

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1122345 JIV report S/N 0231

(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: 1122345 2. Type of incident* OIL SPILL
 3. Name of Location JB WELL CLUSTER, FORGADOS ESTUARY WELL-151
 4. Name of nearest community OGULAGHA 5. State: DELTA 6. LGA BURUTU
 7. Type of Production facility/Installation WELL HEAD 8. Asset owner/District SWAMP1

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 15TH FEBRUARY 2014
 b. Start date/time of investigation: 18TH FEBRUARY, 2014 AT 1151 HRS
 c. Investigation End date: 18TH FEB. 2014 Actual investigation duration, days: 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 ☐ 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 3rd party equipment
 impact ☐ Valve Failure ☐ com unit failure ☐ Cold vent
☐ Relief valve failure ☒ Others (specify) ACCIDENTAL IMPACT ON WELL HEAD FLANGE
 f. Incident caused by:
☐ Third party interference (Sabotage ☐; crude theft ☐; Line theft ☐; Accidental 3rd party damage ☐)
☒ Operational ☐ Others (including Mystery spills) _____

g. Spill point coordinates

Measuring unit <u>METERS</u> <u>MINNA</u> <u>(WEST - BELT)</u>	
Northing: <div style="font-size: 2em; text-align: center;">152897 MN</div>	Easting: <div style="font-size: 2em; text-align: center;">318772 ME</div>

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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: NOT APPLICABLE

☐ 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
- ☐ Drinking water source
- ☐ Built up area
- ☐ Farmlands
- ☐ Fish Farm/Pond
- ☐ Fishing net
- ☐ Others (specify).

[,m]
[,m]
[,m]
[,m]
[,m]
[,m]

