

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0162 | 812764

(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: 812764 2. Type of incident* OIL SPILL
 3. Name of Location 4" AGBADA II WELL 48S FLOWLINE
 4. Name of nearest community OMYOTIA 5. State: RIVERS 6. LGA IKWERE
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/District NEL I

B. INCIDENT INFORMATION:

9. Details of incident

a. Date of incident: 9TH MAY, 2012

b. Date/Period of investigation: 11TH MAY, 2012

c. Description of spill point environment

- | | | |
|---|-------------------------------------|--|
| <input checked="" type="checkbox"/> Firmed soil | <input type="checkbox"/> Loose soil | <input type="checkbox"/> Previously excavated area |
| <input type="checkbox"/> Under water | <input type="checkbox"/> Swampy | <input checked="" type="checkbox"/> Exposed pipe surface |
| <input type="checkbox"/> Well Platform (on Water) | | <input type="checkbox"/> Rig |

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

- | | | |
|---|--|--|
| <input type="checkbox"/> Drilled hole | <input checked="" type="checkbox"/> Hack saw cut | <input type="checkbox"/> Explosive tear, |
| <input type="checkbox"/> Complete Rupture | <input type="checkbox"/> Inward dent, | <input type="checkbox"/> Well head tampering |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve, | | <input checked="" type="checkbox"/> Missing Pipeline/Flowline) |
| <input 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"/> External Corrosion | | <input type="checkbox"/> Internal Corrosion |
| <input type="checkbox"/> Saver-pit over flow, | <input type="checkbox"/> Surge vessel overflow, | <input type="checkbox"/> Outward dent |
| <input type="checkbox"/> Flare System/Bund wall Failure | <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) _____ |

e. Incident due to:

- Third party interference Operational Others (specify) _____

f. Spill point coordinates

Measuring unit METRE MINNA MID - BELT	
Northing: <u>103836.54m</u>	Easting: <u>505 079</u> <u>505329.40m</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). [,m]

NOT APPLICABLE

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

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

NOTE 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					

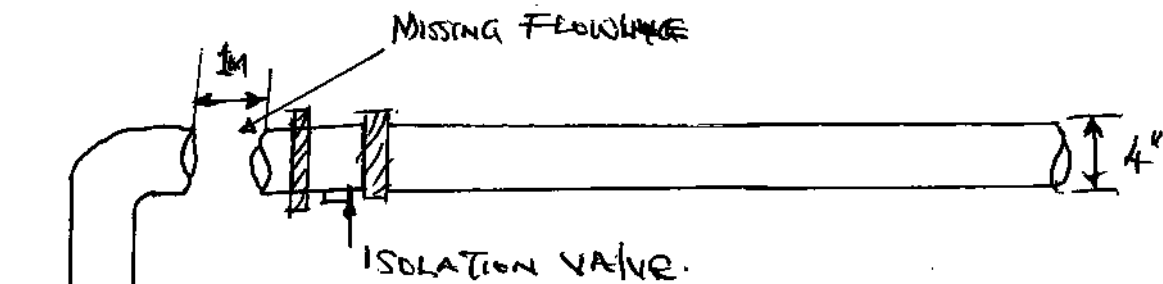
17. Fish/Nets/Ponds

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)



A 1 - METER SECTION OF THE FLOWLINE CLOSE TO THE ISOLATION VALVE WAS CARVED AWAY / VANDALIZED BY UNKNOWN PERSONS

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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)

S/N	Northing	Easting
1.	103854.95m	505335.60m
2.	103851.88m	505338.67m
3.	103850.87m	505337.93m
4.	103845.72m	505344.82m
5.	103850.25m	505337.41m
6.	103849.10m	505336.88m
7.	103850.66m	505334.28m
8.	103842.67m	505332.49m
9.	103836.50m	505344.80m
10.	103824.23m	505338.61m
11.	103827.33m	505323.21m

DF 11/05/2012

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.03 Ha
- Impact within SPDC R.O.W YES
- Impact outside R.O.W NO

OIL IN THE SAND
 PIT = AREA = $66m^2$
 DEPT IS 1meter

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

Recovered oil V_{rec} :	barrels
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$Cat = Volume = AREA \times DEPT$
 $= 66 \times 1 \times 1$
 $= 66 BBLs$
 Emulsification of 45%
 $= 22.64 BBLs$

