

**THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED**

**JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0415-894753**

(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: 894753      2. Type of incident \* OIL SPILL  
 3. Name of Location Imb River Well 64S/L FLOWLINE  
 4. Name of nearest community OWAZA      5. State: ABIA      6. LGA UKWA WEST  
 7. Type of Production facility/Installation PIPELINE      8. Asset owner/ District NESP/LAND

**B. INCIDENT INFORMATION:**

**9. Details of Incident**

- a. Date of incident: 16<sup>TH</sup> NOVEMBER 2012  
 b. Start date/time of investigation: 22<sup>ND</sup> NOVEMBER 2012  
 c. Investigation End date: 23<sup>RD</sup> NOVEMBER 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) \_\_\_\_\_  
 f. Incident caused by:  
 Third party interference       Operational       Mystery \_\_\_\_\_

**g. Spill point coordinates**

Measuring unit <u>(METERS)</u> <u>(MINNA MID-BEIT)</u>	
Northing:  <p style="text-align: center; font-size: 1.2em;">108493.49</p>	Easting:  <p style="text-align: center; font-size: 1.2em;">524095.66</p>

\*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  
 Drinking water source  
 Built up area  
 Farmlands  
 Fish Farm/Pond  
 Fishing net  
 Others (specify).

[ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m]  
 } NOT APPLICABLE

12. Containment measures put in place;

- Booms       Trench       Dyke  
 Others: NATURALLY CONTAINED

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

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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

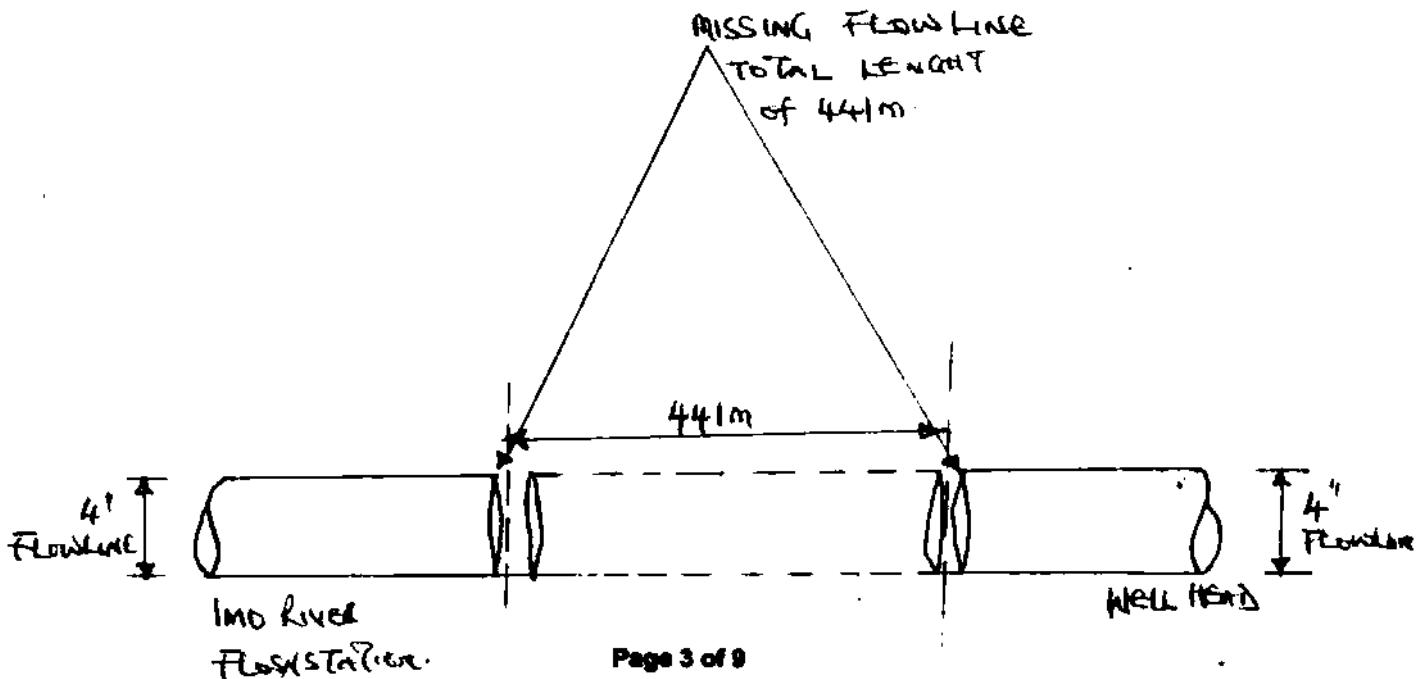
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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** 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)

