

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report S/N: 0234

(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: 1131956 2. Type of incident\* OIL SPILL  
 3. Name of Location YOKRI MANIFOLD - 8 LP2 BULKLINE  
 4. Name of nearest community YOKRI 5. State: DELTA 6. LGA BURUTU  
 7. Type of Production facility/Installation BULKLINE 8. Asset owner/District SWAMP WEST

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 28<sup>TH</sup> FEBRUARY, 2014  
 b. Start date/time of investigation: 7<sup>TH</sup> MARCH, 2014 AT 1300HRS  
 c. Investigation End date: 7<sup>TH</sup> MARCH 2014 Actual investigation duration, days: 1 DAY  
 d. Description of spill point environment  
 Firmed soil  Loose soil  Recently excavated area  
 Under water  Swampy  Exposed pipe surface  
 Well Platform (on Water)  Drill Rig  
 e. Description of leak point (tick as applicable):  
 Drilled hole  Hack saw cut  Tear (\_\_\_\_\_),  
 Complete Rupture  Inward dent,  Well head tampering  
 Failed Weld-on illegal hot tap valve,  Failed Clamp  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 (PIN-HOLE)  Saver-pit over flow,  Surge vessel overflow,  
 Bulging Outward  Flare System/Bund wall failure  Accidental 3<sup>rd</sup> party equipment  
 impact  Valve Failure  com unit failure  Cold vent  
 Relief valve failure  Others (specify) \_\_\_\_\_

f. Incident caused by:

- Third party interference (Sabotage ; crude theft ; Line theft ; Accidental 3<sup>rd</sup> party damage   
 Operational  Others (including Mystery spills) \_\_\_\_\_

g. Spill point coordinates

Measuring unit <u>METERS</u> <u>MINNA (WEST-BELT)</u>	
Northings:	Easting:
<u>159999.3 MN</u>	<u>313610.8 ME</u>

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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report S/N: 0234

**C. RISK ASSESSMENT**

10. Type of environment:

- Land     Swamp     Water     Seasonal swamp     Shoreline/Waterfront

i. Type of environment to which oil has spread:

- Land     Swamp     Water     River (identify) \_\_\_\_\_

ii. Weather condition

- Rain     Sunny     Dry     Wet     Windy     Hot     Cool

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]

} NONE SEEN WITHIN THE VICINITY

12. Containment measures put in place: NOT APPLICABLE

- Booms     Trench     Dyke     Natural depression     Pit  
 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
	<u>NONE WITHIN AREA OF IMPACT</u>				

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report S/N: 0234

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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			

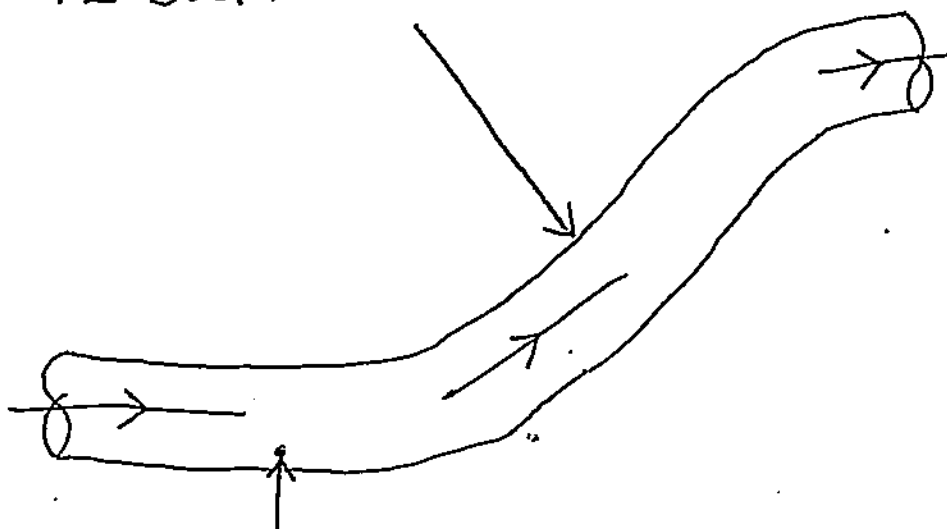
18. Others (Specify) i.e. Animal Traps

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)

YOKRI MANIFOLD - 8

LP2 BULKLINE AT YOKRI



PIN-HOLE LEAK AT  
5 O' CLOCK POSITION

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report S/N: 0234

F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

19. Impacted area boundary Coordinates (If more, Print and attach as an appendix)

MINNA (WES-BELT)

S/N	Northing (M)	Easting (M)
1.	159999.3	313604.7
2.	160002.4	313610.8
3.	159999.3	313620.1
4.	159990.1	313641.6
5.	159977.9	313647.8
6.	159968.6	313638.6
7.	159977.8	313626.2
8.	159987.0	313620.1
9.	159993.2	313604.7

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report S/N: 0234

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 640m<sup>2</sup>
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W NO

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

Recovered oil $V_{rec}$ :	<u>NIL</u>	Barrels
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22. Computation of estimated residual volume on site

a. Computation of estimated volume of pool of free phase oil (on land or confined water body).

