

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0527 900126

(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: 900126 2. Type of incident * OIL SPILL
 3. Name of Location NEMBE I WELL 19 S WELL HEAD
 4. Name of nearest community DGBDLOMABIRI 5. State: BAYELSA 6. LGA NEMBE
 7. Type of Production facility/Installation WELL HEAD 8. Asset owner/ District NES2/NEMBE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 30TH NOVEMBER 2012.
 b. Start date/time of investigation: 3RD DECEMBER 2012.
 c. Investigation End date: 3RD DECEMBER 2012.
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (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) INTERNAL EROSION ON AVA UNIT
 f. Incident caused by:
 Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit		<u>MINNA MID BELT</u>	
Northing:	<u>48590.72m</u>	Easting:	<u>428448.47m</u>

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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: **NO IMPACT WAS OBSERVED AT TIME OF INVESTIGATION.**

- Land Swamp Water River (identify) _____

ii. Weather condition

- Raining Sunny

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]

12. Containment measures put in place;

- Booms Trench Dyke
- 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
NOT APPLICABLE					

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	NOT	APPLICABLE				

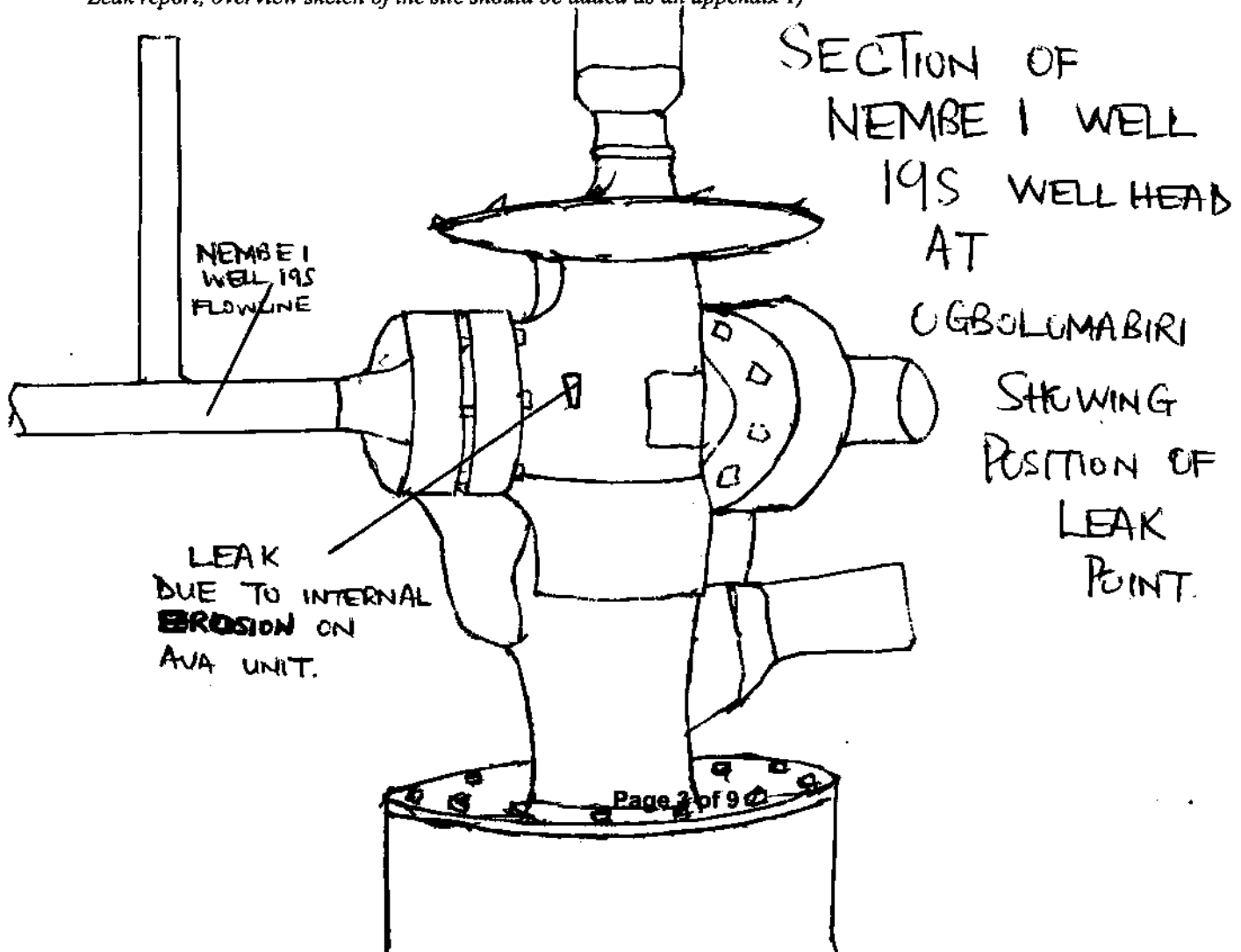
17. Fish/Nets/Ponds

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 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

03/12/2012

G. INCIDENT INFORMATION:

20. Impacted Area Details

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

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

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

- a. Computation of volume of pool of free phase oil (on land or confined water body).
