

**THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.**

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1013193 JIV report S/N: 0217

*(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: 1013193 2. Type of incident\* OIL SPILL  
 3. Name of Location 20 INCH OTUMARA-ESCRAVOS TRUNKLINE  
 4. Name of nearest community UGBOEGUNGUN. State: DELTA 6. LGAWARRI SOUTH WEST  
 7. Type of Production facility/Installation TRUNKLINE 8. Asset owner/District PIPELINE

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 24<sup>TH</sup> JULY, 2013  
 b. Start date/time of investigation: 29<sup>TH</sup> JULY, 2013 AT 1420 HRS  
 c. Investigation End date: 1<sup>ST</sup> AUGUST, 2013 Actual investigation duration, days: THREE [3]

d. Description of spill point environment

- |                                                   |                                            |                                                             |
|---------------------------------------------------|--------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Firmed soil              | <input type="checkbox"/> Loose soil        | <input checked="" type="checkbox"/> Recently excavated area |
| <input type="checkbox"/> Under water              | <input checked="" type="checkbox"/> Swampy | <input type="checkbox"/> Exposed pipe surface               |
| <input type="checkbox"/> Well Platform (on Water) |                                            | <input type="checkbox"/> Drill Rig                          |
- e. Description of leak point (tick as applicable);
- |                                                                                |                                                         |                                                                     |
|--------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|
| <input type="checkbox"/> Drilled hole                                          | <input type="checkbox"/> Hack saw cut                   | <input type="checkbox"/> Tear (_____),                              |
| <input type="checkbox"/> Complete Rupture                                      | <input type="checkbox"/> Inward dent,                   | <input type="checkbox"/> Well head tampering                        |
| <input checked="" type="checkbox"/> Failed Weld-on illegal hot tap valve,      | <input type="checkbox"/> Failed Clamp                   | <input type="checkbox"/> Missing Pipeline/Flowline                  |
| <input checked="" type="checkbox"/> Crude oil theft (illegal bunkering) point, |                                                         | <input type="checkbox"/> Third party tampering with Clamp           |
| <input type="checkbox"/> Third party tampering with valve setting,             |                                                         | <input type="checkbox"/> Third party tampering with flange,         |
| <input type="checkbox"/> Corrosion                                             | <input type="checkbox"/> Saver-pit over flow,           | <input type="checkbox"/> Surge vessel overflow,                     |
| <input type="checkbox"/> Bulging Outward                                       | <input type="checkbox"/> Flare System/Bund wall failure | <input type="checkbox"/> Accidental 3 <sup>rd</sup> party equipment |
| impact <input type="checkbox"/> Valve Failure                                  | <input type="checkbox"/> com unit failure               | <input type="checkbox"/> Cold vent                                  |
| <input type="checkbox"/> Relief valve failure                                  | <input type="checkbox"/> Others (specify)_____          |                                                                     |

f. Incident caused by:

- Third party interference (Sabotage , crude theft , Line theft ; Accidental 3<sup>rd</sup> party damage   
 Operational  Others (including Mystery spills)\_\_\_\_\_

g. Spill point coordinates

Measuring unit	MINNA WEST BELT	
Northings:	Easting:	
SP1 179482 mN	304584 mE	
SP2 179791 mN	304329 mE	
SP3 179835 mN	304289 mE	
SP4 178479 mN	305432 mE	
SP5 178179 mN	305434 mE	
SP6 178035 mN	305796 mE	
SP7 177916 mN	305892 mE	
SP8 177653 mN	306165 mE	

\*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       Shoreline/Waterfront

i. Type of environment to which oil has spread:

- 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 [            ,m]
- Drinking water source [            ,m]
- Built up area [            ,m]
- Farmlands [            ,m]
- Fish Farm/Pond [            ,m]
- Fishing net [            ,m]
- Others (specify). [            ,m]

**NON  
WITHIN  
VICINITY**

12. Containment measures put in place;

- 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
<b>NONE WITHIN AREA OF IMPACT</b>					

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	MANGROVE	5	10	15	30	
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/