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 $64m^2$
 - Average Depth (m) of pool of free phase oil 0.002m
 - Emulsification factor: _____

iv. Volume of pool of free phase oil. V_{pool} :	0.865	barrels
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TOTAL VOLUME OF POOL OF FREE PHASE OIL = 23.5 BBLs

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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: 250 m^2
- ii. Area of the pool of free phase oil in touch with soil: (0.51 m)
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.51 m
- iv. Soil type: SAND MEDIUM
- v. P_e (effective porosity of the soil): 20%

iv. Volume of infiltrated oil. V_{inf}	2.5	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: NIL
- ii. Table of average depth of oil on water based on coloration *

	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		
Blackoil	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} :	8.67	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)

$8.67 + NIL + 2.5 + 23.5 + NIL = 34.67$ BBLs

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$V_{Est}(bbls) = 8.67 + NIL + 2.5 + 23.5 + NIL = 34.67 \text{ BBLs}$
24. <u>Net Total Estimated Spilled Volume</u> $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$
$V_{Est}(bbls) = 34.7 \text{ BARRELS}$

- *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

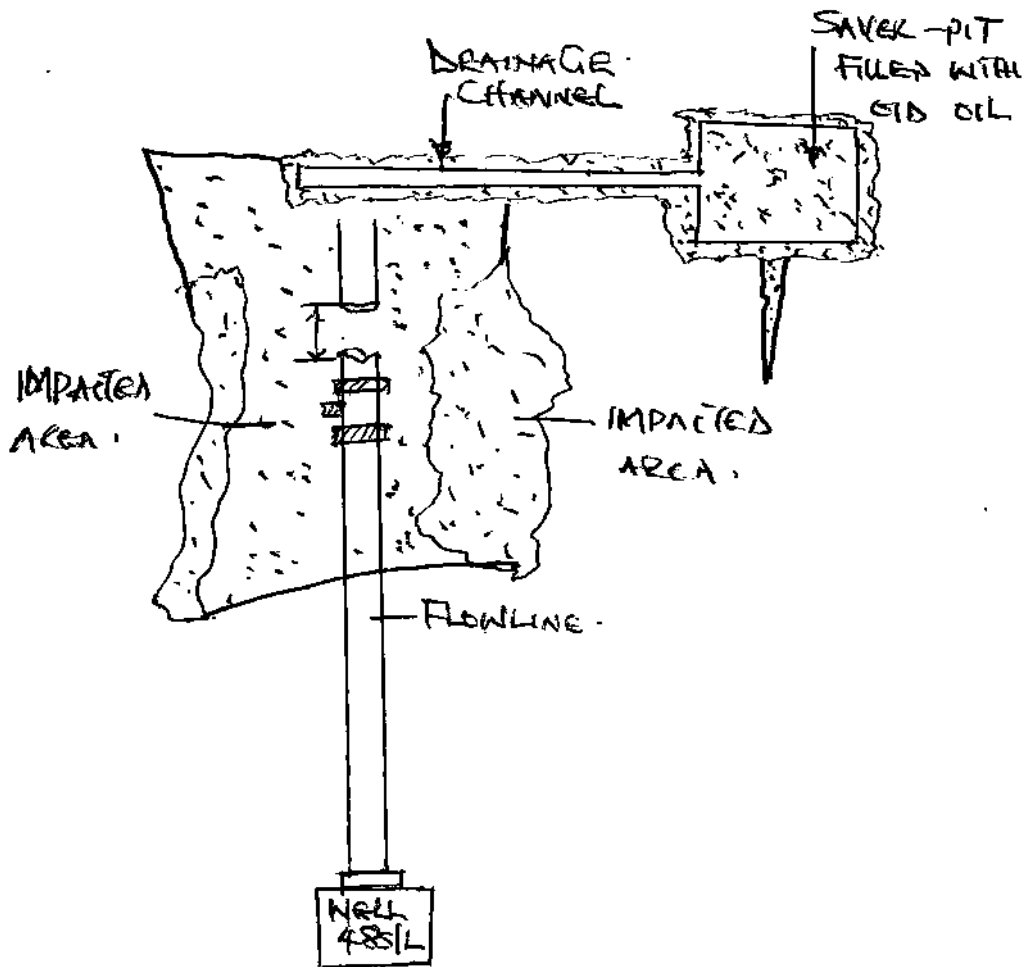
A. Joint investigation of the incident site found that there is no residual impact After the initial response and therefore recommend that the site be closed out <input type="checkbox"/>
B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>

26 Signatories

This report was filled and signed on the <u>11 / 05 / 2012</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 checked="" 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>

20. Appendix 1: Overview sketch of the site

Location: 4^E AGRADAI WELL 48S FLOWLINE AT OMOOTIA.





