



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED
JOINT INVESTIGATION REPORT FOR INCIDENT NO: 616024

No. 01678

A. GENERAL INFORMATION:

1. Spill incident Number: 616024
2. Name of Location 24th NEMBE CREEK TRUNKLINE OF TORA - SANBARTH
3. Name of nearest community TORA - TWENIKIRI
4. State RIVERS LGA AKUKU - TORU
5. Type of Production facility/Installation TRUNKLINE Asset owner /District UIG/P/NESP

B. INCIDENT INFORMATION:

6. Details of incident

- a. Date of incident - 28TH JANUARY 2011
- b. Date/Period of investigation, - 4TH FEBRUARY 2011
- c. Description of spill point environment

- | | | |
|--|------|------|
| <input type="checkbox"/> Firmed soil | [Y] | [N]✓ |
| <input type="checkbox"/> Loose soil | [Y]✓ | [N] |
| <input type="checkbox"/> Previously excavated area | [Y]✓ | [N] |
| <input type="checkbox"/> Under water | [Y] | [N]✓ |
| <input type="checkbox"/> Swampy | [Y]✓ | [N] |
| <input type="checkbox"/> Exposed pipe surface | [Y] | [N]✓ |

d. Description of leak point (tick as applicable);

- | | | |
|--|------|------|
| <input type="checkbox"/> Drilled hole, | [Y] | [N]✓ |
| <input type="checkbox"/> Hack saw cut, | [Y] | [N]✓ |
| <input type="checkbox"/> Explosive tear, | [Y]✓ | [N] |
| <input type="checkbox"/> Complete Rupture | [Y] | [N]✓ |
| <input type="checkbox"/> Inward dent, | [Y]✓ | [N] |
| <input type="checkbox"/> Well head tampering | [Y] | [N]✓ |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | [Y]✓ | [N] |
| <input type="checkbox"/> Missing pipeline (flowline) | [Y] | [N]✓ |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point, | [Y]✓ | [N] |
| <input type="checkbox"/> Third party tampering with Clamp Bolt/Nut, | [Y] | [N]✓ |
| <input type="checkbox"/> Third party tampering with valve setting, | [Y] | [N]✓ |
| <input type="checkbox"/> Third party tampering with flange Nuts/bolts, | [Y] | [N]✓ |
| <input type="checkbox"/> Corrosion, | [Y] | [N]✓ |

Type: NOT APPLICABLE

- | | | |
|--|-----|------|
| <input type="checkbox"/> Saver-pit over flow, | [Y] | [N]✓ |
| <input type="checkbox"/> Surge vessel overflow, | [Y] | [N]✓ |
| <input type="checkbox"/> Outward dent | [Y] | [N]✓ |
| <input type="checkbox"/> Others (specify). <u>NOT APPLICABLE</u> | | |

AFTER DUE INVESTIGATION
OF THE INCIDENT, SPILL
WAS FOUND TO BE DUE
TO THIRD PARTY
INTERFERENCE

e. Spill point coordinates

Northing:

04° 28' 56.6"

Easting:

006° 32' 06.6"



No. 1678

C. RISK/DAMAGE ASSESSMENT

7. Type of environment of spill site:

- ☐ Land
☐ Swamp ✓
☐ water

Type of environment of which oil has spread:

- ☐ Land
☐ Swamp ✓
☐ water

8. 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]
} NOT APPLICABLE

9. Containment measures put in place;

- ☐ Booms
☐ Trench
☐ Dyke

[Y] [N] ✓
[Y] ✓ [N]
[Y] [N] ✓

☐ Others: _____

10. Any pictures or video coverage?

[Y] ✓ [N]

11. 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

A. Structures / Properties

S/N	Type of Structures	Description	Size	Number	Comments
	NONE WITHIN AREA OF IMPACT				



