

JOINT INVESTIGATION REPORT

INCIDENT NO: 2513904 JIV report S/N: 1030207

(Note: As practicable as possible the JIV report is to be signed in the field by all the participating parties)

A. GENERAL INFORMATION:

1. Fountain Incident Number: 2513904 2. Type of incident* OIL SPILL
3. Name of Location 16" EGBE - ASSA PIPELINE
4. Name of nearest community OBILE 5. State: IMO 6. LGA OHAJI/EGBEMA
7. Type of Production facility/Installation OIL PIPELINE
8. Asset owner/District THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED / PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident
a. Date Reported: 25TH AUGUST, 2019 ^{NOVEMBER}
b. Start date/time of investigation: 27TH NOVEMBER, 2019 / 14:32 HRS
c. Investigation End date: 27TH NOVEMBER 2019 Actual investigation duration, days: ONE (1) DAY
d. Description of spill point environment

- | | | |
|--|--|--|
| <input type="checkbox"/> Firm soil | <input checked="" 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 type="checkbox"/> Well Platform (on Water | <input type="checkbox"/> Drill Rig | |

Additional observations around the spill point:

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 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 rd party equipment impact |
| <input type="checkbox"/> Others(specify) _____ | | |

f. Incident caused by:

- Third party interference (Sabotage ; crude theft ; Line theft ; Accidental 3rd party damage
 Operational Others (including Mystery spills) _____

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire, g) non leaking Theft point removal
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g. Spill point coordinates

i. Measuring unit

WGS 84

Northing:	Easting:
<u>5.39640N</u>	<u>6.78937E</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 to Sensitive habitat within 100m radius

- | | |
|--|------------------|
| <input type="checkbox"/> Government reserved and designated protected area | [<u>NIL</u> ,m] |
| <input type="checkbox"/> Drinking water source | [<u>NIL</u> ,m] |
| <input type="checkbox"/> Built up area | [<u>NIL</u> ,m] |
| <input type="checkbox"/> Farmlands | [<u>NIL</u> ,m] |
| <input type="checkbox"/> Fish Farm/Pond | [<u>NIL</u> ,m] |
| <input type="checkbox"/> Fishing net | [<u>NIL</u> ,m] |
| <input type="checkbox"/> Others (specify). | |

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:

AT SPILL POINT INSTALLATION BY UNKNOWN PERSONS

REPAIRS TEAM PLUGGED THE LEAK POINT

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

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If yes to item 15 give brief description:

NOT APPLICABLE

16. Was JIV delayed?

[Y] [N]

If yes to item 16 give brief description:

NOT APPLICABLE

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

17. Structures / Properties

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

18. Crops/Economic Trees

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

19. Fish/Nets/Ponds

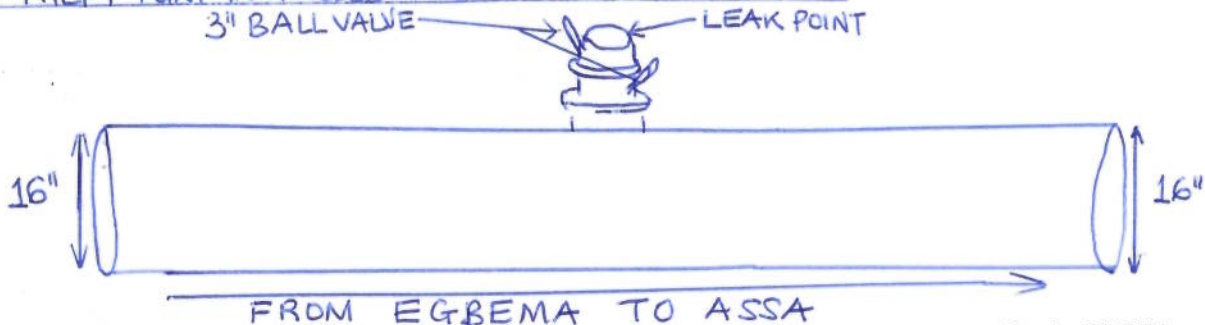
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
<u>NONE WITHIN AREA OF IMPACT</u>				

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

S/N	Others	Description	Quantity/Size	Comments
<u>NONE WITHIN AREA OF IMPACT</u>				

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)

SECTION OF 16" EGBEMA - ASSA PIPELINE A OBILE SHOWING CRUDE OIL THEFT POINT INSTALLED AT 12 O'CLOCK POSITION.