} NONE WITHIN
THE VICINITY

12. Containment measures put in place; NOT APPLICABLE

☐ 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

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0231

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments

NOT APPLICABLE

17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments

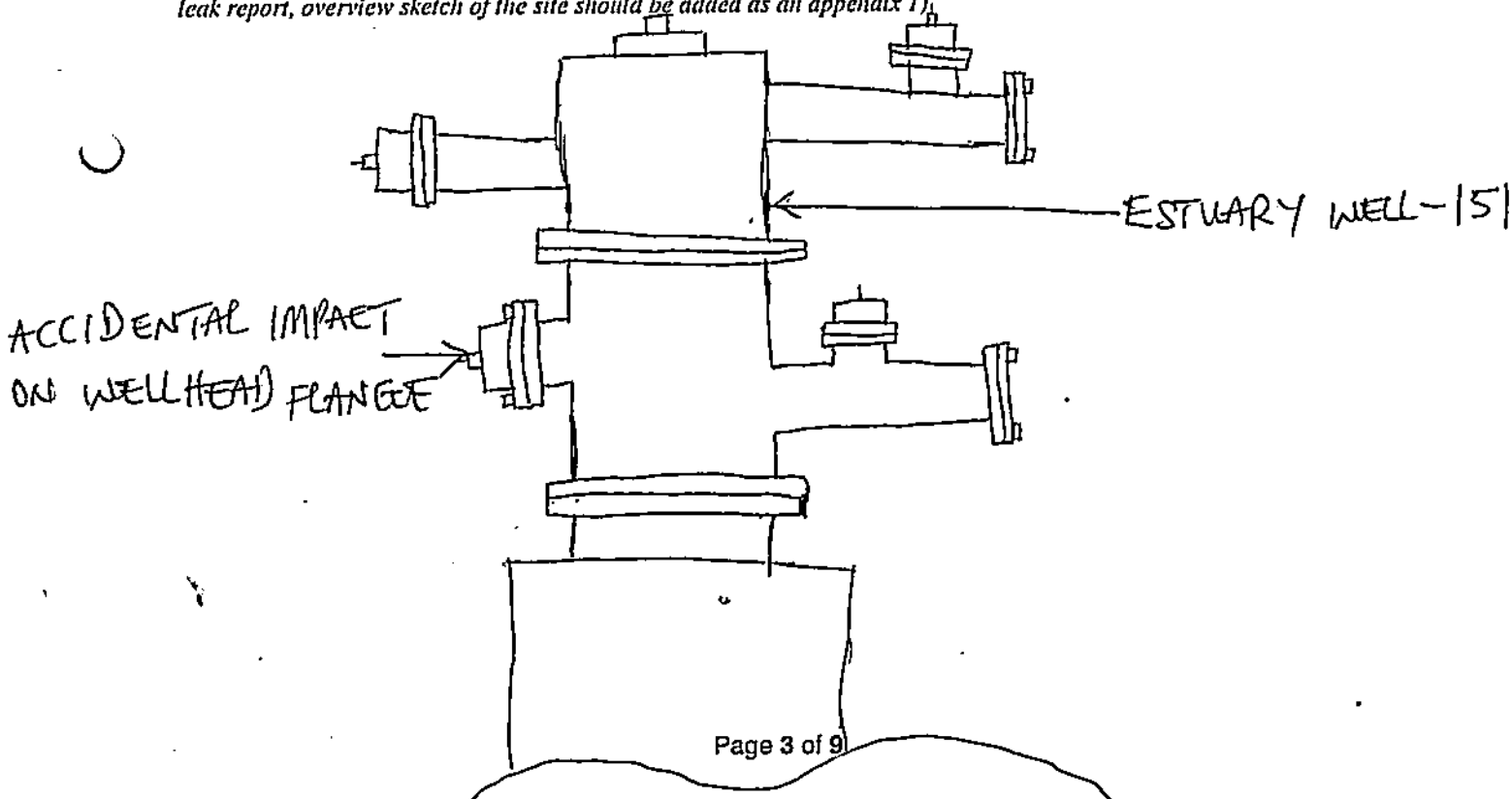
NOT APPLICABLE

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

S/N	Others	Description	Quantity/Size	Comments

NOT APPLICABLE

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 I).



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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact _____
- Impact within SPDC R.O.W _____
- Impact outside SPDC R.O.W _____

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

Recovered oil V_{rec} :	NIL	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 bounded water body).

- i. Area (m^2) occupied by pool of free phase oil _____
- ii. Average Depth (m) of pool of free phase oil _____
- iii. Emulsification factor: _____

iv. Estimated Volume of pool of free phase oil. V_{pool} :	NIL	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: _____
- 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: _____
- vi. Oil type: _____
- 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: _____

x. Estimated Volume of infiltrated oil at spill point. $V_{inf a}$:	NIL	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: _____
- 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: _____
- vi. Oil type: _____
- 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. $V_{inf b}$:	NIL	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 (m²) of soil covered by the oil: _____
- ii. Area (m²) of the pool of free phase oil in touch with soil: _____
- iii. Average Depth (m) below ground surface of infiltration of oil: _____
- iv. Soil type: _____
- v. P_e (effective porosity of the soil): _____

vi.

Estimated Volume of infiltrated oil. At V_{inf} :	<u>NIL</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 ³)
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		

iii.

Percent Total	100%	
Estimated Volume of oil on open water. V_{wat} :	<u>NIL</u>	Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: NOT APPLICABLE
- ii. E-Factor: NOT APPLICABLE
- iii.

Estimated Volume of evaporated oil. V_{evap} :	<u>NIL</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_{Est} (bbls) = V_{evap} (bbls) + V_{wat} (bbls) + V_{inf} (bbls) + V_{pool} (bbls) + V_{reel} (bbls) = SEE ATTACHED ESTIMATION DOC.

Estimated Reported Volume** V_{rep} (bbls) = 5 BBLs

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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 m³ 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

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 type="checkbox"/>

27. REPRESENTATIVES

This report was filled, agreed and signed on the 18/02/2014 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

NOTE: NO ENVIRONMENTAL IMPACT WAS OBSERVED ON SURFACE WATER AROUND THE INCIDENT AREA BUT, THE HOST COMMUNITY REPRESENTATIVES ALLEGED THAT THE CRUDE OIL SPILLED HAS IMPACTED THEIR SHORELINES ABOUT 7KM AWAY FROM THE INCIDENT POINT. HENCE, THE GOVERNMENT REGULATORS RECOMMENDED THAT SPDC SHOULD ASSESS AND CLEAN THE ALLEGED IMPACTED SHORELINES WHERE APPLICABLE.

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28. Appendix 1: Overview sketch of the site

Location: JB WELL CLUSTER, FORCADOS ESTUARY WELL-151 AT OGULAGHA

SEE ATTACHED
OVERVIEW PHOTOGRAPHS
(NO IMPACT OBSERVED)

**ESTIMATED QUANTITY OF CRUDE OIL SPILLED FOR JB WELL CLUSTER, FORCADOS ESTUARY WELL – 151
INCIDENT NUMBER IS: 1122345**

The Quantity of crude oil spilled was calculated using the leak rate obtained from the FIR (first information report). This is due to the fact that there were no environmental impacts observed around the incident area as at time of JIV.

Estimated Leak rate: 1.5litres per minute

Duration of leak was 8hrs (1000hrs – 1800HRS)

CALCULATION

✓ If 1.5litres of crude oil was spilled in 1minute then, 90litres of crude oil will be spilled in 1hour.

Recall that the leakage lasted for about 8hours (see above), as agreed by the JIT.

Therefore, 720litres of crude oil was spilled in 8hours.

720litres = 4.53 bbls

Reported as: 5bbls

Hence, the estimated quantity of crude oil spilled for the leak duration of 8hrs is **5bbls**.

✓