- i. Area ( $m^2$ ) occupied by pool of free phase oil \_\_\_\_\_
- ii. Average Depth (m) of pool of free phase oil \_\_\_\_\_
- iii. Emulsification factor: \_\_\_\_\_

iv. 

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

1. Estimated Volume of infiltrated oil at spill point ( $V_{inf,a}$ )

- i. Area\* ( $m^2$ ) of soil covered by the oil: \_\_\_\_\_
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- iii. Soil type: \_\_\_\_\_ iv.  $P_e$  (effective porosity of the soil): \_\_\_\_\_
- v. Cause of spill: \_\_\_\_\_ vi. Oil type: \_\_\_\_\_
- vii. Oil Residence time on site, day: \_\_\_\_\_
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- ix. Estimated depth of infiltration around spill point: \_\_\_\_\_

x. 

Estimated Volume of infiltrated oil at spill point. $V_{inf,a}$ :	<u>NIL</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ( $V_{inf,b}$ )

- i. Area\* ( $m^2$ ) of soil covered by the oil: \_\_\_\_\_
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- iii. Soil type: \_\_\_\_\_ iv.  $P_e$  (effective porosity of the soil): \_\_\_\_\_
- v. Cause of spill: \_\_\_\_\_ vi. Oil type: \_\_\_\_\_
- vii. Oil Residence time on site, day: \_\_\_\_\_
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: \_\_\_\_\_
- ix. Estimated depth of infiltration around spill point: \_\_\_\_\_

Estimated Volume of infiltrated oil at spill point. $V_{inf,b}$ :	<u>NIL</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region ( $V_{inf,c}$ )

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report, S/N: 0234

- i. Area (m<sup>2</sup>) of soil covered by the oil: 640 m<sup>2</sup>
- ii. Area (m<sup>2</sup>) of the pool of free phase oil in touch with soil: NOT APPLICABLE
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.0064 m
- iv. Soil type: LATERITE
- v. P<sub>e</sub> (effective porosity of the soil): 20 %
- vi. 

Estimated Volume of infiltrated oil. At V <sub>inf</sub> :	<u>5.15</u>	barrels
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23. Computation of estimated volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: NOT APPLICABLE
- ii. Table of average depth of oil on water based on coloration \*\*Spill Factors from USCG FOG (2000 Edition)

	Thickness (mm)	Percentage coverage	Volume (m <sup>3</sup> )
Barely Visible	0.00004		
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		

NOT APPLICABLE

- iii. 

Percent Total	100%	
Estimated Volume of oil on open water. V <sub>wat</sub> :	<u>NIL</u>	Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 5.15 BBLS
- ii. E-Factor: 15 %
- iii. 

Estimated Volume of evaporated oil. V <sub>evap</sub> :	<u>0.91</u>	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

25. Net Estimated Spilled Volume  $V_{\text{net}}(\text{bbls}) = V_{\text{evap}}(\text{bbls}) + V_{\text{wat}}(\text{bbls}) + V_{\text{inf}}(\text{bbls}) + V_{\text{pool}}(\text{bbls}) + V_{\text{recd}}(\text{bbls}) = 0.91 + 5.15 = 6.06 \text{ BBLS}$

Estimated Reported Volume\*\*  $V_{\text{rep}}(\text{bbls}) = 7 \text{ BBLS}$

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1131956 JIV report S/N: 0234

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 m<sup>3</sup> to barrels is Volume (m<sup>3</sup>) x 6.29; **\*\*Round up estimated volume to next whole number using the following rules:**

- Any spill volume in excess of 1 bbl is rounded up to the next whole number.
- Any spill volume in less than 1 bbl is rounded up to the next 0.1 bbl.

Examples: Calculated volume = 15.3 bbl ----- Reported volume = 16 bbl  
Calculated volume = 0.35 bbl ----- Reported volume = 0.4 bbl  
Calculated volume = 0.01 bbl ----- Reported volume = 0.1 bbl.

Wherever this estimation tool is not applicable please refer to paragraph 6c (Deviations) of the JIV procedure to use appropriate steps for column estimation; record the calculation in a plain sheet of paper and attach to the JIV report.