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G. INCIDENT INFORMATION:

a. Impacted Area Details

- Total calculated area of impact 0.087174 HA
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W YES

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

Recovered oil V_{rec} :	<u>5</u>	Barrels
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Controlled recovery/evacuation from source with no impact to environment:

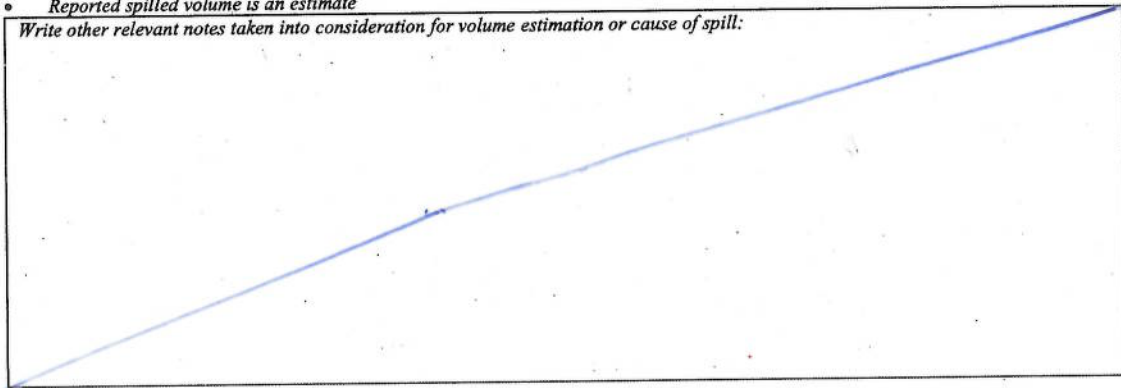
<u>NIL</u>	Barrels
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<p>c. Net Estimated Spilled Volume $V_{Est}(bbls)^*$ = <u>13.7 BBLs</u></p>
<p>Estimated Reported Volume** $V_{rep}(bbls)$ = <u>14 BBLs</u></p>

***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 volume estimation or cause of spill:



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 $Volume (m^3) \times 6.29$; **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.

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ESTIMATION OF OIL SPILL VOLUME

24" 116" Egbema-Assa TL RoI FID: 2019_2513904

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

871.74	m ²
	m ²
	m ²

1 Volume of oil recovered before completion of JIV (V_{rec,i})

- i Estimated Recovered oil (Net)

0.00	bbls
------	------

Estimated Recovered oil (Net) V _{rec,j}	0.00 bbls
--	-----------

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%)

251.74	m ²
0.006	m
	%

Estimated Volume of pool of free phase oil, V _{pool}	1.51 m ³
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Estimated Volume of pool of free phase oil, V _{pool}	9.50 bbls
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b Computation of estimated volume of infiltrated oil in the soil (V_{inf})

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

- 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_e (effective porosity of the soil)

2.00	m ²
1.200	m
Silty or sandy clay	
12	%

- v Cause of spill

Third party interference

vi Calculation of days for infiltration below the leaking point on pipeline or flowline		
Incident Date	JIV Date	Days on Site
11/25/2019 8:40	11/27/2019 11:30	2
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		
Oil type	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
- ix Total depth below ground surface of infiltration of oil

Bonny Medium	
0.001	m
1.201	m

Estimated Volume of infiltrated oil, V _{inf,a}	0.29 m ³
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Estimated Volume of infiltrated oil, V _{inf,a}	1.81 bbls
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2 Volume of infiltrated oil at second spill point [if applicable] (V_{inf,b})

- 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_e (effective porosity of the soil)

	m ²
	m
- Select -	
0	%

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

0.000	m
-------	---

- vi Total depth below ground surface of infiltration of oil

0.000	m
-------	---

Estimated Volume of infiltrated oil, V _{inf,b}	0.00 m ³
---	---------------------

Estimated Volume of infiltrated oil, V _{inf,b}	0.00 bbls
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3 Volume of infiltrated oil outside immediate spill point(s) region (V_{inf,c})

- i Total Area covered by the oil (infiltration)
- ii Total Area of the pool of free phase oil in touch with soil

620.00	m ²
249.74	m ²

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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 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

