

# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595524 JIV report S/N: Nº 0000143

(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: 1595524 2. Type of incident\* OIL SPILL  
3. Name of Location ETELEBOU FLOW STATION  
4. Name of nearest community OG BOLOMA 5. State BAYELSA 6. LGA YENAGOA  
7. Type of Production facility/Installation FLOW STATION  
8. Asset owner/District THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED / LAND 2

## B. INCIDENT INFORMATION:

### 9. Details of incident

a. Date of incident: 14TH MARCH, 2016  
b. Start date/time of investigation: 17TH MARCH, 2016 / 13:05 HOURS  
c. Investigation End date: 17TH MARCH, 2016 Actual investigation duration, days: ONE (1) DAY  
d. Description of spill point environment 2016

- |   |                                     |  |
|---|-------------------------------------|--|
| <input type="checkbox"/> Firm soil                                  | <input type="checkbox"/> Loose soil | <input type="checkbox"/> Recently excavated area |
| <input type="checkbox"/> Under water                                | <input type="checkbox"/> Swampy     | <input type="checkbox"/> Exposed pipe surface    |
| <input checked="" type="checkbox"/> Well Platform (on <u>LAND</u> ) | <input type="checkbox"/> Drill Rig  |  |

Additional observations around the spill point: THE JOINT INVESTIGATION TEAM, ON ARRIVAL AT SITE, OBSERVED THE SPILL POINT TO BE THE WATER OUTLET WITHIN THE 'SECONDARY RECOVERY' SAVER PIT AT ETELEBOU FLOW STATION. THE SAVER PIT OVERFLOWED, THEREBY DISCHARGING SPILL OUTSIDE THE FLOW STATION VIA THE WATER OUTLET PIPE EXTENDING BEYOND THE FLOW STATION FENCE.

### 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 type="checkbox"/> Failed Weld-on illegal hot tap valve       | <input type="checkbox"/> Failed Clamp,                  | <input type="checkbox"/> Missing Pipeline/Flowline                         |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point, | <input checked="" 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.

# JOINT INVESTIGATION REPORT

INCIDENT NO: 15 95524 JIV report S/N: **Nº 0000143**

g. Spill point coordinates WGS 84  
 h. Measuring unit .

Northing: (LATITUDE)	Easting: (LONGITUDE)
<u>05.025568</u>	<u>6.360499</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 (SEASONAL)     
  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) PLANTAIN TREES      2 m

12. Containment measures put in place;

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

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

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

If yes to item 14, give brief description:

NOT APPLICABLE

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

# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595524 JIV report S/N: Nº 0000143

