

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1003203 JIV report S/N: 001

(Note: As practicable as possible the JIR report is to be signed in the field by all the participating parties)

A. GENERAL INFORMATION:

1. Spill incident Number: 1003203 2. Type of incident* OIL SPILL
 3. Name of Location 20" OTUMARA - ESCRAVOS TRUNKLINE
 4. Name of nearest community OTUMARA 5. State: DELTA 6. LGA WARRI - 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: 2ND JULY, 2013
 b. Start date/time of investigation: 5TH JULY, 2013
 c. Investigation End date: 5TH JULY, 2013 Actual investigation duration, days: 1 (ONE) DAY
 d. Description of spill point environment
 Firmed soil Loose soil Recently excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Drill Rig
 e. Description of leak point (tick as applicable):
 Drilled hole Hack saw cut Tear (_____).
 Complete Rupture Inward dent. Well head tampering
 Failed Weld-on illegal hot tap valve. Failed Clamp 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,
 Bulging Outward Flare System/Bund wall failure Accidental 3rd party equipment impact
 Valve Failure com unit failure Cold vent
 Relief valve failure Others (specify) _____

f. Incident caused by:

- Third party interference (Sabotage , crude theft , Line theft , Accidental 3rd party damage)
 Operational Others (including Mystery spills) _____

g. Spill point coordinates

Measuring unit <u>M</u> <u>MINNA WEST BELT</u>	
Northing: <p align="center"><u>180538 mN</u></p>	Easting: <p align="center"><u>303706 mE</u></p>

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire.

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1003203 JIV report S/N: 0211

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]

*NONE WITHIN
THE 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
	<u>NONE WITHIN AREA OF IMPACT</u>				

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1003203 JIV report S/N: 0211

16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	MANGROVES	18	35	67	120	

17. Fish/Nets/Ponds

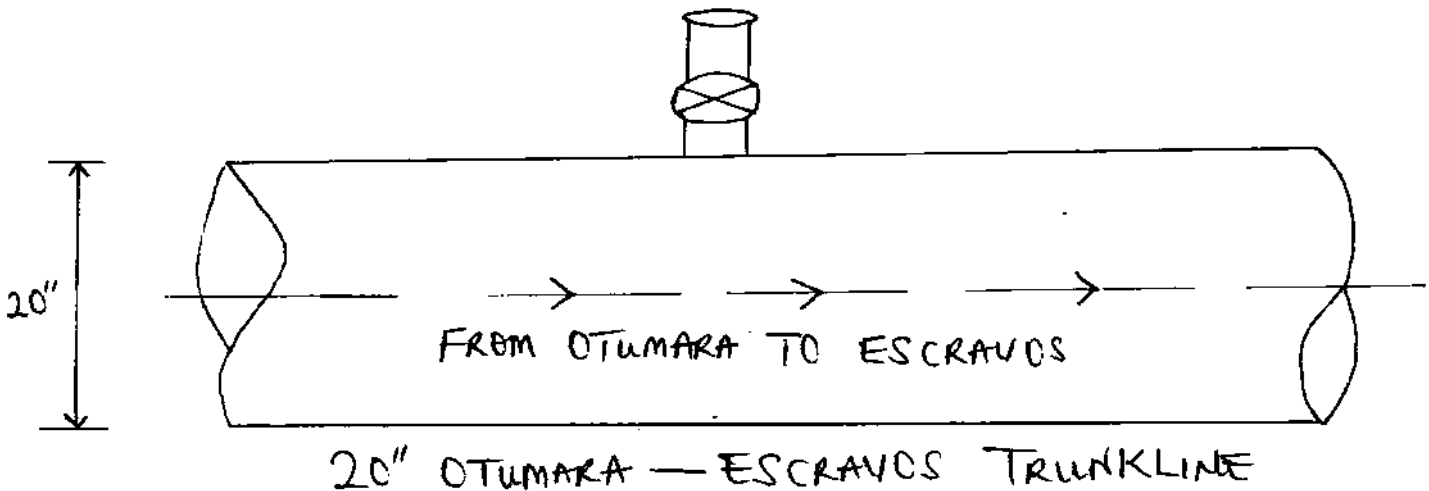
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
		NONE WITHIN AREA OF IMPACT		

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)

FAILED WELD-ON 3" ILLEGAL HOT TAP VALVE AT 12 O'CLOCK POSITION (LEAKING)



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1003203 - JIV report S/N: 011

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
1	180539	303707
2	180536	303708
3	180534	303708
4	180533	303704
5	180534	303703
6	180538	303701
7	180544	303700
8	180549	303696
9	180552	303694
10	180554	303697
11	180554	303698
12	180554	303698
13	180553	303699
14	180546	303704
15	180541	303707
16	180539	303707
17	180371	303855
18	180414	303900
19	180474	303932
20	180520	303927
21	180603	303889
22	180660	303848
23	180709	303798
24	180738	303765

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1003203 JIV report S/N: 011

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 305 m²
- Impact within SPDC R.O.W 305 m²
- Impact outside SPDC R.O.W NOT APPLICABLE

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

Recovered oil V _{rec} :	<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 (m²) occupied by pool of free phase oil 79 m²
- ii. Average Depth (m) of pool of free phase oil 0.003 m
- iii. Emulsification factor: NOT APPLICABLE
- iv.

Estimated Volume of pool of free phase oil. V _{pool} :	<u>1.49</u>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil (V_{inf}).

1. Estimated Volume of infiltrated oil at spill point (V_{inf a})

- i. Area* (m²) of soil covered by the oil: NOT APPLICABLE
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: _____
- iii. Soil type: _____ iv. P_e (effective porosity of the soil): _____
- v. Cause of spill: _____ Oil type: _____
- vi. Oil Residence time on site, day: _____
- vii. 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 _{inf a} :	<u>NIL</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] (V_{inf b})

- i. Area* (m²) of soil covered by the oil: _____
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: _____
- iii. Soil type: _____ iv. P_e (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 _{inf b} :	<u>NIL</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region (V_{inf c})

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 10032 03 JIV report S/N: 021

- i. Area (m²) of soil covered by the oil: NOT APPLICABLE
- ii. Area (m²) 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: NOT APPLICABLE
- v. P_c (effective porosity of the soil): _____
- vi.

Estimated Volume of infiltrated oil. At V_{m1} :	<u>NIL</u>	barrels
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23. Computation of estimated volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: 226 m²
- 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 ³)
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	<u>35%</u>	<u>0.0079</u>
Emulsion (30% Oil)	1	<u>65%</u>	<u>0.0441</u>

- iii.

Percent Total Estimated Volume of oil on open water. V_{wat} :	<u>0.33</u>	Barrels
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24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 1.82 BBLs
- ii. E-Factor: 15%
- iii.

Estimated Volume of evaporated oil. V_{evap} :	<u>0.32</u>	Barrels
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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) = 2.14 BBLs**

Estimated Reported Volume V_{rep} (bbls) = 3 BBLs**

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1003203 JIV report S/N: 0211

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 Volume (m³) 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 volume 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 06/07/2013 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]:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings

Tick as applicable

ADDITIONAL COMMENTS

-BUNKERING VALVE AND FITTINGS WAS LEAKING ON SPDC RIGHT OF WAY
 -FRESH AND WEATHERED CRUDE OIL WAS FOUND ON SPDC RIGHT OF WAY,
 RESULTING FROM CRUDE OIL THEFT AND ILLEGAL LOCAL REFINERIES
 ACTIVITIES ON THIRD PARTY AREA.

Appendix 1: Overview sketch of the site

Figure 20" OTUMARA — ESCRAVES TRUNKLINE AT OTUMARA

