

# THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0423-908931

(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: 908931 2. Type of incident \* OIL SPILL  
 3. Name of Location NEMBE 1 WELL 3S FLOWLINE  
 4. Name of nearest community ENELESUO 5. State: BAYELSA 6. LGA NEMBE  
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/ District SWAMP II

## B. INCIDENT INFORMATION:

### 9. Details of incident

- a. Date of incident: 26<sup>TH</sup> DECEMBER, 2012  
 b. Start date/time of investigation: 28<sup>TH</sup> DECEMBER, 2012  
 c. Investigation End date: 28<sup>TH</sup> 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) \_\_\_\_\_  
 f. Incident caused by:  
☐ Third party interference ☒ Operational ☐ Mystery \_\_\_\_\_

### g. Spill point coordinates

Measuring unit <u>METRE</u> ( <u>MINNA MID-BEIT</u> )	
Northing:  <div style="font-size: 2em; text-align: center;">48207.85</div>	Easting:  <div style="font-size: 2em; text-align: center;">429058.07</div>

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

[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
} NOT APPLICABLE

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

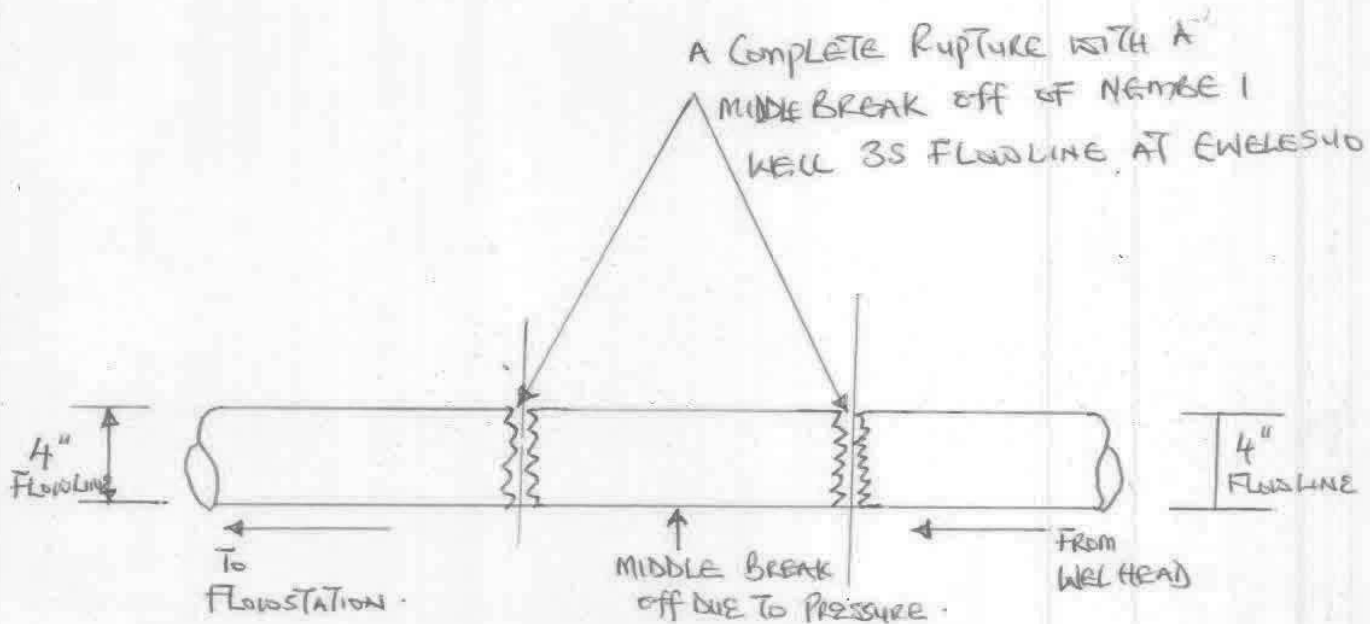
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT.			

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)

SECTIONAL VIEW OF NAME 1 WELL 3S FLOWING AT EWELESUO  
SHOWING COMPLETE RUPTURE.



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19. Impacted area boundary Coordinates (If more than 12 points, Attach as an appendix 2)

MINNA (Mid-Belt)

[illegible]

## 20. Impacted Area Details

- Total calculated area of impact 0.55 Ha
- Impact within SPDC R.O.W YES
- Impact outside R.O.W NO

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

Recovered oil $V_{rec.I}$	NIL	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<sup>2</sup>) occupied by pool of free phase oil \_\_\_\_\_
- ii. Average Depth (m) of pool of free phase oil Not Applicable

### ESTIMATED VOLUME CALCULATION OF OIL

(A) Length of pipeline from the point of rupture to the point of closure (m) (upstream and downstream point of rupture)  $L = 1800$  meters.

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iii. Emulsification factor: NIL

iv.

Volume of pool of free phase oil.  $V_{pool}$ :

NOT APPLICABLE

barrels

b. Computation of volume of infiltrated oil in the soil ( $V_{inf}$ ).

(B) OIL FLOW RATE  
IN THE PIPELINE  
(cu-m/hr) = Q  
Q = 3.5 m<sup>3</sup>/hr

i. Area (m<sup>2</sup>) covered by the oil: NOT APPLICABLE

ii. Area 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: CLAY

v.  $P_c$  (effective porosity of the soil): 8%

iv. Volume of infiltrated oil.  $V_{inf}$

NOT APPLICABLE

barrels

21. Computation of 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\*\*

(C) FRACTION OF PIPELINE  
OCCUPIED BY THE OIL

= F

F = 14%

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003	<u>NOT</u>	
Dull	0.001		
Dark	0.002	<u>APPLICABLE</u>	
Black oil	0.1		
Emulsion (30% Oil)	1		

(A) DURATION, HR

=  $\Delta T$

Percent Total

100%

Total Volume

NIL

bbl

iii.

Volume of oil on open water.  $V_{wat}$ :

NIL

barrels

22. Calculation of evaporated volume:

$\Delta T = 0.167 \text{ hr}$

i. Oil type: BONNY LIGHT

ii. E-Factor: 25%

iii.

Volume of evaporated oil.  $V_{evap}$ :

NA

barrels

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%

(E) CROSS SECTIONAL AREA  
OF THE PIPELINE (Sq-m)

$AP = 0.0082 \text{ m}^2$

(F) VALUE OF 10 mins ONGOING PRODUCTION =  $QT (\text{cu-m}) = 0.583 \text{ m}^3$

(G) VALUE OF FULL STATIC FLOWLINE VOLUME =  $FAL (\text{cu-m}) = 2.05812 \text{ m}^3$

(H) TOTAL =  $QT + FAL (\text{cu-m}) = (0.583 + 2.05812) = 2.6415 \text{ m}^3$

(I) TOTAL = THE BSW OF 9.09% (cu-m) =  $2.6415 - (9.09\% \text{ of } QT + FAL)$

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= 2.401 m<sup>3</sup>

(J) ESTIMATED VOLUME, BARRELS  $(2.401 \times 6.29) = 15.10 \text{ BARRELS}$

\*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

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

$V_{Est}(bbls) =$  15.10 BARREL

## 24. Net Total Estimated Spilled Volume

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

$V_{Est}(bbls) =$  16 BARRELS

\*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 28 / 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

