

# JOINT INVESTIGATION REPORT

INCIDENT NO: 3066061 JIV report S/N: 0000982

(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: 3066061 2. Type of incident\* OIL SPILL  
3. Name of Location 18" ASSA - RUMUKEPE PIPELINE  
4. Name of nearest community UMUDDIBE 5. State: IMO 6. LGA OHAI EGBEMA  
7. Production Facility/Installation CRUDE OIL PIPELINE  
8. Asset Owner/Hub THE SHELL PETROLEUM DEVELOPMENT COMPANY  
OF NIGERIA LIMITED / PIPELINE

## B. INCIDENT INFORMATION:

9. Details of incident  
a. Date Reported: 21<sup>ST</sup> NOVEMBER 2021  
b. Start date/time of Investigation: 24<sup>TH</sup> NOVEMBER 2021 / 11:13 HRS  
c. Investigation End date: 24<sup>TH</sup> NOVEMBER 2021 Day(s) on site: ONE DAY  
d. Description of spill point environment

- |   |                                     |   |
|---|-------------------------------------|---|
| <input type="checkbox"/> Firm soil                | <input type="checkbox"/> Loose soil | <input checked="" 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  | <input checked="" type="checkbox"/> Sand bag(s)             |

Additional observations around the spill point:

NOT APPLICABLE

## e. Description of leak point (tick as applicable);

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Smooth round-edge hole                                | <input type="checkbox"/> Rough-edge hole      | <input type="checkbox"/> Hack saw cut                                      |
| <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"/> Tear (_____)  |   |  |
| <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) Siltation (d) Water Leak (e) Fire (f) Non-leaking theft point removal

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Blue (Host Community)

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g. Spill Point Coordinates (\*Incidents  $\leq 100m$  apart to be aggregated into one Joint Investigation Report)

h. Measuring unit

WGS 84

Northing:	Easting:
<u>5.310.58</u>	<u>6.78644</u>
/	/
/	/

## C. RISK ASSESSMENT

### 10. Details of Environment

i. Type of environment where spill occurred (select one):

- Land     
  Swamp     
  Water     
  Seasonal swamp     
  Shoreline/Waterfront

ii. Type of environment to which oil has spread:

- Land     
  Swamp     
  Waterbody (specify) \_\_\_\_\_

iii. Weather condition

- Dry     
  Wet     
  Windy     
  Hot

### 11. Distance to Sensitive habitat within 100m radius

- Government reserved and designated protected area [ NILm]
- Drinking water source [ NILm]
  - Surface water
  - Borehole
- Built up Area [ NILm]
  - Residential Area
  - Commercial/Industrial Area
- Farmlands IMPACTED BY SPILL [ NILm]
- Fish Farm/Pond [ NILm]
- Fishing net [ NILm]
- Others (specify) \_\_\_\_\_ [ NILm]

### 12. Containment measures put in place:

- Booms   
  Trench   
  Dyke   
  Pit   
 Natural depression   
 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:

REPAIR WORK ONGOING

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

If yes to item 15 give brief description:

NOT APPLICABLE

16. Was JIV delayed? [Y]  [N]

Reason(s): NOT APPLICABLE

Delayed Community Access Approval  Security Challenges  Access constraint due to terrain

Others (specify)

**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
1	<u>CASSAVA</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>85</u>	<u>IMPACTED BY SPILL</u>

19. Fish/Nets/Ponds

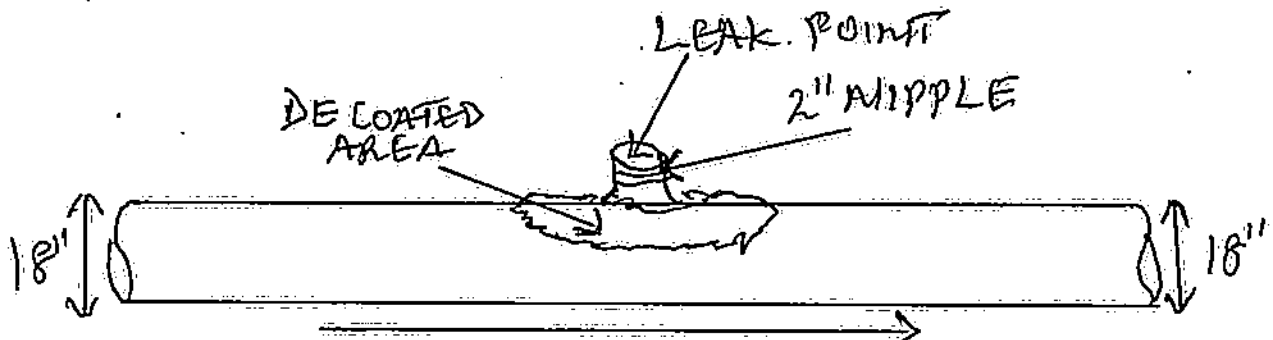
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
<u>NONE WITHIN AREA OF IMPACT</u>				