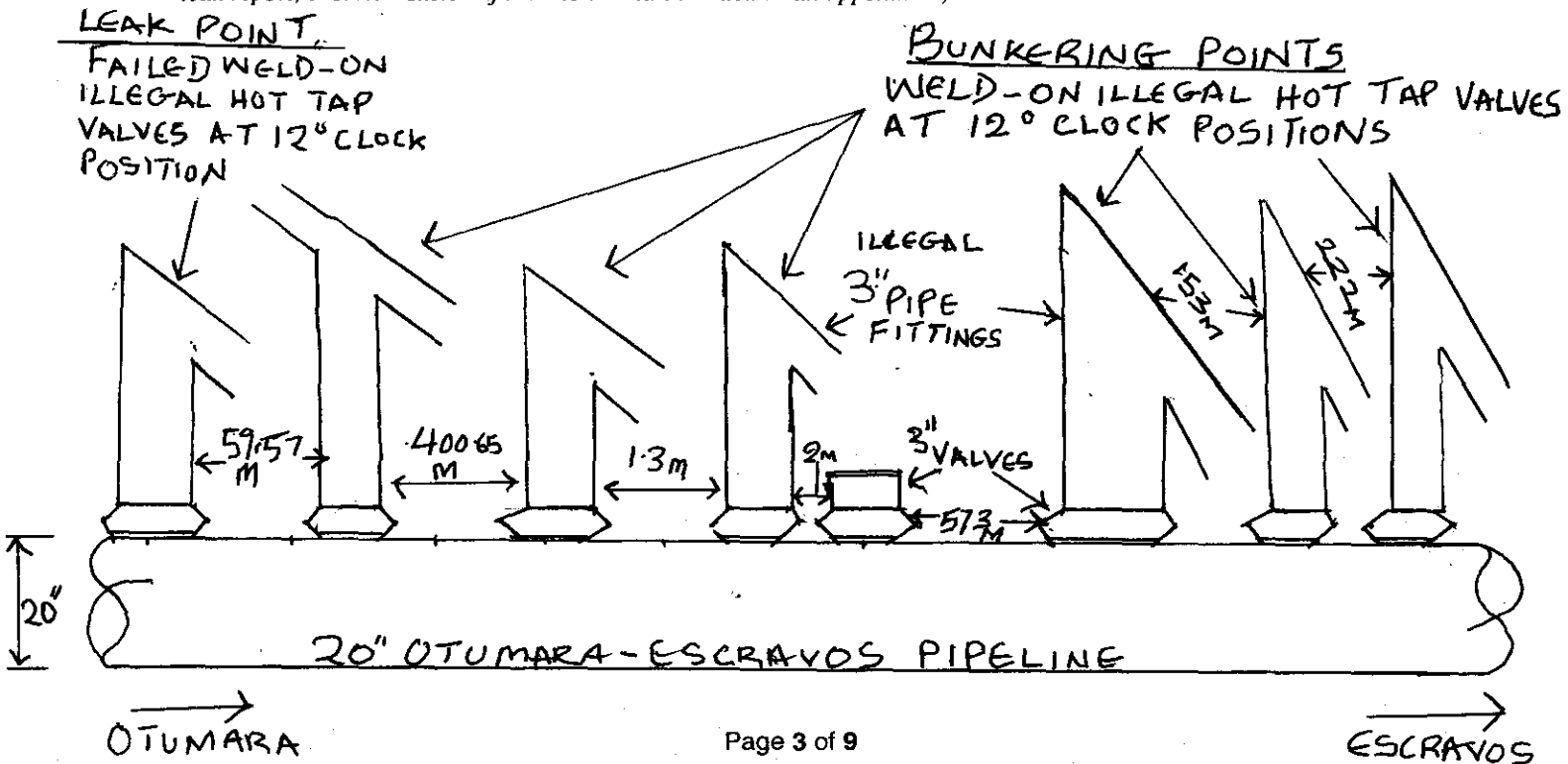
17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NON WITHIN AREA OF IMPACT				
NON WITHIN AREA OF IMPACT				
NON WITHIN AREA OF IMPACT				

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

S/N	Others	Description	Quantity/Size	Comments
NON WITHIN AREA OF IMPACT				
NON 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, Print and attach as an appendix)