SECTIONAL SKETCH OF IMO RIVER WELL 645 FLOWLINE AT CUZA  
SHOWING MISSING FLOWLINE



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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 - BEIT)

S/N	Northing (meter)	Easting (meter)
W1077	108 462.91	524 027.83
W1078	108 475.24	524 006.29

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 2.56 Ha
- Impact within SPDC R.O.W YES
- Impact outside R.O.W YES

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

Recovered oil $V_{re}$	ONGOING	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<sup>2</sup>) occupied by pool of free phase oil 10,605 m<sup>2</sup>
  - Average Depth (m) of pool of free phase oil 0.010m

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iii. Emulsification factor: 30%

iv. 

Volume of pool of free phase oil. $V_{pool}$ :	466.72	barrels
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b. Computation of volume of infiltrated oil in the soil ( $V_{inf}$ ).

*Handwritten notes:*  
 Computation of Total  
 Net Spill Infiltrate  
 Area = 10m<sup>2</sup>  
 Depth = 1.5m  
 Porosity = 8%  
 Volume = 10 x 1.5 x 0.08  
 = 1.2 m<sup>3</sup>  
 = 7.55 bbls

i. Area \*(m<sup>2</sup>) covered by the oil: 14,990.00

ii. Area of the pool of free phase oil in touch with soil: \_\_\_\_\_

iii. Average Depth (m) below ground surface of infiltration of oil: 0.005m

iv. Soil type: CLAY

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

iv. 

Volume of infiltrated oil. $V_{inf}$	37.71	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 (m <sup>3</sup> )
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015	<b>NOT APPLICABLE</b>	
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 MEDIUM

ii. E-Factor: 15%

iii. 

Volume of evaporated oil. $V_{evap}$ :	90.35	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%

\*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**

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

$V_{Est}(bbls) = 90.35 + NIL + (7.55 + 37.71) + 466.72 + NIL = 602.33 \text{ Barrels}$

**24. Net Total Estimated Spilled Volume**

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

$V_{Est}(bbls) = 603 \text{ BARRELS}$

\*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 filed and signed on the 23 / 11 / 2012 at incident site by joint investigation representatives from