26. 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

27. REPRESENTATIVES

This report was filled, agreed and signed on the 7/3/2014 by joint investigation representatives from

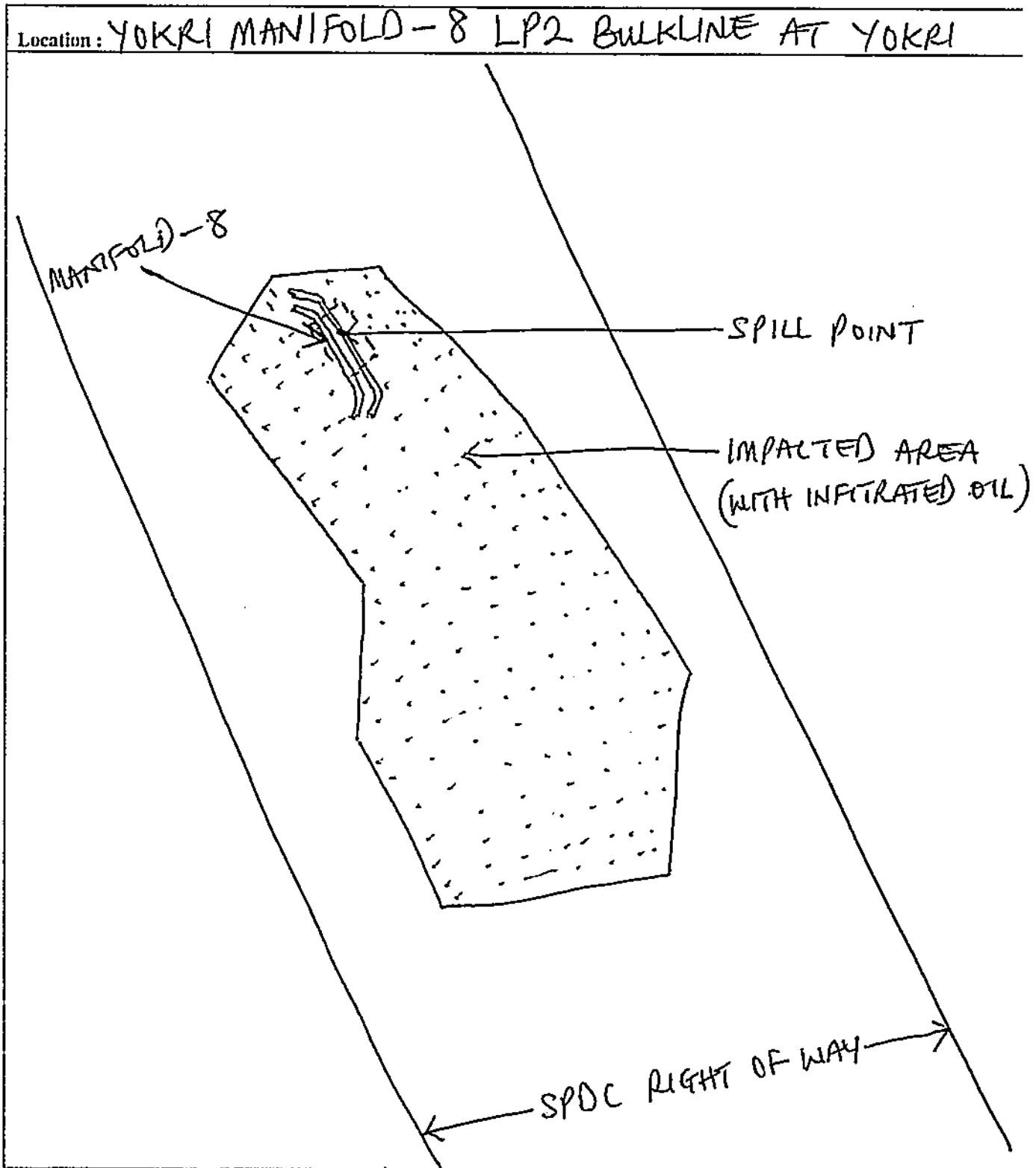
- Host Community:
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings

Tick as applicable

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28. Appendix 1: Overview sketch of the site



