

# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595255 JIV report S/N: Nº 0000137

*(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: 1595255 2. Type of incident\* OIL SPILL  
 3. Name of Location 36" NKPOKU - BOTU TRANS NIGER PIPELINE  
 4. Name of nearest community RUMUOCHIOLU 5. State: RIVERS 6. LGA OBIO/AKPO  
 7. Type of Production facility/Installation OIL PIPELINE  
 8. Asset owner/District THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

**B. INCIDENT INFORMATION:**

9. Details of incident  
 a. Date of incident: 15<sup>TH</sup> MARCH, 2016  
 b. Start date/time of investigation: 22<sup>ND</sup> MARCH, 2016  
 c. Investigation End date: 22<sup>ND</sup> MARCH, 2016 Actual investigation duration, days: ONE DAY  
 d. Description of spill point environment  
 Firm soil                       Loose soil                       Recently excavated area  
 Under water                       Swampy                       Exposed pipe surface  
 Well Platform (on Water)                       Drill Rig

Additional observations around the spill point: THE JOINT INVESTIGATING TEAM OBSERVED THAT THE INCIDENT POINT IS VERY CLOSED TO SURVEILLANCE HUT.

- e. Description of leak point (tick as applicable):
- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Drilled hole  | <input type="checkbox"/> Hack saw cut         | <input type="checkbox"/> Tear (_____)                                      |
| <input type="checkbox"/> Complete Rupture                                      | <input type="checkbox"/> Inward dent,         | <input type="checkbox"/> Well head tampering                               |
| <input checked="" type="checkbox"/> Failed Weld-on illegal hot tap valve       | <input type="checkbox"/> Failed Clamp,        | <input type="checkbox"/> Missing Pipeline/Flowline                         |
| <input checked="" type="checkbox"/> Crude oil theft (illegal bunkering) point. | <input type="checkbox"/> Saver-pit over flow  | <input type="checkbox"/> Third party tampering with Clamp                  |
| <input type="checkbox"/> Third party tampering with valve setting              | <input type="checkbox"/> Bulging Outward      | <input type="checkbox"/> Third party tampering with flange.                |
| <input type="checkbox"/> Flare System/Bund wall failure                        | <input type="checkbox"/> Cold vent            | <input type="checkbox"/> Surge vessel overflow.                            |
| <input type="checkbox"/> Valve Failure   | <input type="checkbox"/> Relief valve failure | <input type="checkbox"/> Accidental 3 <sup>rd</sup> party equipment impact |
| <input type="checkbox"/> 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) \_\_\_\_\_

*\* This can be: a) Oil Spill b) Drilling fluid Chemical c) Situation d) construction e) Encroachment f) Fire.*

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g. Spill point coordinates

h. Measuring unit

Northing: <u>217</u>	Easting: <u>208</u>
<u>4 921997</u>	<u>7 137763</u>

## 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

- |   |  |                                       |
|---|--|---------------------------------------|
| <input type="checkbox"/> Government reserved and designated protected area<br><input type="checkbox"/> Drinking water source<br><input type="checkbox"/> Built up area<br><input type="checkbox"/> Farmlands<br><input type="checkbox"/> Fish Farm/Pond<br><input type="checkbox"/> Fishing net<br><input type="checkbox"/> Others (specify). | [ .m]<br>[ .m]<br>[ .m]<br>[ .m]<br>[ .m]<br>[ .m] | } NONE SEEN<br>} WITHIN<br>} VICINITY |
|---|--|---------------------------------------|

12. Containment measures put in place:

- Booms     
  Trench     
  Dyke     
  Natural depression     
  Pit     
  None
- Others: \_\_\_\_\_

13. Any pictures or video coverage? [  ] [N]

14. Further response/repair initiated as at the time of JIV? [  ] [N]

If yes to item 14, give brief description:

