

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0530 902460

(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: 902460 2. Type of incident * OIL SPILL
 3. Name of Location EKULAMA 2 WELL 381 FLOWLINE
 4. Name of nearest community FREE TOWN (KULA) State: RIVERS 6. LGA AKUKU-TORU
 7. Type of Production facility/Installation OIL FLOWLINE 8. Asset owner/ District NES2/EKULAMA

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 8TH DECEMBER 2012.
 b. Start date/time of investigation: 11TH DECEMBER 2012.
 c. Investigation End date: 11TH 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) FAILED WELDED JOINT
 f. Incident caused by:
 Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit Meters MID-BELI (MIMRA)

Northing: <p style="text-align: center; font-size: 24px;">59605.1</p>	Easting: <p style="text-align: center; font-size: 24px;">466770.4</p>
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*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

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

MANGROVE IMPACTED BY SPILL.

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

13. Any pictures or video coverage? [] [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
1	MANGROVE			✓	NUMEROUS	WITHIN SPILL-IMPACTED REGION.

17. Fish/Nets/Ponds

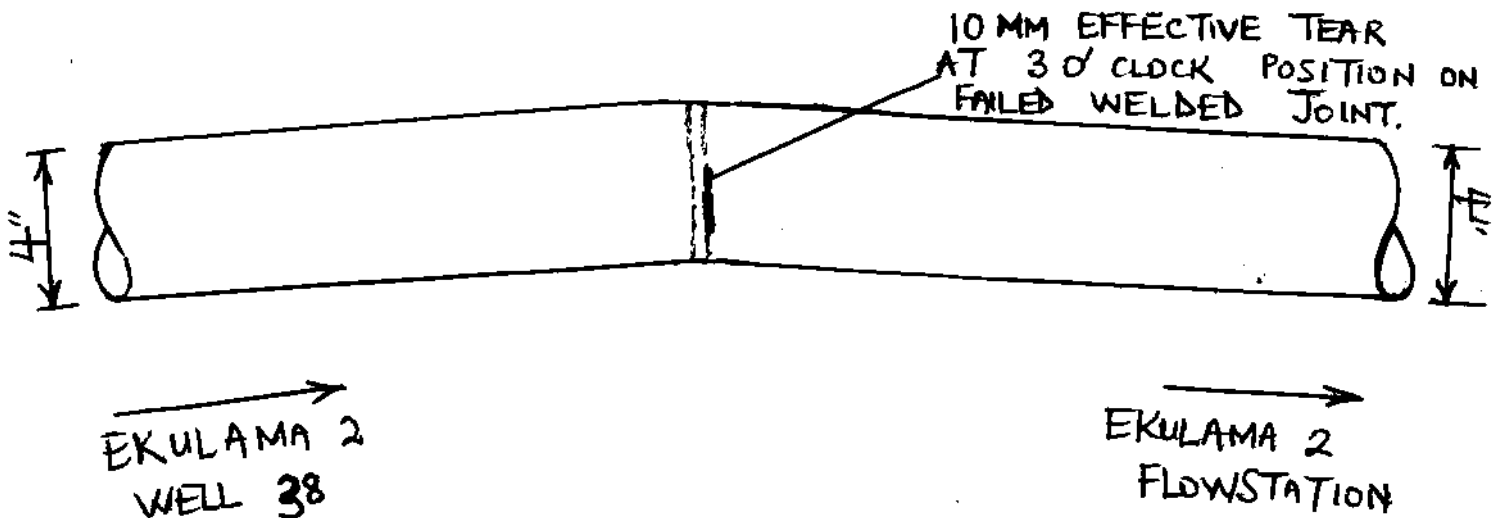
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE	WITHIN AREA OF IMPACT		

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)*

SECTION OF EKULAMA 2 WELL 38 L FLOWLINE AT FREETOWN (KULA) SHOWING POSITION OF FAILED WELDED JOINT.



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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)

NUO-BELT (MINNA)

S/N	Northing METERS	Easting METERS
	59929.34	466409
	59876.97	466461.3
	59861.57	466476.7
	59790.71	466550.5
	59781.45	466569
	59765.9	46630.6
	59625.68	466767.2
	59618.1	466769
	59657.97	466796.8
	59657.94	466809.1
	59645.64	466812.2
	59599.63	466781.2
	59589.45	466772.3

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 2.73 Ha
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

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

Recovered oil V_{rec}	<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).

- Area (m^2) occupied by pool of free phase oil 12,288
- Average Depth (m) of pool of free phase oil REFERENCE TO DARK COLOUR (SPILL FACTORS FROM USCG FOG)

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iii. Emulsification factor: NIL

iv.

