

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

0137

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N:

*(Note: As practicable as possible the JIV report is to be signed in the field by all the participating parties)*

**A. GENERAL INFORMATION:**

1. Spill incident Number: 1026092      2. Type of incident\* OIL SPILL  
 3. Name of Location CAWTHORNE CHANNEL 4" WELL S1T FLOWLINE  
 4. Name of nearest community MBIAMA      5. State: RIVERS      6. LGA DEGEMA  
 7. Type of Production facility/Installation FLOWLINE      8. Asset owner/District SWAMP 1 / CAWTH

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 18<sup>TH</sup> AUGUST, 2013  
 b. Start date/time of investigation: 21<sup>ST</sup> AUGUST, 2013  
 c. Investigation End date: 21<sup>ST</sup> AUGUST, 2013 Actual investigation duration, days: ONE (1) 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 FLOWLINE       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>(NINNA MID-BERT)</u>	
Northing:  <p align="center"><u>61567.65mN</u></p>	Easting:  <p align="center"><u>504476.6mE</u></p>

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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N: **0137**

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

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.				

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N: 0137

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

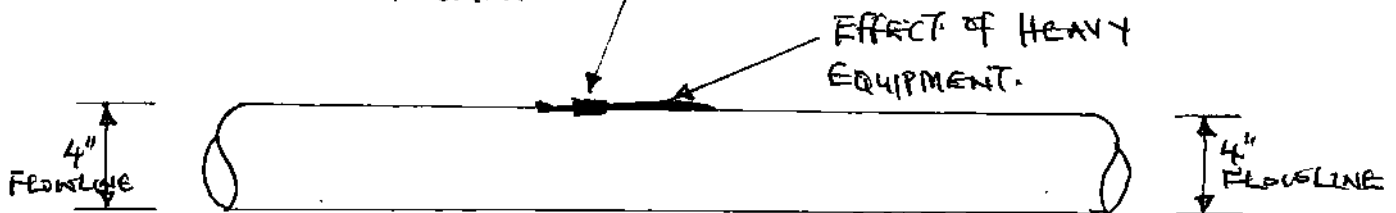
S/N	Others	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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 CASTHORNE CHANNEL 2 4" WELL SIT FLOWLINE:

AT MBIAMA, CAUSE SHOWING 30mm LONGITUDINAL RUPTURE

LEAK DUE TO 30mm LONGITUDINAL  
RUPTURE WITH SURFACE REDUCTION  
DUE TO HEAVY EQUIPMENT AT 12° CLOCK  
POSITION.



WELL SIT FLOWLINE - CASTHORNE CHANNEL  
Page 3 of 9

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N: 0137

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 MIN - BEIT)

S/N	Northing	Easting
Spill Point	61567.65m	504476.60m
1	61570.85m	504473.20m
2	61558.43m	504479.60m
3	61558.43m	504482.70m
4	61564.58m	504476.60m
5	61567.65m	504479.60m
6	61567.63m	504488.90m

Impacted Area

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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 · JIV report S/N: 0137

**G. INCIDENT INFORMATION:**

**20. Impacted Area Details**

- Total calculated area of impact 0.0086 Ha
- 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>NOT APPLICABLE</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 16  $m^2$
- ii. Average Depth (m) of pool of free phase oil 0.008 m
- iii. Emulsification factor: 30%

iv. 

Estimated Volume of pool of free phase oil. $V_{pool}$ :	<u>0.56</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: 0.02 m
- iii. Soil type: CLAY      iv.  $P_e$  (effective porosity of the soil): 8%
- v. Cause of spill: OPERATIONAL      vi. Oil type: BONNY LIGHT
- vii. Oil Residence time on site, day: THREE (3) DAYS
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.0019
- ix. Estimated depth of infiltration around spill point: 0.0219 m

x. 

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$ :	<u>0.02</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. Estimated Volume of infiltrated oil outside immediate spill point(s) region ( $V_{inf c}$ )**

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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N: 0137

- i. Area (m<sup>2</sup>) of soil covered by the oil: 66m<sup>2</sup>
- ii. Area (m<sup>2</sup>) of the pool of free phase oil in touch with soil: \_\_\_\_\_
- 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>0.03</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: NOT APPLICABLE
- 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		
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>NOT APPLICABLE</u>	Barrels
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**24. Calculation of evaporated volume:**

- i. Estimated Volume available for evaporation within surface area: 0.61 Barrels
- ii. E-Factor: 25%

iii.	Estimated Volume of evaporated oil. V <sub>evap</sub> :	<u>0.20</u>	Barrels
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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>(bbls) = V<sub>evap</sub>(bbls) + V<sub>wat</sub>(bbls) + V<sub>inf</sub>(bbls) + V<sub>pool</sub>(bbls) + V<sub>rej</sub>(bbls) = 0.20 + NIL + 0.05 + 0.56 + NIL = 0.82 bbls**

**Estimated Reported Volume\*\* V<sub>rep</sub>(bbls) = 1 BARRELS.**

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N:

**0137**

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 <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 24 / 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

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1026092 JIV report S/N: **0137**

28. Appendix 1: Overview sketch of the site

Location: CANTHORNE CHANNEL 4" WELL 51T FLOWLINE AT MBIAMA