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..... 812764
- 3. Name of Location/Facility..... 4" AGBADA II WELL 48S
FLOWLINE @ OMOUOHIA

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: 09-05-2012
- ii. Date Reported to the DPR: 10-05-2012
- iii. Date/Period of First Investigation: 11-05-2012
- 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): A 1-METER SECTION OF THE FLOWLINE, CLOSE TO THE ISOLATION VALVE, WAS CARTED AWAY/VANDALIZED BY UNKNOWN PERSONS.

6. Coordinates of Spill Point/Location(s): N04°56'17.7" E007°00'34.0"

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)

The spill is within the fenced-round, SPDC acquired facility location.

8. 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)

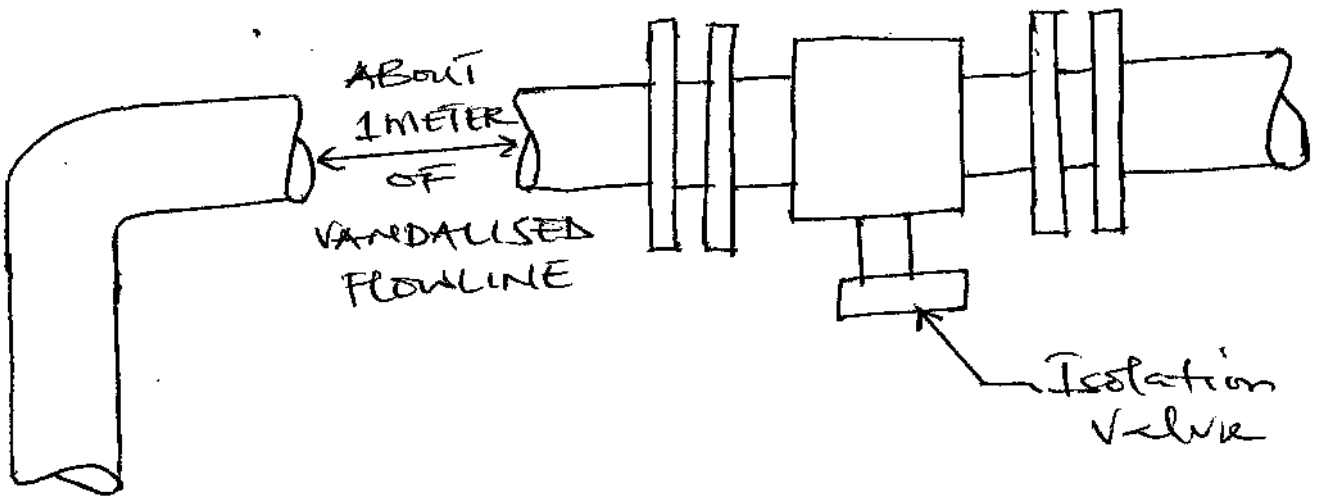


Table of Key Coordinates of Mapped Area

S/N	Eastings	Northings

S/N	Eastings	Northings

10. Property Impacted (Provide details)

None within Area of Impact.

11. Communities Impacted

- a) Omuhia
- b)

c)
d)

e)
f)

12. Estimated Quantity Spilled (bbls): 34.7

(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): Still photographs were taken.

15. Additional Comments/Remarks, if any:

- ① The Well 48 is no longer a producing well. It was reportedly vandalized and shut-in since November 2007
 - ② Free phase crude-oil around the leak point.
 - ③ Withered vegetation
 - ④ Some of the spilled crude oil were contained in the Saver pit in the facility
- Recommendation: Recover free phase oil and clean the spill impacted areas.

16. Participants