NO RECOVERABLE OIL, WHILE REPAIR WORK IS ON-GOING

15. Was there any disruption to the investigation? [Y] [  ] [N]

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If yes to item 15 give brief description:

NOT APPLICABLE

**D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL**

**16. Structures / Properties**

S/N	Type of Structures	Description	Size	Number	Comments
NONE WITHIN AREA OF IMPACT					

**17. Crops/Economic Trees**

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
NONE WITHIN AREA OF IMPACT						

**18. Fishing Nets/Fish Ponds**

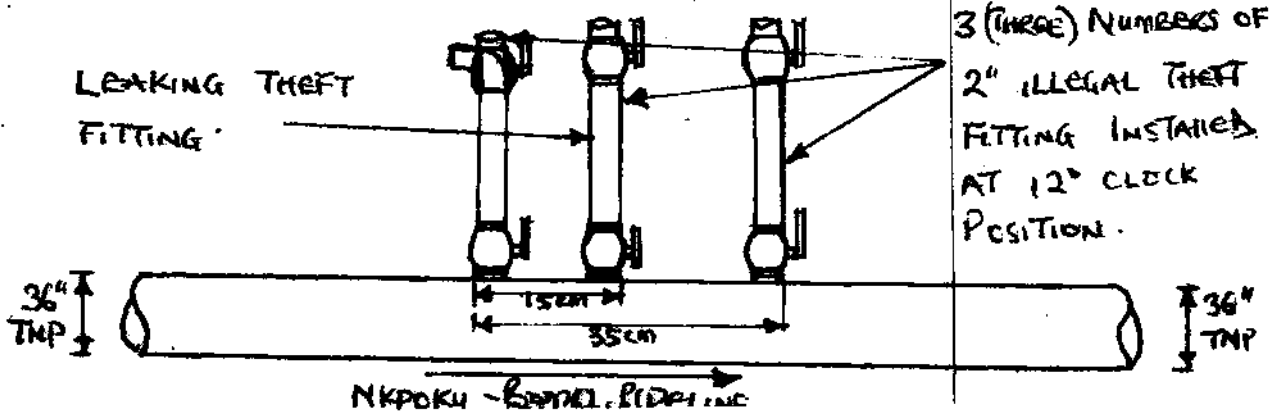
S/N	Nets/Ponds	Description	Quantity/Size	Comments
NONE WITHIN AREA OF IMPACT				

**19. 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 VIEW OF 36" NKPOKU - BOMM TRANS NIGER PIPELINE AT RUMVOCHIE  
- ENKA SHOWING :- A FAILED WEID - ON ILLEGAL THEFT POINT.





**ESTIMATION OF OIL SPILL VOLUME**

FID =1595255 AT 38° NKPOKU BOMU TRANS NIGER PIPELINE AT RUMUOCHIOLU ENEKA JV VOLUME CALCULATION REPORT

**A OIL SPILLED ONSHORE/OFFSHORE (Leak stopped at source)**

**Impacted Area Details**

Total Calculated Area of Impact

64.00	m <sup>2</sup>
	m <sup>2</sup>
	m <sup>2</sup>

i Impact within SPDC R.O.W

ii Impact outside SPDC R.O.W

**1 Volume of oil recovered before completion of JV (V<sub>rec</sub>)**

i Estimated Recovered oil (Net)

	bbls
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Estimated Recovered oil (Net) V <sub>rec</sub>	0.00 bbls
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**2 Computation of estimated residual volume on site**

**a Computation of volume of free phase oil (on land or confined water body)**

i Total area occupied by pool of free phase oil

28.00	m <sup>2</sup>
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ii Average depth of pool of free phase oil

0.002	m
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iii Emulsification factor (if applicable, else 0%)

30	%
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Estimated Volume of pool of free phase oil, V <sub>pool</sub>	0.04 m <sup>3</sup>
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Estimated Volume of pool of free phase oil, V <sub>pool</sub>	0.25 bbls
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**b Computation of estimated volume of infiltrated oil in the soil (V<sub>inf</sub>)**

