

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0309

(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: 831537 2. Type of incident * OIL SPILL
 3. Name of Location OPUKUSHI WELL 24T FLOWLINE
 4. Name of nearest community AGBEMO - ANGALEBIRI 5. State: BAYELSA 6. LGA EKEREMO
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/ District NWS 2

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 23/6/2012
 b. Start date/time of investigation: 25/6/2012 @ 1340 HRS
 c. Investigation End date: 30/6/2012 @ 1320 HRS
 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) _____
 f. Incident caused by:
 Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit	
Northing:	Easting:
101005m	371581m

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

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] []

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	/	YES	/	LOT	/
/	/	/	/	/	/	/

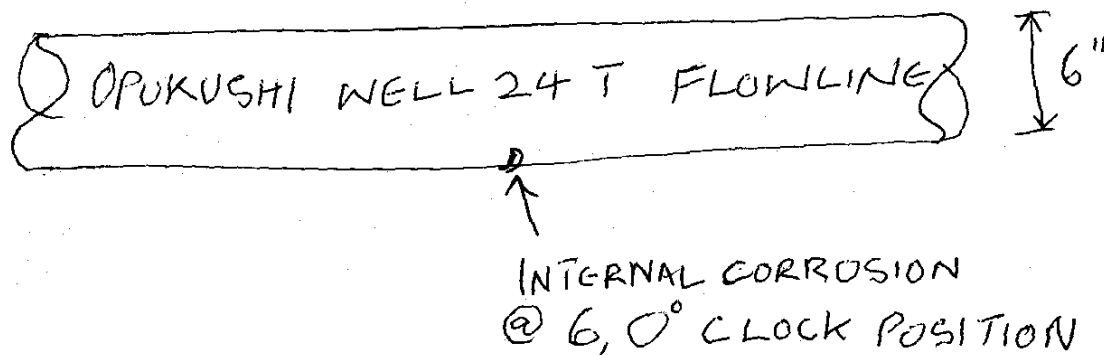
17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHINE 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)



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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
SP pt	101 005	371 581
1	101 007	371 577
2	100 998	371 566
3	100 977	371 544
4	100 999	371 592
5	101003	371 609
6	101019	371 588
7	101 038	371 506
8	101 060	371 355
9	101 115	371 130
10	101 289	370 922
11	101 337 337	370 901
12	101 090	371 559

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 71,676 M²
- Impact within SPDC R.O.W 71,676 M²
- Impact outside R.O.W NIL

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

Recovered oil V _{rec}	30	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 (m²) occupied by pool of free phase oil NIL
- Average Depth (m) of pool of free phase oil NOT APPLICABLE

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iii. Emulsification factor: NOT APPLICABLE

iv.

Volume of pool of free phase oil, V_{pool} :	NIL
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 barrels

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

i. Area *(m²) covered by the oil: 150 m²

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: 0.15 m

iv. Soil type: CLAY

v. P_c (effective porosity of the soil): 8%

iv.

Volume of infiltrated oil, V_{inf} :	11.32
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 barrels

21. Computation of volume of oil on open water based on standard coloration.

i. Total area of oil on open water: 71,526 m²

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

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004	50%	0.000143052
Silvery	0.00008	15%	0.000858312
Slight Color	0.00015		
Bright Color	0.0003	2%	0.000429156
Dull	0.001	3%	0.00214578
Dark	0.002		
Black oil	0.1	15%	1.07289
Emulsion (30% Oil)	1	15%	10.7289
	Percent Total	100%	Total Volume <u>11.81 m³</u>

iii.

Volume of oil on open water, V_{wat} :	74.26
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 barrels

22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 15%

iii.

Volume of evaporated oil, V_{evap} :	20.4
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 barrels

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%

*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

$$V_{Est} (bbls) = V_{evap} (bbls) + V_{wat} (bbls) + V_{inf} (bbls) + V_{pool} (bbls) + V_{recf} (bbls)$$

$$V_{Est} (bbls) = 135.97 BBLs$$

24. Net Total Estimated Spilled Volume

$$V_{Est} (bbls) = V_{evap} (bbls) + 0.6 * V_{wat} (bbls) + V_{inf} (bbls) + V_{pool} (bbls) + V_{recf} (bbls)$$