- i. Area (m^2) occupied by pool of free phase oil _____
 - ii. Average Depth (m) of pool of free phase oil _____

CALCULATION OF SPILLED VOLUME BASED ON PRODUCTION CAPACITY OF WELL 19. (= 2,278 BARRELS PER DAY (NET)).

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iii. Emulsification factor: _____

AREA OF LEAK POINT
(TRIANGULAR SHAPED)

iv.

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

- i Area *(m²) covered by the oil: _____ $= \frac{1}{2} \times \text{BASE} \times \text{HEIGHT}$
- ii Area of the pool of free phase oil in touch with soil: _____ $= \frac{1}{2} \times 0.03 \text{ m} \times 0.01 \text{ m}$
- iii Average Depth (m) below ground surface of infiltration of oil: _____ $\approx 0.0002 \text{ m}^3$
- iv Soil type: _____
- v P_e (effective porosity of the soil): _____

AREA OF 4" DIAMETER
FLOWLINE THROUGH

iv.

Volume of infiltrated oil, V_{inf}	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: _____
- ii. Table of average depth of oil on water based on coloration**

WHICH WELL PRODUCES
 $\frac{22}{7} (\pi) \times 0.05 \text{ m}$
 $\times 0.05 \text{ m}$

	Thickness (mm)	Percentage coverage	Volume (m3)
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		
Percent Total		100%	Total Volume

$= 0.008 \text{ m}^2$
MATHEMATICALLY,
 $0.008 \text{ m}^2 \equiv 2,278 \text{ BARRELS PER DAY}$
 $\therefore 0.0002 \text{ m}^2 \equiv \frac{0.0002}{0.008} \times 2278$

iii.

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

- i. Oil type: _____
- ii. E-Factor: _____

≈ 56.95
BARRELS/DAY:
THIS IMPLIES THAT:
24 HOURS $\equiv 56.95$ BARRELS
 $\therefore 1 \text{ HOUR} \equiv$

iii.

Volume of evaporated oil, V_{evap}	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%

$\frac{1}{24} \times 56.95$
BARRELS
 $= \frac{56.95}{24} = 2.37$
BARRELS

LEAK DURATION
FROM 8:00 AM - 8:20 AM
(TIME OF REPORT) (TIME WELL WAS SHUT IN)

= 20 MINUTES.