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

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

**E. GRAPHIC DESCRIPTION OF LEAK POINT** (while detailed description of the leak point should be contained in the leak report, overview sketch of the site should be added as appendix 1)

SECTION OF 18" ASSA-RUMUKEPE PIPELINE AT UMUDIBE SHOWING CRUDE OIL THEFT POINT INSTALLED AT 12 O'CLOCK POSITION BY UNKNOWN PERSON(S).



FROM ASSA TO RUMUKEPE



(3066061) 18" Assa - Rumuekpe pipeline at Umuodibe

PNT_ISD	LAT	LONG
1	5.31047	6.78645
2	5.31051	6.78645
3	5.31057	6.78639
4	5.3106	6.78641
5	5.31066	6.78648
6	5.31064	6.7865
7	5.31058	6.78649
8	5.31057	6.78651
9	5.31037	6.78648
10	5.31015	6.7864
11	5.30961	6.78628
12	5.30942	6.78621
13	5.30908	6.78611
14	5.30907	6.78611
15	5.3089	6.78607
16	5.3089	6.78613
17	5.30888	6.78615
18	5.3088	6.78613
19	5.3088	6.78609
20	5.30871	6.78607
21	5.30868	6.7861
22	5.30861	6.78612
23	5.30851	6.78609
24	5.30851	6.78606
25	5.30857	6.78604
26	5.30862	6.78597
27	5.30866	6.78598
28	5.30868	6.78595
29	5.30876	6.78598
30	5.30907	6.78609
31	5.30963	6.78626
32	5.31017	6.78639
33	5.31037	6.78645
SP	5.31058	6.78644

*Handwritten signature*

**ESTIMATION OF OIL SPILL VOLUME**

FID:(3066061) 18" Assa - Rumuakpe pipeline at Umuodibe spill volume estimation.

**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

1,100.00	m <sup>2</sup>
	m <sup>2</sup>
	m <sup>2</sup>

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

i Estimated Recovered oil (Net)

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

**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%)

200.00	m <sup>2</sup>
0.001	m
	%

Estimated Volume of pool of free phase oil, V <sub>pool</sub>	0.10 m <sup>3</sup>
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Estimated Volume of pool of free phase oil, V <sub>pool</sub>	0.63 bbbls
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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>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>a</sub> (effective porosity of the soil)

1.00	m <sup>2</sup>
1.100	m
Clay	
8	%

v Cause of spill

Third party interference	
--------------------------	--

Calculation of days for infiltration below the leaking point on pipeline or flowline		
Incident Date	JIV Date	Days on Site
11/21/2021 13:40	11/24/2021 11:13	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		
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 Medium	
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viii Average depth of infiltration below leaking facility i.e. pipeline/flowline

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

1.200	m
-------	---

Estimated Volume of infiltrated oil, V <sub>inf a</sub>	0.10 m <sup>3</sup>
---	---------------------

Estimated Volume of infiltrated oil, V <sub>inf a</sub>	0.60 bbbls
---	------------

**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>a</sub> (effective porosity of the soil)

	m <sup>2</sup>
	m
Silty or sandy clay	
12	%

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

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

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

Estimated Volume of infiltrated oil,  $V_{inf b}$   bbls

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  ▾

iv  $P_e$  (effective porosity of the soil)  %

v Average depth below ground surface of infiltration of oil  m

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

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

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

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

Estimated Total Volume of Infiltrated oil,  $V_{inf}$   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 Aid](#)

Spill Factors from USCG FOG (2000 Edition)

	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:		0%	0.0000

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

Estimated Volume of oil on open water,  $V_{wat}$   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?  ▾

ii Estimated volume available for evaporation

1.69 bbls

iii E-factor

15%

Estimated Volume of evaporated oil,  $V_{\text{evap}}$  0.30 bbls

Net Total Estimated Spilled Volume,  $V_{\text{Est}}$  1.99 bbls



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## G. INCIDENT INFORMATION:

### a. Impacted Area Details \*

- Total calculated area of impact (Ha) 0.11 Ha
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W YES

\* Round off to 2 decimal places if area is  $\geq 100 \text{ m}^2$  or to 4 decimal places if area is  $< 100 \text{ m}^2$  (e.g. 14.55, 0.0051, 0.0009)  
\* Express in Hectares (Ha)