No. 1678

B. Crops/Economic Trees

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

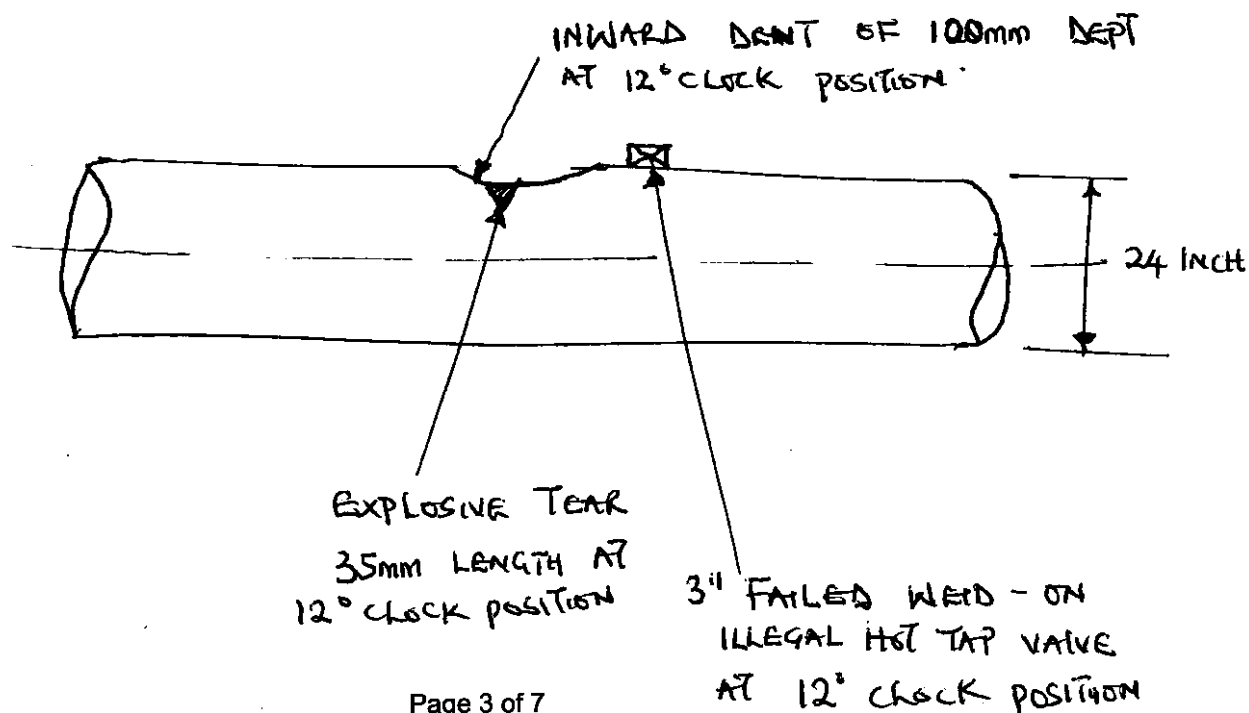
C. Fish/Nets/Ponds

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

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

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

E. GRAPHIC DESCRIPTION OF LEAK POINT (Details should be contained in leak repair report)





616024

F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

S/N	Northing	Easting
369	04° 28' 56.7"	006° 32' 01.4"
357	04° 28' 58.3"	006° 32' 03.2"
360	04° 28' 57.5"	006° 32' 09.6"
366	04° 28' 54.8"	006° 32' 05.3"



No. 1678

G. INCIDENT INFORMATION:

17 Impacted Area Details

- a. Total calculated area of impact (BURNED = 0.80 Ha + CHARRED = 0.66 Ha) = 1.46 Ha
- Impact within SPDC R.O.W 1.46 Ha
 - Impact outside R.O.W NIL

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

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

- a. Computation of the volume of pooled free phase oil (on land or confined water body).

- NOTE! - AT THE TIME OF INVESTIGATION AROUND SPILL POINT WAS OBSERVED TO HAVE BURNED SOIL WITH AREA OF 0.80 Ha AND LIGHT PATCHED. OIL IMPACTED ON A TOTAL AREA OF 1.46 Ha AND IT IS NOT RECOVERABLE
- i. Area (m^2) occupied by pool of free phase oil 6600 m^2
 - ii. Average Depth (m) of pool of free phase oil 0.00051 m
 - iii. Volume of pooled of free phase oil, V_{pool} : 0.41 barrels
 - iv. Computation of volume of infiltrated oil in the soil (V_3).

- i. Area (m^2) covered by the oil: 8000 m^2
- ii. Average Depth (m) below ground surface of infiltration of oil: 0.0001
- iii. Soil type: CLAY
- iv. P_o (effective porosity of the soil): 8%
- v.

	<u>0.40</u>	barrels
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20. Computation of volume of oil on open water based on standard coloration.

	Thickness (mm)	Percentage coverage	Volume (m^3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Colour	0.00015		
Bright Colour	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>NOT APPLICABLE</u> bbl

Spill Factors from USCG FOG (2000 Edition)



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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 616 824

No. 1678

Volume of oil on open water V_{wat} :

NIL

barrels

21. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%
- iii.

Volume of evaporated oil V_{vap} :

0.27

barrels

Oil Type		Bonny Light	Bonny Medium
		E-Factor	E-Factor
Period Since Oil Spill	<1 day	10%	5%
	1-7 days	25%	15%
	>7 days	40%	25%

9. Gross Total Estimated Spilled Volume $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$$V_{Est}(bbls) = 0.41 + 0.40 + 0.27 = 1.08 \text{ BARREL}$$

10. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{vap}(bbls) + 0.6 \cdot V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$$V_{Est}(bbls) = 1.08 \approx 1 \text{ BARREL}$$

- *Calculation of the respective estimated volume is to done using the new spill estimation software on site
- *Conversion of m3 to barrel is Total volume VT (m3) x6.29
- *Emulsification factor for spill on water to consider is 60% of volume of oil.

This report was filled and signed on the 04 / 02 / 2011 at incident site by joint investigation representative 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