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						

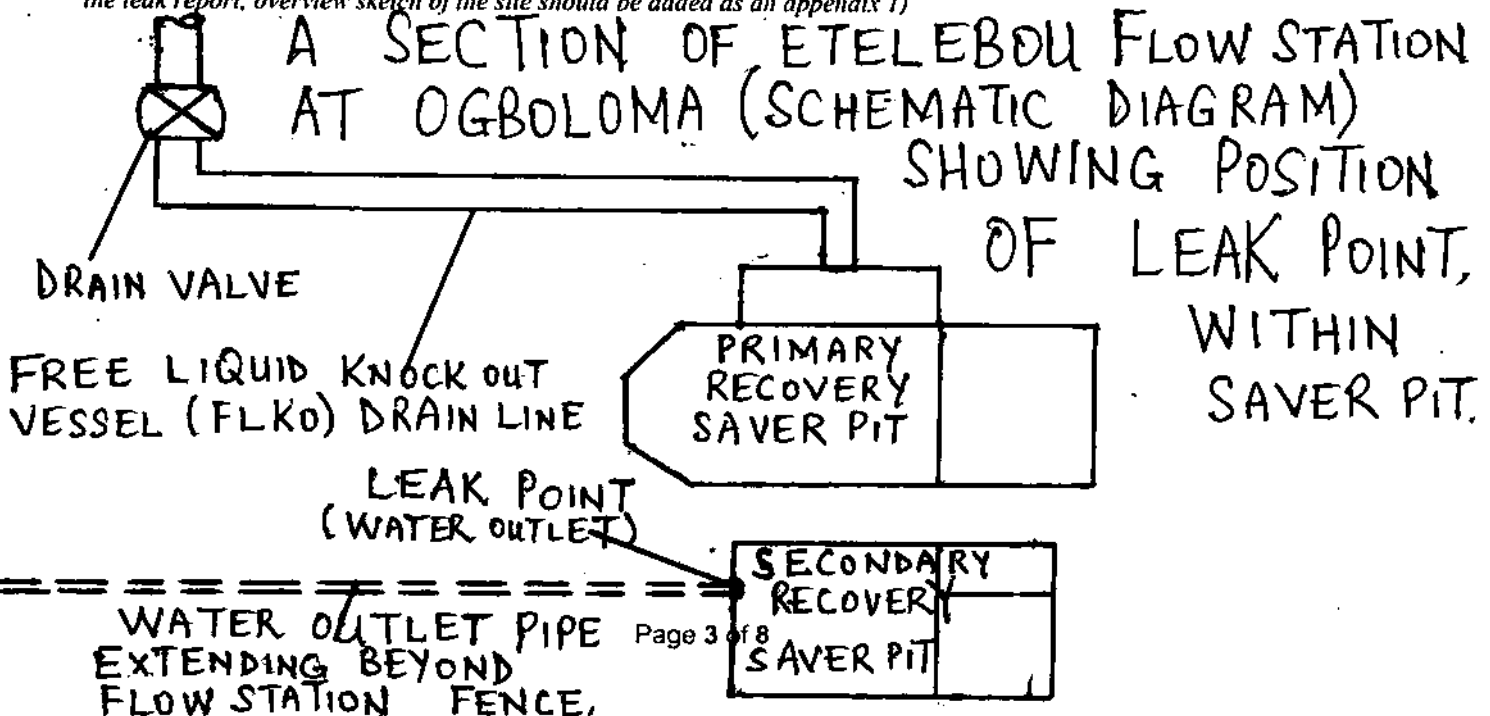
**18. Fishing Nets/Fish Ponds**

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)



# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595524 JIV report S/N: Nº 0000143

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

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

WGS-84

S/N	Northing	Easting

SEE ATTACHED APPENDIX A FOR IMPACTED AREA COORDINATES

## APPENDIX A

INCIDENT No.

1595524

LOCATION: ETELEBOU FLOWSTATION AT OGBOLOMA

### IMPACTED AREA CO-ORDINATES (WGS-84)

POINT	LATITUDE	LONGITUDE
pt7	5.02539	6.36072
pt8	5.02551	6.36071
pt9	5.02555	6.36071
pt10	5.02553	6.36108
pt11	5.02548	6.3612
pt12	5.02545	6.3612
pt14	5.02549	6.36135
pt15	5.02541	6.36106
pt16	5.02539	6.36087
pt17	5.02538	6.36077
pt18	5.02525	6.36076
pt20	5.02563	6.36134
pt21	5.02566	6.36112
PT 21A	5.02566	6.36113
pt22	5.02547	6.36114
pt24	5.02525	6.36075
pt25	5.02552	6.36138
pt28	5.02535	6.36075
pt29	5.02564	6.36138
eoi 1	5.02569	6.36113
eoi 2	5.02567	6.36135
culv4	5.02547	6.36133
eoi3	5.02548	6.36137
eoi4	5.02546	6.36134
eoi5	5.02546	6.3612
eoi6	5.02562	6.36136

# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595524 JIV report S/N: Nº 0000143

## G. INCIDENT INFORMATION:

### a. Impacted Area Details

- Total calculated area of impact 0.0930 Hectares
- Impact within R.O.W Yes
- Impact outside R.O.W No

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

Recovered oil $V_{rec}$ :	<u>NIL</u>	Barrels
---------------------------	------------	---------

Controlled recovery/evacuation from source with no impact to environment:

<u>NIL</u>	Barrels
------------	---------

c. Net Estimated Spilled Volume  $V_{est}$ (bbls)\* = 71.58

Estimated Reported Volume\*\*  $V_{rep}$ (bbls)= 72 BARRELS

#### \*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  $m^3$  to barrels is Volume ( $m^3$ ) 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 volume estimation; record the calculation in a plain sheet of paper and attach to the JIV report.