**1 Volume of infiltrated oil at spill point (V<sub>inf1</sub>)**

i Total area covered by the oil (infiltration)

2.00	m <sup>2</sup>
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ii Average depth of infiltration above leaking facility i.e. pipeline/flowline

0.100	m
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iii Soil type

Silty or sandy clay	
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iv P<sub>e</sub> (effective porosity of the soil)

12	%
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v Cause of spill

Third party interference	
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**vi Calculation of days for infiltration below the leaking point on pipeline or flowline**

Incident Date	JV Date	Days on Site
3/15/2016 13:40	3/22/2016 14:45	7
If cause of spill is operational, use 1 week as worst case scenario except where time on site exceeds 7		7

Infiltration of oil types in various soil types vs time.			
Soil type	Approximate time to reach 1m depth below ground level		
Oil type	Sand	Loam	Clay
Bonny Medium	3 weeks	3 years	> 10 years
Bonny Light	2 days	2 months	> 10 years

vii Oil type

Bonny Light	
-------------	--

viii Average depth of infiltration below leaking facility i.e. pipeline/flowline

0.002	m
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ix Total depth below ground surface of infiltration of oil

0.102	m
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Estimated Volume of infiltrated oil, V <sub>inf1</sub>	0.02 m <sup>3</sup>
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Estimated Volume of infiltrated oil, V <sub>inf1</sub>	0.15 bbls
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**2 Volume of infiltrated oil at second spill point [if applicable] (V<sub>inf2</sub>)**

i Total area covered by the oil (infiltration)

	m <sup>2</sup>
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ii Average depth of infiltration above leaking facility i.e. pipeline/flowline

	m
--	---

iii Soil type

Silty or sandy clay	
---------------------	--

iv P<sub>e</sub> (effective porosity of the soil)

12	%
----	---

v Average depth of infiltration below leaking facility i.e. pipeline/flowline

0.002	m
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vi Total depth below ground surface of infiltration of oil

0.002	m
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Estimated Volume of infiltrated oil, V <sub>inf2</sub>	0.00 m <sup>3</sup>
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Estimated Volume of infiltrated oil, V <sub>inf2</sub>	0.00 bbls
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**3 Volume of infiltrated oil outside immediate spill point(s) region (V<sub>inf3</sub>)**

i Total Area covered by the oil (infiltration)

34.03	m <sup>2</sup>
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ii Total Area of the pool of free phase oil in touch with soil

	m <sup>2</sup>
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JOINT INVESTIGATION REPORT SPILL VOLUME ESTIMATE FOR INCIDENT NO. 1595255

iii Soil type: Silty or sandy clay

iv  $P_s$  (effective porosity of the soil):  %

v Average depth below ground surface of infiltration of oil:  m

Estimated Volume of infiltrated oil,  $V_{inf,c}$ :  0.01 m<sup>3</sup>

Estimated Volume of infiltrated oil,  $V_{inf,c}$ :  0.05 bbls

4 Volume of infiltrated oil outside immediate spill point(s) region (superficial impact,  $V_{inf,d}$ )

i Total Area covered by the oil (infiltration):  m<sup>2</sup>

ii Total Area of the pool of free phase oil in touch with soil:  m<sup>2</sup>

iii Average depth below ground surface of infiltration of oil:  0.002 m

Estimated Volume of infiltrated oil,  $V_{inf,d}$ :  0.00 m<sup>3</sup>

Estimated Volume of infiltrated oil,  $V_{inf,d}$ :  0.00 bbls

Estimated Total Volume of infiltrated oil,  $V_{inf}$ :  0.03 m<sup>3</sup>

Estimated Total Volume of infiltrated oil,  $V_{inf}$ :  0.20 bbls

c Computation of volume of oil on open water based on standard coloration

i Total area of oil on open water:  m<sup>2</sup>

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

Link to Coverage Visual

Spill Factors from USCG FOG (2008 Edition)		Oil	
	Thickness (m)	Percentage coverage (%)	Volume (m <sup>3</sup> )
Barely Visible	0.00004		0.0000
Silvery	0.00008		0.0000
Slight Color	0.00015		0.0000
Bright Color	0.0003		0.0000
Dull	0.001		0.0000
Dark	0.002		0.0000
Black oil	0.1		0.0000
Emulsion (30% Oil)	1		0.0000
Percent Total:		0%	0.0000