$$V_{Est} (bbls) = 106.27 BBLs$$

*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

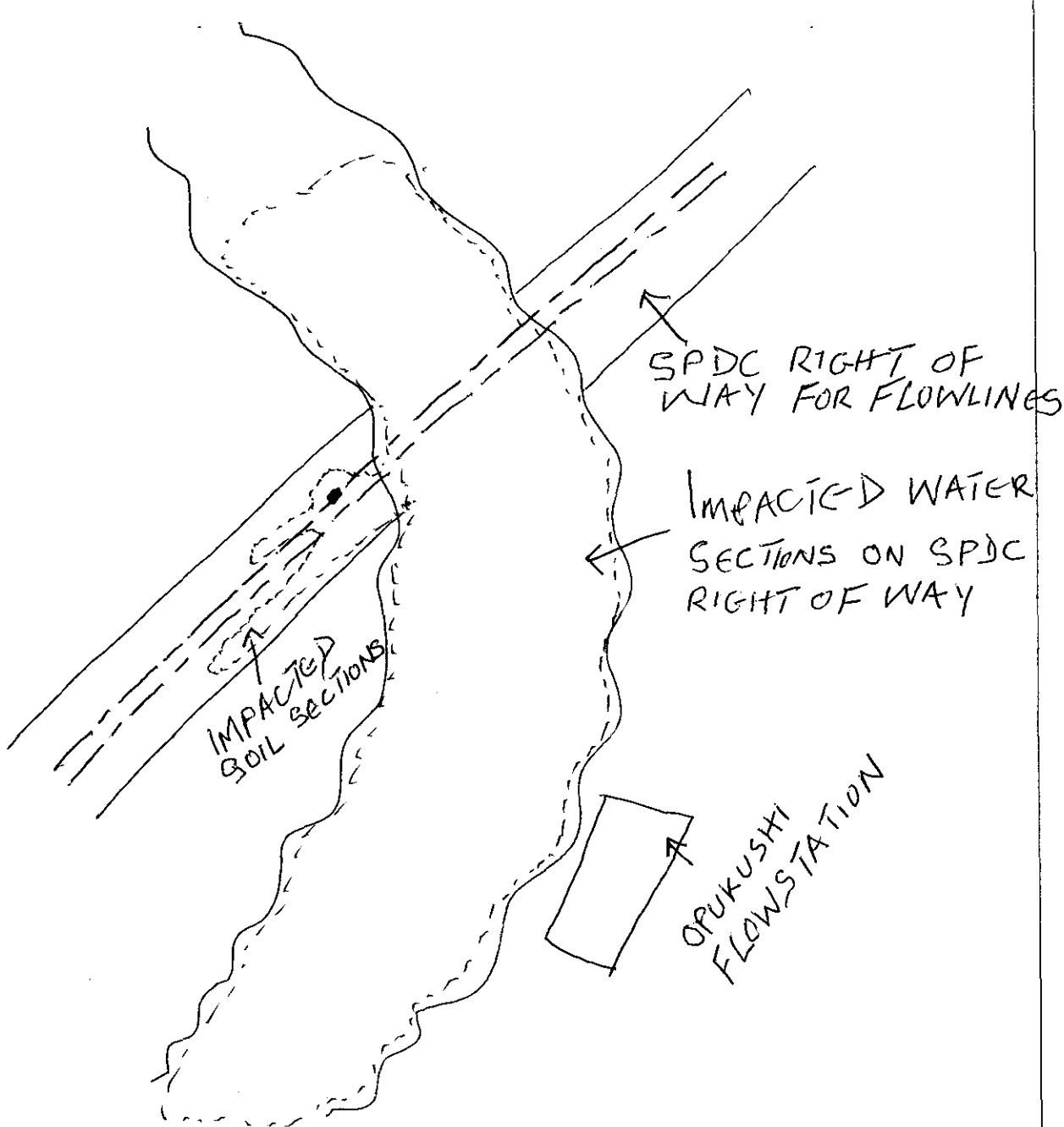
This report was filled and signed on the 25/30/06/2012 at incident site by joint investigation representatives from

- 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]:

Tick as applicable

27. Appendix 1: Overview sketch of the site

Location: OPUKUSHI WELL 24T FLOWLINE



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21. Appendix 2: TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

S/N	Northing	Easting
	101 095	371 620
	101 014	371 719
	100 953	371 724
	100 888	371 772
	100 930	371 788
	100 699	371 954
	100 535	372 112
	100 417	372 218
	100 417	371 9
	100 139	371 957
	100 472	371 265
	100 755	371 949
	100 870	371 957
	100 874	371 838