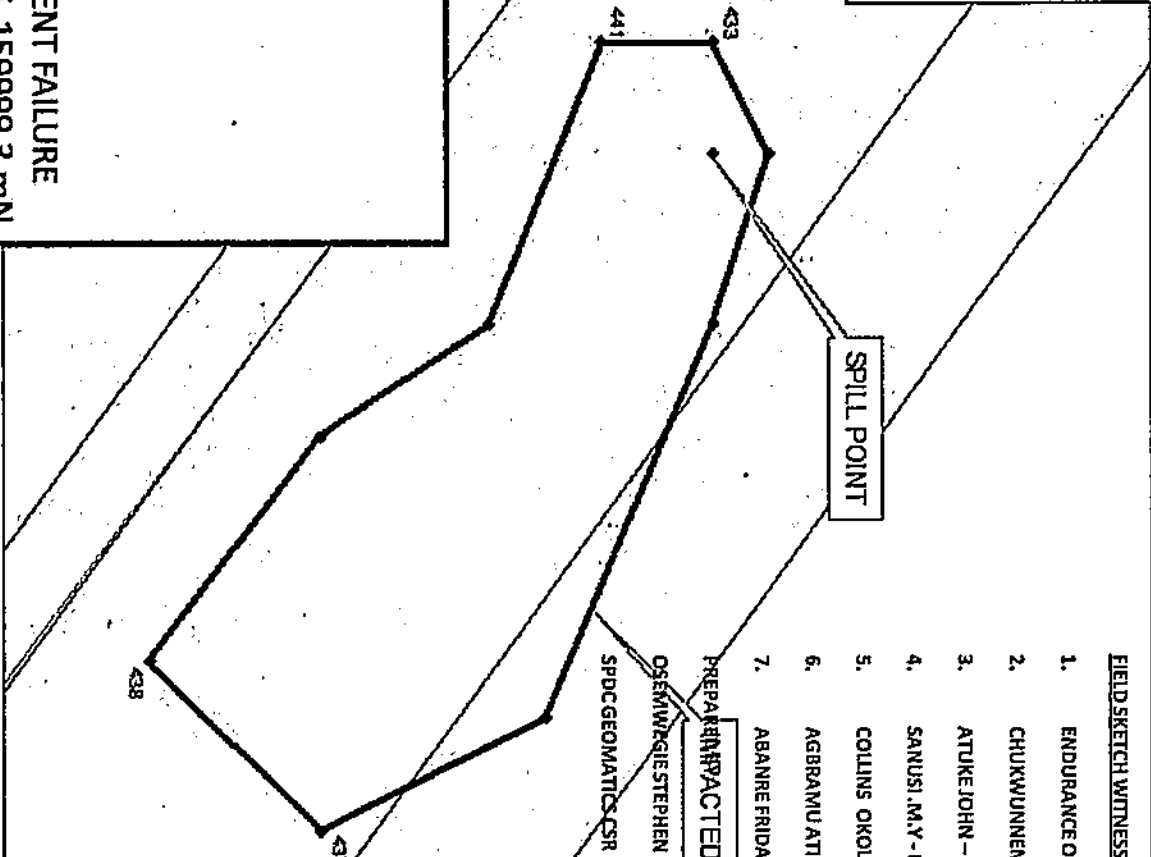


**AREAS AFFECTED BY GRUDE OIL SPILLAGE ALONG YOKRI IN LAND MANI FOLD 8 1122 BUIKUNE @ YOKRI**

Measure

Area measurement  
 Segment: 6, 14300.4 Meters  
 Perimeter: 115,998856 Meters  
 Area: 0,0653907 Hectares

**JIV DATA**  
 INC. NO.: 2014\_1131956  
 INC. DATE: 28/02/2014  
 INV. DATE: 07/03/2014  
 AREA IMPACTED: 0.064Ha  
 IMPACT TYPE: LIGHT  
 VEGETATION: THICK BUSH  
 TERRAIN: SEASONAL SWAMP  
 VISUAL CAUSE OF SPILL: EQUIPMENT FAILURE  
 SPILL POINT COORD 313610.8 mE, 159999.3 mN  
 (Minna West Belt)  
 CSR: OSEMWEGIE STEPHEN



**FIELD SKETCH WITNESSED BY:**

1. ENDURANCE O - SPDC DSRT *[Signature]* 7/3/14
2. CHUKWUNNEME AKACHUKWU - SPDC LANDS DEPT *[Signature]*
3. ATUKE JOHN - DSMEV *[Signature]* 7/3/14
4. SANUSI, M.Y - DPR *[Signature]* 07/03/14
5. COLLINS OKOLO - NOSDRA *[Signature]* 07/03/14
6. AGRAMU ATIKU - JIT LEAD *[Signature]* 07/03/14
7. ABANRE FRIDAY - SOKEBIOLOU COMMUNITY CHAIRMAN

PREPARED IMPACTED AREA = 0.064Ha

OSEMWE GIE STEPHEN  
 SPDC GEOMATICS CSR  
*[Signature]* 07/03/14

Name	EAST	NORTH
POINT 432	313610.8	159999.3
433	313604.7	159999.3
434	313610.8	160002.4
435	313620.1	159999.3
436	313647.8	159990.1
437	313647.8	159977.9
438	313638.6	159968.6
439	313626.2	159977.8
440	313620.1	159987
441	313604.7	159993.2