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

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

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

c. Net Estimated Spilled Volume $V_{est}$ (bbls) =	<u>199 BARRELS</u>
Estimated Reported Volume ** $V_{ren}$ (bbls) =	<u>2 BARRELS</u>

#### \*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:

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  $\text{m}^3$  to barrels is  $\text{Volume (m}^3) \times 6.29$ ; \*\*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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## 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
- ii. Investigation of the incident site showed that there is residual impact on site requiring further works

## 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]:
- The Shell Petroleum Development Company [SPDC]:
- *Separate DPR form has been filled out with same findings*
- *Separate NOSDRA form has been filled out with same findings*
- *Separate SME form has been filled out with same findings*

*Tick as applicable*

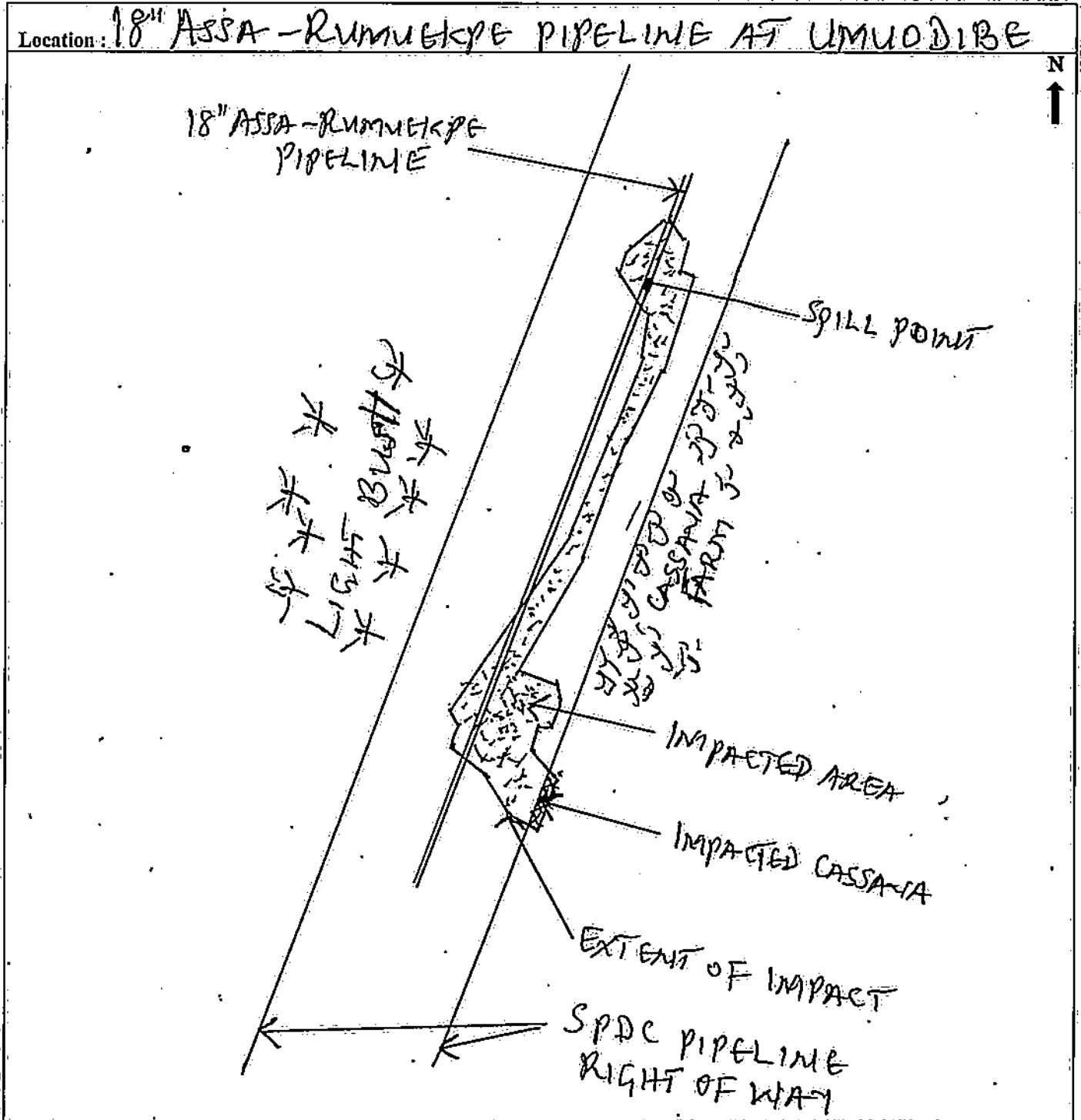
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f. Appendix 1: Overview sketch of the site



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