**ESTIMATION OF OIL SPILL VOLUME**

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

**Impacted Area Details**

Total Calculated Area of Impact

- i Impact within SPDC R.O.W
- ii Impact outside SPDC R.O.W

930.00	m <sup>2</sup>
930.00	m <sup>2</sup>
0.00	m <sup>2</sup>

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

I Estimated Recovered oil (Net)

 bbls

<b>Estimated Recovered oil (Net) V<sub>rec</sub></b>	<b>0.00 bbls</b>
--	------------------

**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
- ii Average depth of pool of free phase oil
- iii Emulsification factor (If applicable, else 0%)

820.00	m <sup>2</sup>
0.009	m
	%

<b>Estimated Volume of pool of free phase oil, V<sub>pool</sub></b>	<b>7.38 m<sup>3</sup></b>
<b>Estimated Volume of pool of free phase oil, V<sub>pool</sub></b>	<b>46.42 bbls</b>

**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>inf a</sub>)**

- i Total area covered by the oil (infiltration)
- ii Average depth of infiltration above leaking facility i.e. pipeline/flowline
- iii Soil type
- iv P<sub>s</sub> (effective porosity of the soil)

	m <sup>2</sup>
	m
- Select -	
0	%

v Cause of spill

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

Incident Date	JIV Date	Days on Site
3/14/2016 11:17	3/17/2016 14:45	3
If 'cause of spill' is operational, use 1 week as worst case scenario except where 'days 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		
	Sand	Loam	Clay
Bonny Medium	3 weeks	3 years	> 10 years
Bonny Light	2 days	2 months	> 10 years

vii Oil type

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

 m

ix Total depth below ground surface of infiltration of oil

 m

<b>Estimated Volume of infiltrated oil, V<sub>inf a</sub></b>	<b>0.00 m<sup>3</sup></b>
<b>Estimated Volume of infiltrated oil, V<sub>inf a</sub></b>	<b>0.00 bbls</b>

**2 Volume of infiltrated oil at second spill point [if applicable] (V<sub>inf b</sub>)**

- i Total area covered by the oil (infiltration)
- ii Average depth of infiltration above leaking facility i.e. pipeline/flowline
- iii Soil type
- iv P<sub>s</sub> (effective porosity of the soil)

	m <sup>2</sup>
	m
- Select -	
0	%

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

 m

vi Total depth below ground surface of infiltration of oil

 m

<b>Estimated Volume of infiltrated oil, V<sub>inf b</sub></b>	<b>0.00 m<sup>3</sup></b>
<b>Estimated Volume of infiltrated oil, V<sub>inf b</sub></b>	<b>0.00 bbls</b>

**3 Volume of infiltrated oil outside immediate spill point(s) region ( $V_{inf c}$ )**

- 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 Soil type Silt ▼
- iv  $P_e$  (effective porosity of the soil)  %
- v Average depth below ground surface of infiltration of oil  m

Estimated Volume of infiltrated oil, $V_{inf c}$	<input type="text" value="1.16"/> m <sup>3</sup>
Estimated Volume of infiltrated oil, $V_{inf c}$	<input type="text" value="7.26"/> 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  m

Estimated Volume of infiltrated oil, $V_{inf d}$	<input type="text" value="0.00"/> m <sup>3</sup>
Estimated Volume of infiltrated oil, $V_{inf d}$	<input type="text" value="0.00"/> bbls

Estimated Total Volume of Infiltrated oil, $V_{inf}$	<input type="text" value="1.16"/> m <sup>3</sup>
Estimated Total Volume of Infiltrated oil, $V_{inf}$	<input type="text" value="7.26"/> 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 (2000 Edition)		Akl	
	Thickness (mm)	Percentage coverage (%)	Volume (m3)
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:		<b>0%</b>	<b>0.0000</b>

Estimated Volume of oil on open water, $V_{wat}$	<input type="text" value="0.00"/> m <sup>3</sup>
Estimated Volume of oil on open water, $V_{wat}$	<input type="text" value="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  bbls
- iii E-factor  %

Estimated Volume of evaporated oil, $V_{evap}$	<input type="text" value="17.90"/> bbls
--	---

Net Total Estimated Spilled Volume, $V_{Est}$	<input type="text" value="71.68"/> bbls
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# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595524 JIV report S/N: N<sup>o</sup> 0000143

## 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 type="checkbox"/> |
| ii. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>  |