Estimated Volume of oil on open water,  $V_{oil}$ :  0.00 m<sup>3</sup>

Estimated Volume of oil on open water,  $V_{oil}$ :  0.00 bbls

3 Calculation of evaporated volume

Evaporation Factors (E-Factor) for SPDC Crude oil		
Residence time of spilled oil (days on site)	Oil type	
	Bonny Light	Bonny Medium
< 1 day	10%	5%
1-7 days	25%	15%
> 7 days	40%	25%

i Was oil recovery before JIV completion done before JIV date? No

ii Estimated volume available for evaporation:  0.45 bbls

iii E-factor:  25%

Estimated Volume of evaporated oil,  $V_{evap}$ :  0.16 bbls

Net Total Estimated Spilled Volume,  $V_{Net}$ :  0.60 bbls

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**G. INCIDENT INFORMATION:**

**a. Impacted Area Details**

- Total calculated area of impact 0.006324 m²
- Impact within R.O.W YES
- Impact outside R.O.W NIL

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

Recovered oil $V_{rec}$ :	<b>NIL</b>	Barrels
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Controlled recovery/evacuation from source with no impact to environment:

<b>NIL</b>	Barrels
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**c. Net Estimated Spilled Volume  $V_{Est}$  (bbls)\* =**

0.6 BARREL

**Estimated Reported Volume\*\*  $V_{rep}$  (bbls) =** 0.6 BARREL

**\*Notes.**

- Volume estimation was done using an excel based tool (see attached for details on the calculation)
- Reported spilled volume is an estimate

Write other relevant notes taken into consideration for estimating the spilled in the box below:

NOT APPLICABLE

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

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

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## d. General Status of the site

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

## e. Representatives

**This report was filled, agreed and signed by the following joint investigation team representatives:**

- Host Community:
- Department of Petroleum Resources (DPR):
- National Oil Spill Detection and Response Agency (NOSDRA):
- State Ministry of Environment (SME):
- Asset Owner:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings

