

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0177 753067

(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: 753067 2. Type of incident* OIL SPILL
 3. Name of Location EKULAMA I WELL 35 S FLOWLINE
 4. Name of nearest community SAND SAND VILLAGE 5. State: RIVERS 6. LGA AKULGA
 7. Type of Production facility/Installation OIL FLOWLINE 8. Asset owner/District NES 2/EKULAMA I

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 12TH DECEMBER, 2011
 b. Date/Period of investigation: 19TH DECEMBER, 2011

c. Description of spill point environment

- Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig

d. 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,
 External Corrosion Internal Corrosion
 Saver-pit over flow, Surge vessel overflow, Outward dent (SWAMP BUGGY IMPACT)
 Flare System/Bund wall Failure Valve Failure com unit failure
 Cold vent Relief valve failure Others (specify) _____

e. Incident due to:

- Third party interference Operational Others (specify SWAMP BUGGY IMPACT)

f. Spill point coordinates

Measuring unit <u>meters</u> (<u>MINNA: MID BELT</u>)	
Northing: <u>61741.33</u>	Easting: <u>471584.3</u>

*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). **FISHING SETTLEMENT** [1000m

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

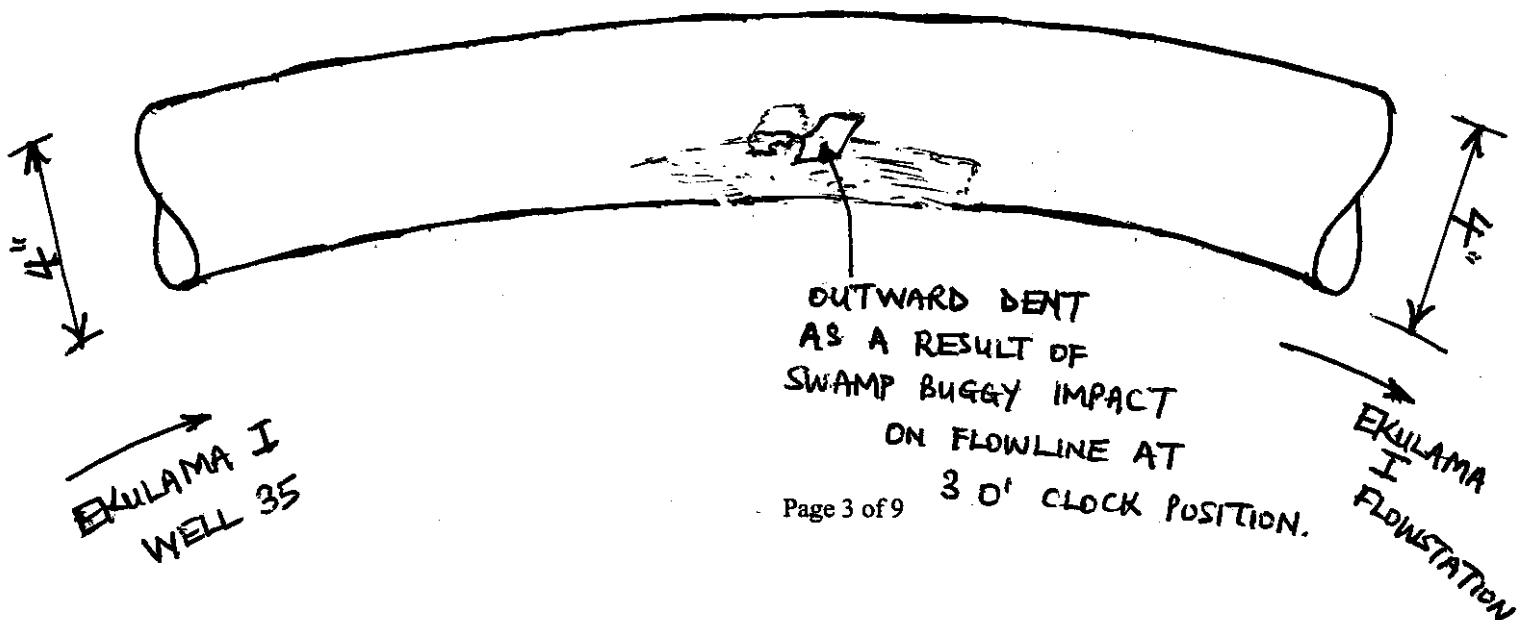
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

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 (Overview sketch of the site should be added as an appendix)

SECTION OF EKULAMA I WELL 35 S FLOWLINE AT SAND-SAND SHOWING POSITION OF OUTWARD DENT (DUE TO SWAMP BUGGY IMPACT).



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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)

MINNA, MID BELT

S/N	Northing (m)	Easting (m)
1.	61741.33	471584.3
2.	61806.19	471747.16
3.	61740.58	471700.59
4.	61629.77	471654.45
5.	61702.27	471577.19
6.	61695.92	471542.27
7.	61776.88	471524.27
8.	61791.69	471496.23
9.	61873.7	471482.88
10.	61873.7 61901.25	471523.03
11.	61895.05	471544.6
12.	61985.48	471516.44
13.	62016.7	471514.33

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 3.19 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 24,000
- Average Depth (m) of pool of free phase oil OIL ON THE FLOODED RIGHT OF WAY SEEN AS DULL COLOUR (REFERENCE: SPILL FACTORS FROM USCG FOG TABLE).
- Emulsification factor: NIL

iv. Volume of pool of free phase oil. V_{pool} :	<u>0.15</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: 563
- 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: 0.015
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil, V_{inf}	<u>4.25</u>	barrels
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21. Computation of volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: 7,381 m^2
- ii. Table of average depth of oil on water based on coloration *

	Thickness (mm)	Percentage coverage	Volume (m^3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015	<u>70%</u>	<u>0.001</u>
Bright Color	0.0003	<u>30%</u>	<u>0.001</u>
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>0.01</u> bbl

iii. Volume of oil on open water, V_{wat}	<u>0.01</u>	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}	<u>1.47</u>	barrels
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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%

23. **Gross Total Estimated Spilled Volume** $V_{Est} (bbls) = V_{evap} (bbls) + V_{wat} (bbls) + V_{inf} (bbls) + V_{pool} (bbls) + V_{recj} (bbls) = 1.47 + 0.01 + 4.25 + 0.15 = 5.88$

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$V_{Est}(bbls)=$	5.9 BARRELS
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls) = 1.47 + (0.01 * 0.6) + 4.25 + 0.15 = 5.88$	
$V_{Est}(bbls)=$	5.9 BARRELS.

*Calculation of the respective estimated volume is to be done using the new spill 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 <input type="checkbox"/>
B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>

26 Signatories

This report was filled and signed on the <u>19/12/2011</u> at incident site by joint investigation representatives from
<ul style="list-style-type: none">• Host Community <input checked="" type="checkbox"/>• Department of Petroleum Resources [DPR]: <input type="checkbox"/>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/>• Nigeria Police Force [NPF]: <input type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

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20. Appendix 1: Overview sketch of the site