## e. Representatives

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

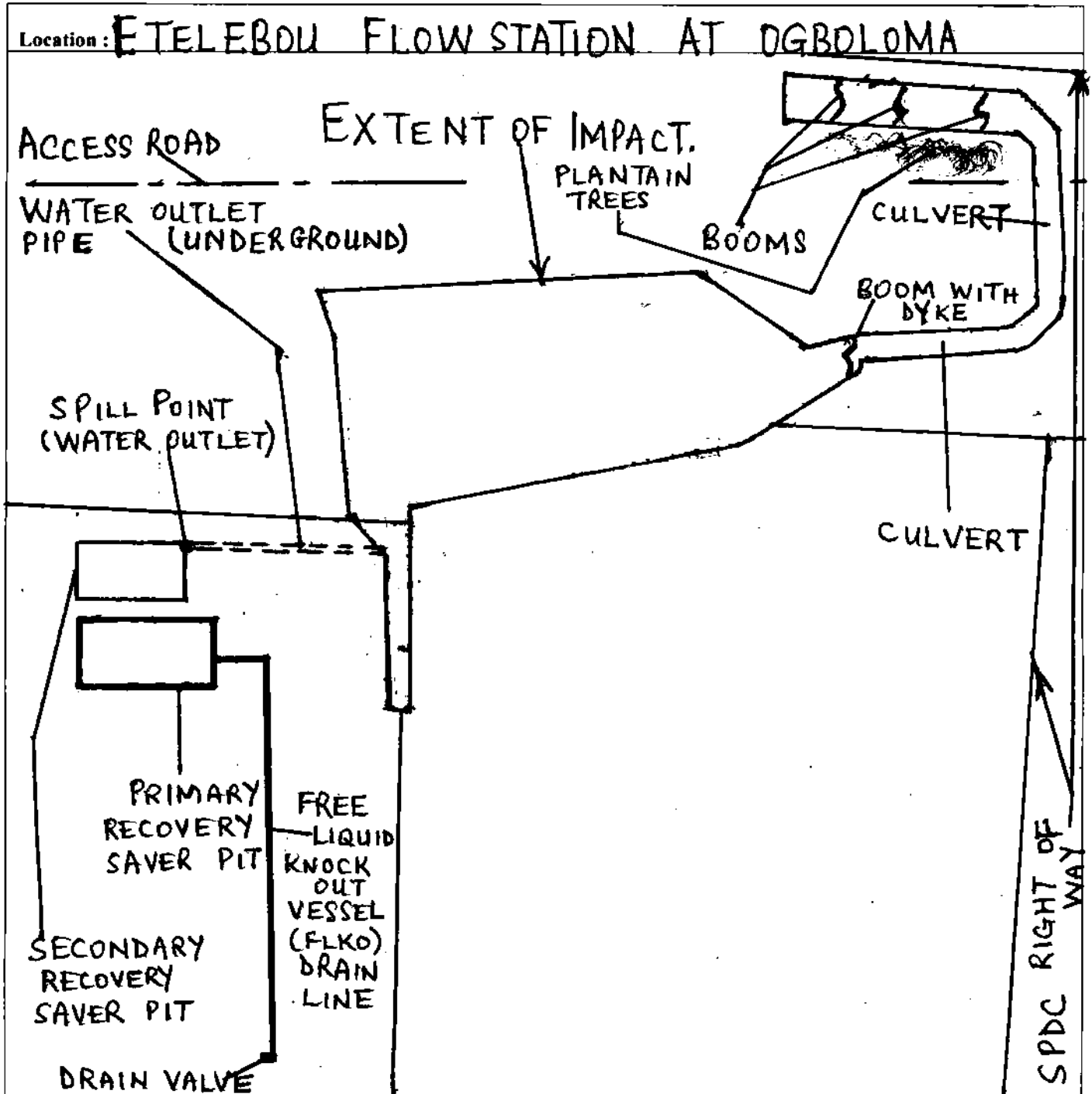
- Host Community:
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Asset Owner:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings

*Tick as applicable*

# JOINT INVESTIGATION REPORT

INCIDENT NO: 1595524 JIV report S/N: Nº 0000143

f. Appendix 1: Overview sketch of the site



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INCIDENT NO: 1595524 JIV report S/N: Nº 0000143

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

*Having read through the JIT 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	KIMILAYE EBIBODERE EMILIA	NATIONAL OIL SPILL DETECTION AND RESPONSE AGENCY (NOSDRA)	ESI	<i>[Signature]</i> 17/03/2016 15:00 pm
3	IIMITIMI TARIWARAI	STATE MIN. OF ENVIRONMENT	SCIENTIFIC OFFICER	<i>[Signature]</i> 17/03/16 15:00pm
4	AKERI RES (ALI) COMR. WOZI ZAMABO	HOST COMMUNITY REPRESENTATIVE	AKERWARAI FAMILY REP OGBOLONA DUEI FAMILY REP	<i>[Signature]</i> 17/03/2016 15:00 PM <i>[Signature]</i> 17-3-016 15:00 PM
5	AMANWAJI I-O	ASSET OWNER REPRESENTATIVE	Operations Team Leader	<i>[Signature]</i> 17/3/16 15:05
6	SAMSON ILITA	NIGERIA POLICE FORCE (NPF)	INSPR.	17/3/16 <i>[Signature]</i> 1501 HRS