Volume of pool of free phase oil. V_{pool} :	0.15	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{int}).

COMPUTATION
OF OIL-INFILTRATION VOLUME
AT SPILL POINT:
AREA OF OIL-INFILTRATION = $1m^2$
DEPTH OF INFILTRATION =
 $0.7 \times 2m$

i. Area *(m²) covered by the oil: 14,977
ii. Area of the pool of free phase oil in touch with soil: NIL
iii. Average Depth (m) below ground surface of infiltration of oil: 0.001

iv. Soil type: CLAY
v. P_e (effective porosity of the soil): 8% VOLUME OF OIL-INFILTRATION OUTSIDE IMMEDIATE SPILL POINT REGION = 6.19 BARRELS

iv.

Volume of infiltrated oil. V_{int} (TOTAL)	$0.35 + 6.19 = 6.55$	barrels
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21. Computation of volume of oil on open water based on standard coloration.

VOLUME i. Total area of oil on open water: NIL
 $= 1m^2 \times$
 $0.7 \times 2m \times$

ii. Table of average depth of oil on water based on coloration**

EFFECTIVE POROSITY
OF CLAY SOIL (8%) x
 $6.29 =$
 0.35
BARREL.

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004	NOT APPLICABLE	
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 <u>NIL</u> bbl

iii.

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

i. Oil type: BONNY LIGHT

ii. E-Factor: 25%

iii.

Volume of evaporated oil. V_{evap} :	2.23	barrels
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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%

*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	= 2.23 + NIL + 6.55 + 0.15 + NIL ≈ 8.94
$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recj}(bbls)$	
$V_{Est}(bbls) =$	9 BARRELS
24. Net Total Estimated Spilled Volume	= 2.23 + NIL + 6.55 + 0.15 + NIL ≈ 8.94
$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recj}(bbls)$	
$V_{Est}(bbls) =$	9 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 11/12/2012 at incident site by joint investigation representatives from

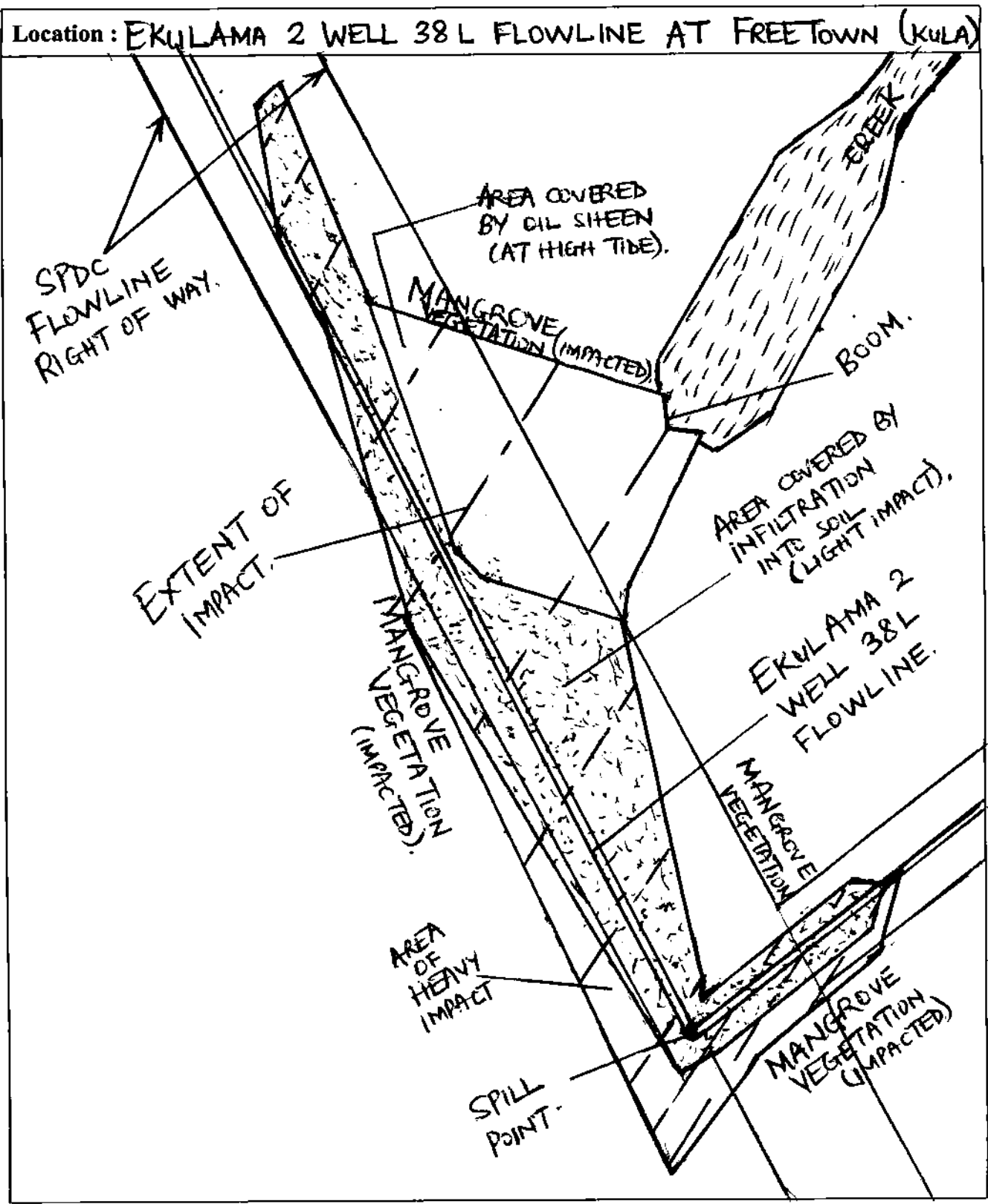
- Host Community
- Department of Petroleum Resources [DPR]: **DPR INVESTIGATION REPORT ATTACHED.**
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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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

