

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0305 819533

(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: 819533 2. Type of incident * OIL SPILL
- 3. Name of Location BENISEDE WELL II FLOWLINE
- 4. Name of nearest community TAMOGBENE 5. State: BAYELSA 6. LGA EKEREMOR
- 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/ District NWS 2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 28/5/12
- b. Start date/time of investigation: 31/5/12
- c. Investigation End date: 31/5/12
- d. Description of spill point environment
 - Firmed soil Loose soil Previously excavated area
 - Under water Swampy Exposed pipe surface
 - Well Plateform (on Water) Rig
- e. Description of leak point (tick as applicable);
 - Drilled hole Hack saw cut Explosive tear,
 - Complete Rupture Inward dent, Well head tampering
 - Failed Weld-on illegal hot tap valve, 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
 - Outward dent Flare System/Bund wall failure
 - Valve Failure com unit failure Cold vent
 - Relief valve failure Others (specify) _____
- f. Incident caused by:
 - Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit	
Northing:	Easting:
<u>110537m</u>	<u>363611m</u>

*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

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Raining Sunny

11. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [2000 ,m]
 Drinking water source [2000 ,m]
 Built up area [2000 ,m]
 Farmlands [2000 ,m]
 Fish Farm/Pond [2000 ,m]
 Fishing net [2000 ,m]
 Others (specify). [2000 ,m]

12. Containment measures put in place;

- Booms Trench Dyke

Others: NOT APPLICABLE

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

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	NONE WITHIN AREA OF IMPACT					

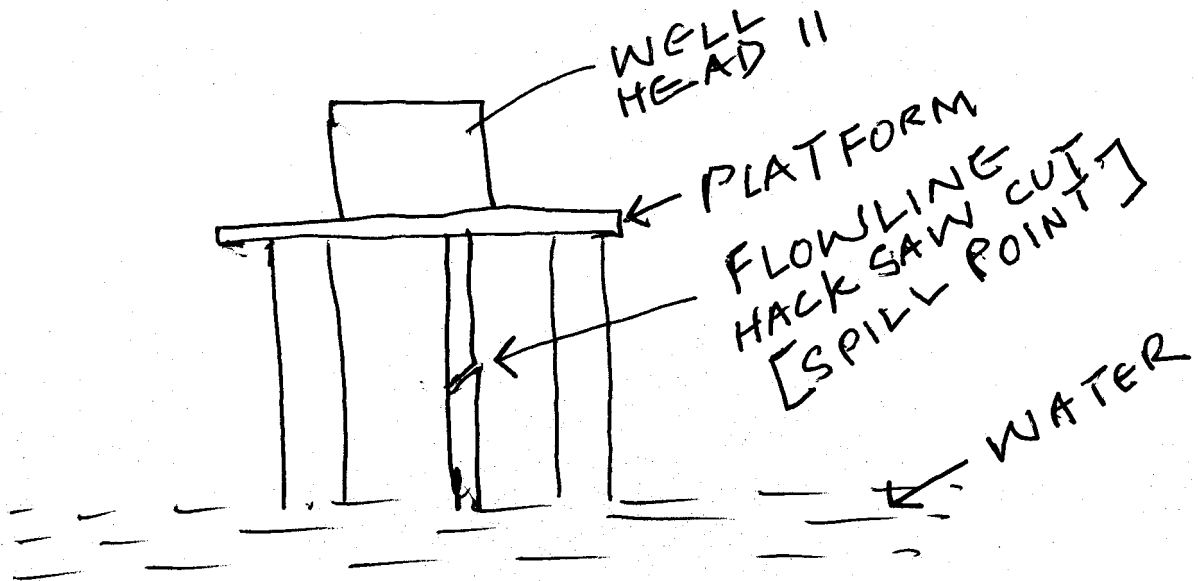
17. Fish/Nets/Ponds

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 added as an 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 than 12 points, Attach as an appendix 2)

S/N	Northing	Easting
SP	110537	363611
1	110560	363621
2	110541	363643
3	110506	363612
4	110480	363593
5	110464	363639
6	110453	363633
7	110412	363658
8	110394	363660
9	110430	363540
10	110392	363497
11	110409	363477
12	110397	363472

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 17,348m²
- Impact within SPDC R.O.W 17,348m²
- Impact outside R.O.W NIL

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

Recovered oil V_{rec}	<u>NIL</u>	barrels
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20. Computation of the residual volume on site

- Computation of volume of pool of free phase oil (on land or confined water body).
 - Area (m²) occupied by pool of free phase oil NIL
 - Average Depth (m) of pool of free phase oil NOT APPLICABLE

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iii. Emulsification factor: NOT APPLICABLE

iv.

Volume of pool of free phase oil. V_{pool} :	NIL	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf})

- i Area *(m²) covered by the oil: NIL
- ii Area of the pool of free phase oil in touch with soil: NIL
- iii Average Depth (m) below ground surface of infiltration of oil: NOT APPLICABLE
- iv Soil type: NOT APPLICABLE
- v P_c (effective porosity of the soil). NOT APPLICABLE

iv.

