted by the incident.
- Further investigation visit to the site was carried out 31st July and 7th August, 2013. No further impact was found on site. OSRT reportedly recovered 5.5 barrels from the environment.

*[Handwritten signature]*

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**G. INCIDENT INFORMATION:**

**20. Impacted Area Details**

- Total calculated area of impact 4.35m<sup>2</sup> · 0.1529t/a
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W NO

**21. Volume of oil recovered before completion of JIV ( $V_{rec}$ ):**

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<sup>2</sup>) occupied by pool of free phase oil 557
- ii. Average Depth (m) of pool of free phase oil 0.0016
- iii. Emulsification factor: NIL

iv. 

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<u>5.61</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<sup>2</sup>) of soil covered by the oil: NOT APPLICABLE
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- iii. Soil type: SILT iv.  $P_e$  (effective porosity of the soil): 21%
- v. Cause of spill: OPERATIONAL vi. Oil type: BONNY MEDIUM
- vii. Oil Residence time on site, day: 1 DAY
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NOT APPLICABLE
- ix. Estimated depth of infiltration around spill point: NOT APPLICABLE

x. 

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

- i. Area\* (m<sup>2</sup>) of soil covered by the oil: \_\_\_\_\_
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- iii. Soil type: \_\_\_\_\_ iv.  $P_e$  (effective porosity of the soil): \_\_\_\_\_
- v. Cause of spill: NOT APPLICABLE vi. Oil type: APPLICABLE
- vii. Oil Residence time on site, day: \_\_\_\_\_
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- ix. Estimated depth of infiltration around spill point: \_\_\_\_\_

Estimated Volume of infiltrated oil at spill point. $V_{inf b}$ :	<u>NIL</u>	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: 972
- 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: 0.001m
- iv. Soil type: SILT
- v. P<sub>e</sub> (effective porosity of the soil): 21%
- vi. 

Estimated Volume of infiltrated oil. At V <sub>inf</sub> :	<u>1.17</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: NIL
- ii. Table of average depth of oil on water based on coloration (\*\*Spill Factors from USCG FOG (2000 Edition))

	Thickness (mm)	Percentage coverage	Volume (m <sup>3</sup> )
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003	<b>NOT</b>	
Dull	0.001		
Dark	0.002	<b>APPLICABLE</b>	
Black oil	0.1		
Emulsion (30% Oil)	1		

- 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: 6.78 BARRELS
- ii. E-Factor: 15%
- iii. 

Estimated Volume of evaporated oil. V <sub>evap</sub> :	<u>1.20</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><b>25. Net Estimated Spilled Volume V<sub>net</sub>(bbls) = V<sub>evap</sub>(bbls) + V<sub>wat</sub>(bbls) + V<sub>inf</sub>(bbls) + V<sub>pool</sub>(bbls) + V<sub>recd</sub>(bbls) =</b></p> <p style="text-align: center;"><b>1.20 + NIL + 1.17 + 5.61 + NIL</b></p> <p style="text-align: right;"><b>≈ 7.97</b></p>
<p><b>Estimated Reported Volume** V<sub>rep</sub>(bbls) =</b></p> <p style="text-align: center;"><b>8 BARRELS</b></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<sup>3</sup> to barrels is Volume (m<sup>3</sup>) 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

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 07/08/2013 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