Mina (Mid-Belt)

S/N	Northing METERS	Easting METERS
	59766.14	466547.3
	59870.87	466445.8
	59889.37	466421.2
	59923.2	466405.9
	59929.34	466409.9
	59845.85	466615.4
	59833.55	466621.5
	59828.94	466636.3
	59781.29	466630.6
	59665.03	466815.7
	59639.71	466820.8
	59601.13	466795
	59559.7	466775



DEPARTMENT OF PETROLEUM RESOURCES

FIELD JOINT INVESTIGATION REPORT

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

1. Company..... SPDC

2. Incident Serial Number..... 202460

3. Name of Location/Facility..... EKULAMA 2 WELL 38L @ FREE TOWN (KULA), AKULGA, AS

4. Type of Incident: (Indicate ✓ where appropriate and X where not applicable)

- Crude Oil Spill
- Product Spill (Specify)
- Drilling Mud/Chemicals Spill
- Fire
- Others (specify)

5. Details of Incident

- i. Date of Incident: 08/12/2012
- ii. Date Reported to the DPR:
- iii. Date/Period of First Investigation: 11/12/2012
- iv. Date/Period of Second/Subsequent Investigation:
- v. Cause of Incident (Indicate ✓ where appropriate and X where not applicable)

- Corrosion
- Equipment Failure
- Human Error (Production/Maintenance)
- Third Party Interference
- Mystery Spill
- Others (Specify)

Additional description of cause of incident (if any): 10mm tear on a failed welded joint at 3 o'clock position.

6. Coordinates of Spill Point/Location(s): Northing Eastings
596051 466770.4

7. Brief Description of Circumstances Around Spill Point(s) (Please indicate containment measures put in place, point of breach along pipeline and any necessary details observed at site. Attach additional sheets if necessary)

8.1 Delineation of Impacted Area: (Indicate ✓ where appropriate and X where not applicable)

- a) Within company's facilities/ROW
- b) Outside company's facilities/ROW

9. Description of Environment Around Spill Point/Location(s): (Indicate ✓ where appropriate and X where not applicable)

- Land
- Seasonal Swamp
- Swamp
- Coastland
- Inland waters
- Near shore
- Offshore

Please provide a graphic sketch of spill site/leak point (Detailed sketches and maps can be attached where necessary)

Table of Key Coordinates of Mapped Area

S/N	Eastings	Northings
	466409	50929.34
	466461.3	50876.97
	466476.7	50861.57
	466550.5	50790.71
	466569	50781.45
	46650.6	50765.9
	466767.2	50625.68
	466769	50618.1
	466796.8	50657.97
	466809.1	50657.94

S/N	Eastings	Northings
	466812.2	50645.64
	466781.2	5059.63
	466772.3	50589.45

10. Property Impacted (Provide details)

11. Communities Impacted

- a) Freetown
- b)
- c)
- d)
- e)

12. Estimated Quantity Spilled (bbls): SBBL

(Please provide below, the methodology used, standards adopted and any assumptions made in the estimate. Where relevant, make brief comments on quantities unaccounted for. Attach and endorse additional sheets if necessary)

13. Quantity Recovered (As at time of the investigation): NIL

14. Any Photograph or Video Recording? (Provide details): Pictures and video recordings were taken.

15. Additional Comments/Remarks, if any: Prompt clean-up of the impacted areas is recommended.