S/N	Northing	Easting
	179837	304289
	179836	304290
	179834	304291
	179832	304288
	179836	304287
	179835	304292
	179838	304293
	179818	304311
	179811	304307
	179804	304297
	179822	304281
	179828	304285
	179814	304297
	179819	304299
	179829	304291
	177897	305927
	177893	305930
	177886	305923
	177874	305917
	177879	305912
	177890	305918
	178043	305789
	178042	305789
	178083	305743

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**G. INCIDENT INFORMATION:**

**20. Impacted Area Details**

- Total calculated area of impact 600.23 m<sup>2</sup>
- Impact within SPDC R.O.W 590.86 m<sup>2</sup>
- Impact outside SPDC R.O.W 9.37 m<sup>2</sup>

**21. Volume of oil recovered before completion of JIV (V<sub>rec</sub>):**

Recovered oil V <sub>rec</sub> :	<u>NIL</u>	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 confined water body).

- i. Area (m<sup>2</sup>) occupied by pool of free phase oil 457.07
- ii. Average Depth (m) of pool of free phase oil 0.002
- iii. Emulsification factor: 40%

iv. 

Estimated Volume of pool of free phase oil. V <sub>pool</sub> :	<u>3.45</u>	barrels
-----------------------------------------------------------------	-------------	---------

b. Computation of estimated volume of infiltrated oil in the soil (V<sub>inf</sub>).

1. Estimated Volume of infiltrated oil at spill point (V<sub>inf a</sub>)

- i. Area\* (m<sup>2</sup>) of soil covered by the oil: \_\_\_\_\_
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- iii. Soil type: \_\_\_\_\_ iv. P<sub>e</sub> (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 <sub>inf a</sub> :	<u>NIL</u>	barrels
--------------------------------------------------------------------------	------------	---------

2. Estimated Volume of infiltrated oil at second spill point [if applicable] (V<sub>inf b</sub>)

- i. Area\* (m<sup>2</sup>) of soil covered by the oil: \_\_\_\_\_
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- iii. Soil type: \_\_\_\_\_ iv. P<sub>e</sub> (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 <sub>inf b</sub> :	<u>NIL</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region (V<sub>inf c</sub>)

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- i. Area (m<sup>2</sup>) of soil covered by the oil: \_\_\_\_\_
- ii. Area (m<sup>2</sup>) 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  $V_{inf}$ : NIL barrels

**23. Computation of estimated volume of oil on open water based on standard coloration.**

- i. Total area of oil on open water: 143.16 m<sup>2</sup>
- 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 <sup>3</sup> )
Barely Visible	0.00004		
Silvery	0.00008	10%	0.00001145
Slight Color	0.00015	18%	0.000003815
Bright Color	0.0003		
Dull	0.001	50%	0.000071581
Dark	0.002	20%	0.000057265
Black oil	0.1		
Emulsion (30% Oil)	1	2%	0.000858912

iii. Estimated Volume of oil on open water.  $V_{wat}$ : 0.01 Barrels

**24. Calculation of evaporated volume:**

- i. Estimated Volume available for evaporation within surface area: 3.46 BARRELS
- ii. E-Factor: 25%

iii. Estimated Volume of evaporated oil.  $V_{evap}$ : 1.15 Barrels

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) +  $V_{rec}$  (bbls) = 1.15 + 0.01 + 3.45 = 4.61 BBLs**

**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 m<sup>3</sup> to barrels is Volume (m<sup>3</sup>) 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 checked="" type="checkbox"/>

**27. REPRESENTATIVES**

This report was filled, agreed and signed on the <u>01/08/2013</u> by joint investigation representatives from
<ul style="list-style-type: none"><li>• Host Community: <input checked="" type="checkbox"/></li><li>• Department of Petroleum Resources [DPR]: <input type="checkbox"/></li><li>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/></li><li>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/></li><li>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/></li><li>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/></li><li>• Signatories agree with reported findings: <input checked="" type="checkbox"/></li><li>• Separate DPR form has been filled out with same findings <input type="checkbox"/></li></ul>
<i>Tick as applicable</i>

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28. Appendix 1: Overview sketch of the site