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

THUS: 1 HOUR $\equiv 2.37$ BARRELS
(60 MINUTES)
20 MINUTES $\equiv \frac{20}{60} \times 2.37$ BARRELS
 $= 0.79$ BARREL

ESTIMATED SPILL VOLUME ≈ 0.8 BARREL

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23. Gross Total Estimated Spilled Volume

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

$V_{Est}(bbls) =$ 0.8 BARREL

24. Net Total Estimated Spilled Volume

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

$V_{Est}(bbls) =$ 0.8 BARREL

*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

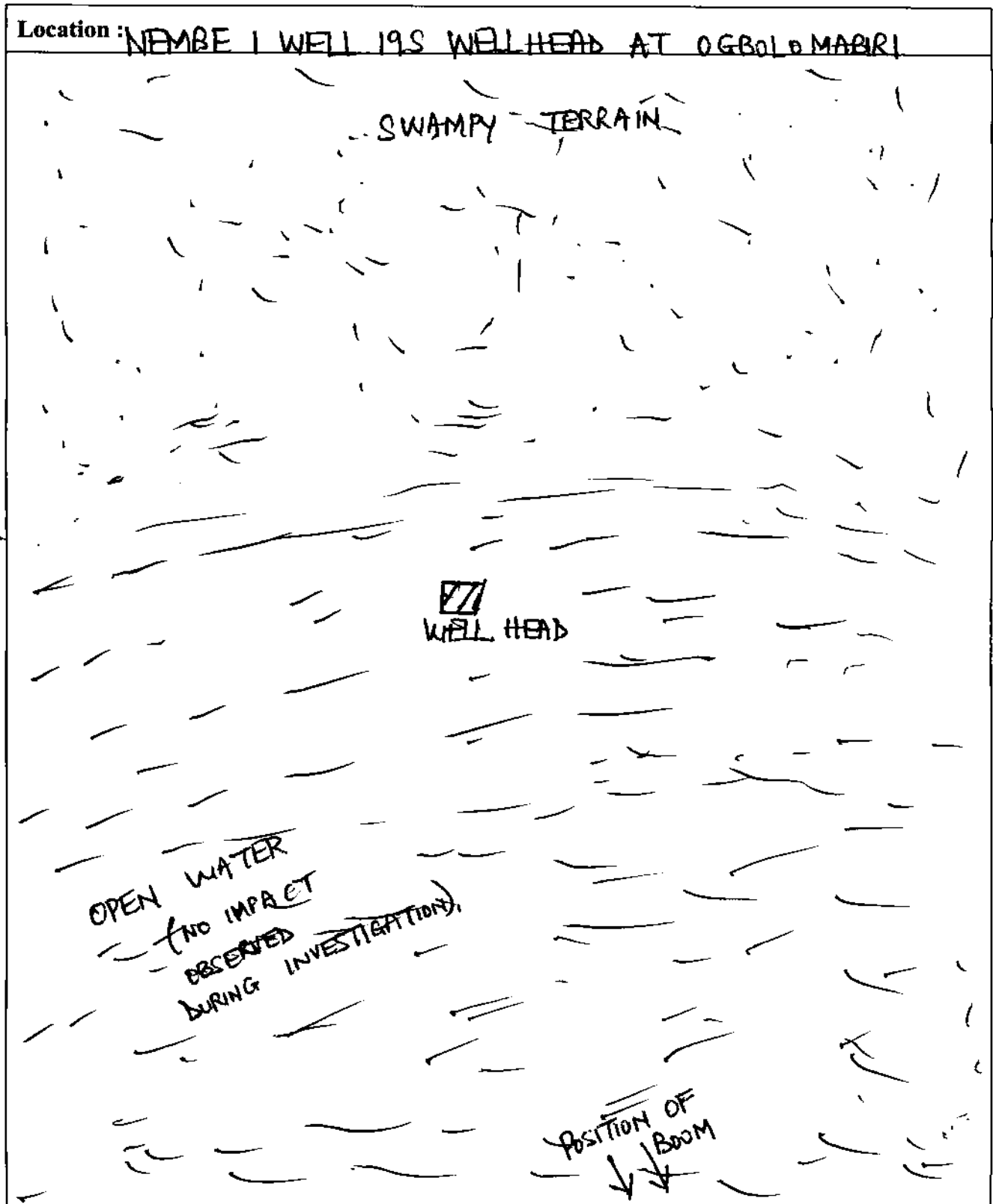
26 REPRESENTATIVES

This report was filled and signed on the 03/12/2012 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

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

Rg 03/12/2012