Volume of infiltrated oil. V_{inf}	NIL	barrels
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21. Computation of volume of oil on open water based on standard coloration.

i. Total area of oil on open water: 17,348 m²

ii. Table of average depth of oil on water based on coloration**

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004	5%	0.000034696
Silvery	0.00008	20%	0.000277568
Slight Color	0.00015	10%	0.000260220
Bright Color	0.0003	/	/
Dull	0.001	/	/
Dark	0.002	20%	0.00693392
Black oil	0.1	30%	0.52044
Emulsion (30% Oil)	1	15%	2.60220000
Percent Total		100%	Total Volume <u>3.13 m³</u>

iii.

Volume of oil on open water. V_{wat} :	19.69	barrels
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22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 15%

iii.

Volume of evaporated oil. V_{evap} :	3.47	barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Period Since Oil Spill	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

*If area is not same as the total area of impact, please indicate in the overview sketch
 ** Spill Factor from USCG FOG (2000 Edition)

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23. Gross Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$$

$V_{Est}(bbls) =$ 23.16 BBLs

24. Net Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$$

$V_{Est}(bbls) =$ 15.29 BBLs

*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 Total volume VT (m3) x 6.29

*Emulsification factor for spill on water to consider is 60% of volume of oil.

25. 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

26 REPRESENTATIVES

This report was filled and signed on the 31 / 5 /2012 at incident site by joint investigation representatives from

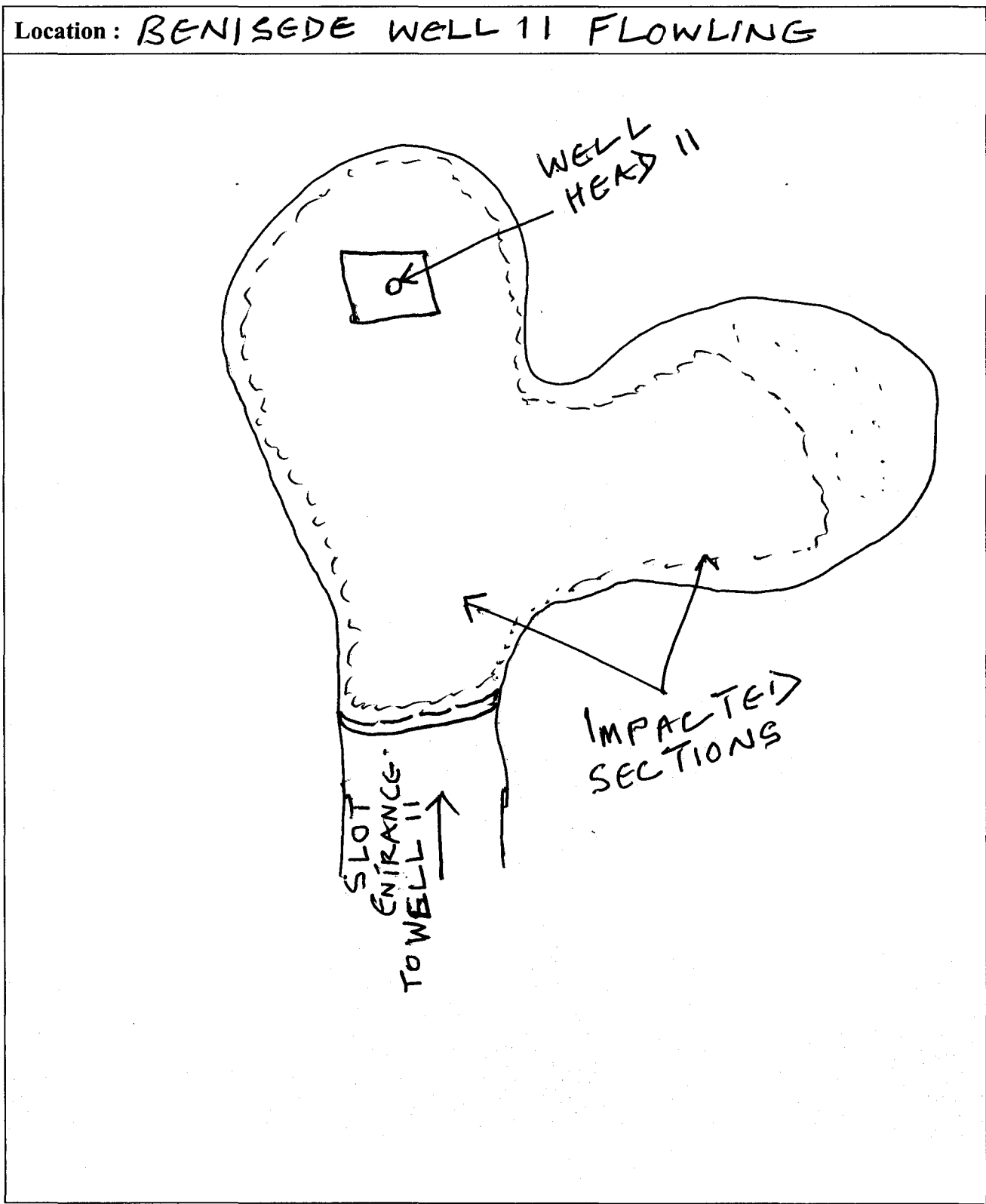
- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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27. Appendix 1: Overview sketch of the site



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21. Appendix 2:TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

S/N	Northing	Easting
13	110397	363466
14	110412	363470
15	110451	363497
16	110503	363522
17	110545	363560
18	110585	363594