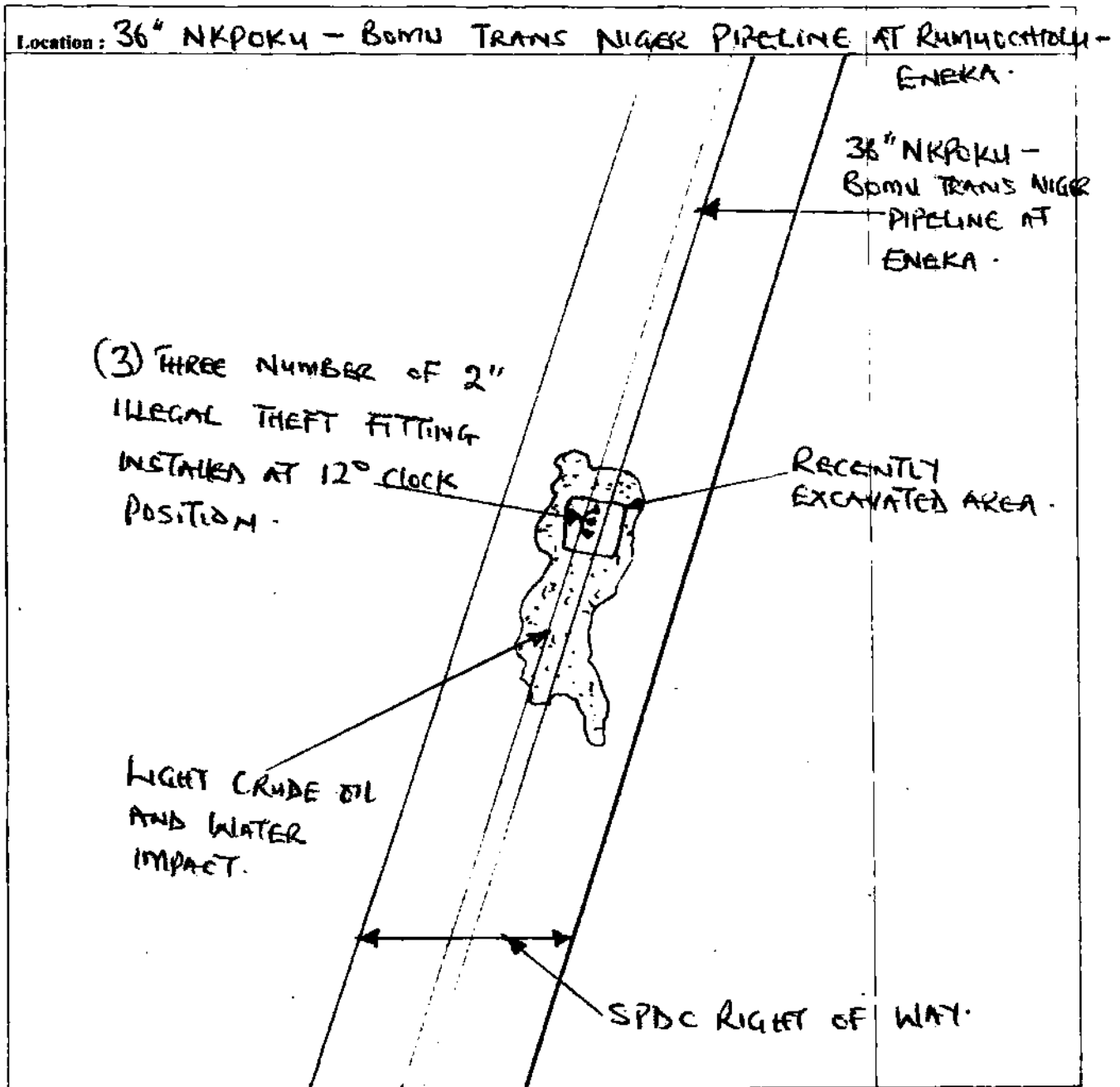
*Tick as applicable*



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f. Appendix 1: Overview sketch of the site



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**g. SIGNATORIES: JOINT INVESTIGATION TEAM MEMBERS**

*Having read through the JIV report, the following representatives append their respective signatures in agreement with the content therein:*

S/N	Name	Members present	Designation	Signature/Date and Time
1	//	DEPARTMENT OF PETROLEUM RESOURCES (DPR)	//	//
2	OBA ABUBAKAR O	NATIONAL OIL SPILL DETECTION AND RESPONSE AGENCY (NOSDRA)	PSI	<i>[Signature]</i> 1330HRS 22/03/2016
3	EJOLU HORHO	STATE MIN. OF ENVIRONMENT	S.C. Eng.	<i>[Signature]</i> 22/3/2016
4	FOODLUBA NGOZI OWUNNATH	HOST COMMUNITY REPRESENTATIVE	FIN. SEC. C.D.C	<i>[Signature]</i> 22.5/2016
5	OTHS OKHUSE	ASSET OWNER REPRESENTATIVE	PNPD	<i>[Signature]</i> 22/03/16
6	SAMSON ILIYA	NIGERIA POLICE FORCE (NPF)	INSPR	1530HRS <i>[Signature]</i> 22/3/16
	//	//	//	//