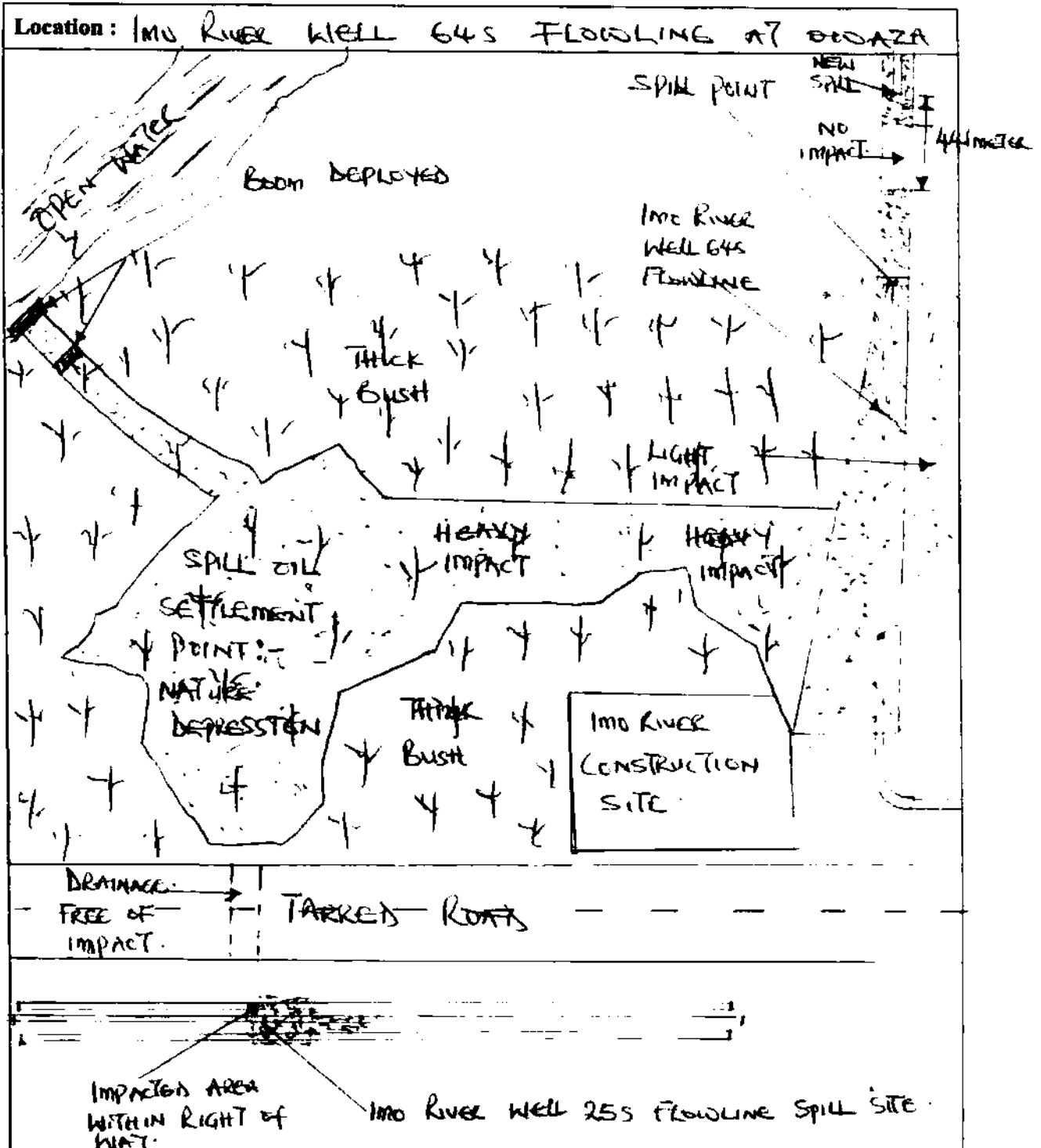
- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

*Tick as applicable*

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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  
(MINNA MID - BEIT)

S/N	Northing (METER)	Easting (METER)
WP068	108 481.65	523 873.83
WP069	108 444.87	523 833.71
WP071	108 429.59	523 793.63
WP053	108 429.61	523 781.31
WP054	108 448.12	523 741.29
WP057	108 491.10	523 756.78
WP061	108 512.57	523 772.23
WP063	108 518.70	523 778.40
WP066	108 533.95	523 830.81
WP080	108 604.54	523 797.22
WP081	108 687.57	523 815.71
WP067	108 521.57	523 880.07
WP085	108 498.25	524 084.82
WP086	108 554.66	524 090.65
WP087	108 553.69	524 102.32
WP072	108 422.82	524 104.76
WP075	108 432.09	524 077.05
WP076	108 450.56	524 058.61