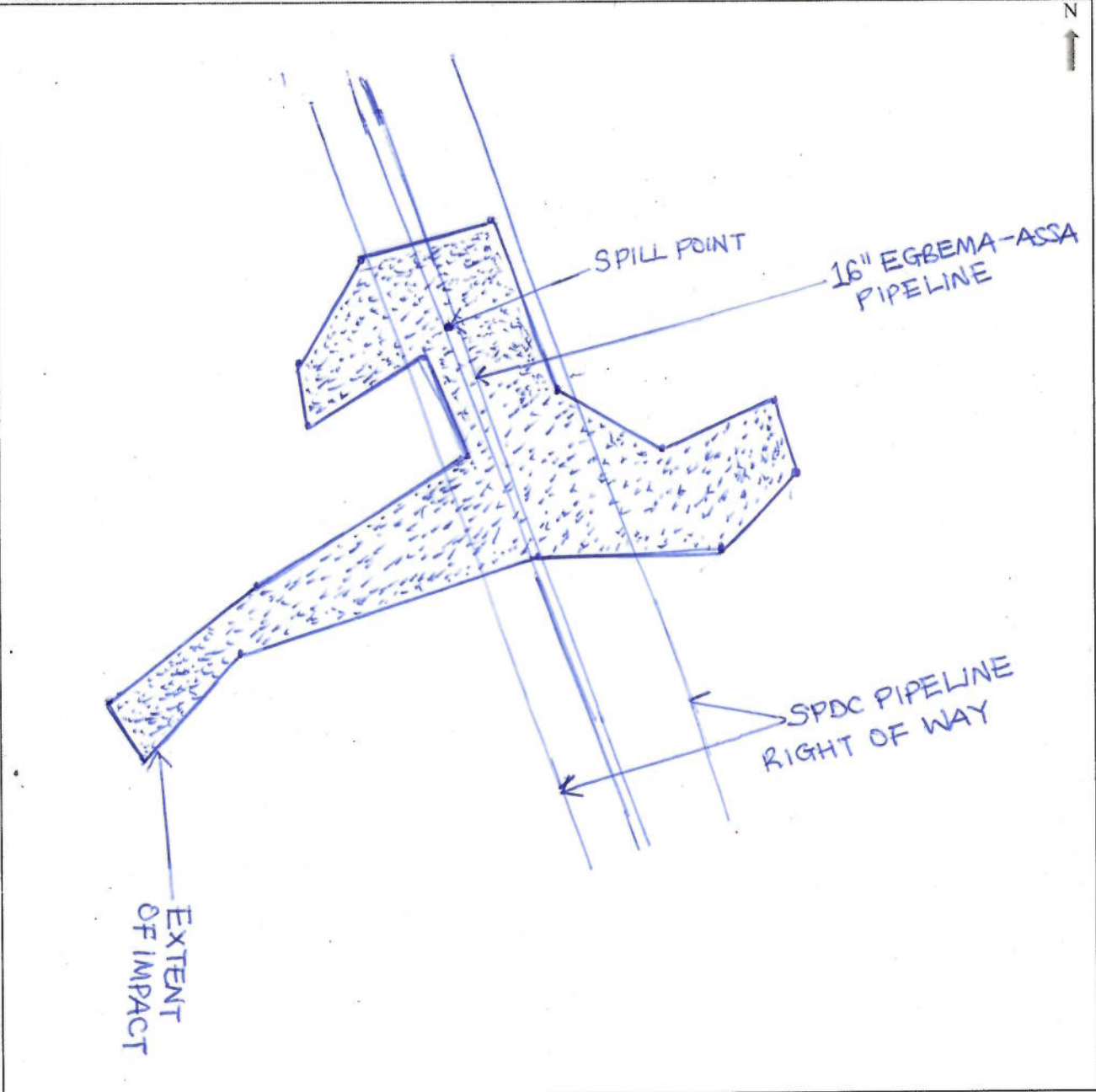
<p>This report was <u>filled</u>, <u>agreed</u> and <u>signed</u> by the following joint investigation team representatives:</p> <ul style="list-style-type: none">• Host Community: <input checked="" type="checkbox"/>• Department of Petroleum Resources [DPR]: <input checked="" type="checkbox"/>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>• Separate DPR form has been filled out with same findings <input type="checkbox"/> <p style="text-align: right;"><i>Tick as applicable</i></p>

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f. Appendix 1: Overview sketch of the site

Location: 16" EGBEMA - ASSA PIPELINE AT OBILE



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