

# JOINT INVESTIGATION REPORT

INCIDENT NO: 2368826 JIV report S/N: 1030015

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

## A. GENERAL INFORMATION:

1. Fountain Incident Number: 2368826 2. Type of incident\* OIL SPILL  
3. Name of Location 14" OKORDIA - RUMUEKPE PIPELINE  
4. Name of nearest community AKARA-OLU State: RIVERS 6. LGA AITADA WEST  
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: 5TH JUNE, 2019  
b. Start date/time of investigation: 10TH JUNE, 2019/16:00HRS.  
c. Investigation End date: 10TH JUNE, 2019 Actual investigation duration, days: ONE (1) 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: THIS IS THE POINT THAT WAS REPORTED ON THE 5TH OF JUNE, 2019 (FID: 2366896) AS A NON-LEAKING POINT. (2366896).

### 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 <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) Siltation d) construction e) Encroachment f) Fire. g) non leaking Theft point removal  
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g. Spill point coordinates

h. Measuring unit

WGS 84

Northing: LATITUDE	Easting: LONGITUDE
5.11132	6.49989
/	/
/	/
/	/

## 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

- Government reserved and designated protected area
- Drinking water source
- Built up area
- Farmlands
- Fish Farm/Pond
- Fishing net
- Others (specify):

[ ,m] } NONE WITHIN  
 [ ,m] } VICINITY AS  
 [ ,m] } OBSERVED  
 [ ,m] }  
 [ ,m] }  
 [ ,m] }

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:

REPAIR BY CLAMPING ONGOING.

15. Was there any disruption to the investigation?

[Y]  [N]

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If yes to item 15 give brief description: NOT APPLICABLE  
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
NONE WITHIN AREA OF IMPACT					

18. Crops/Economic Trees

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

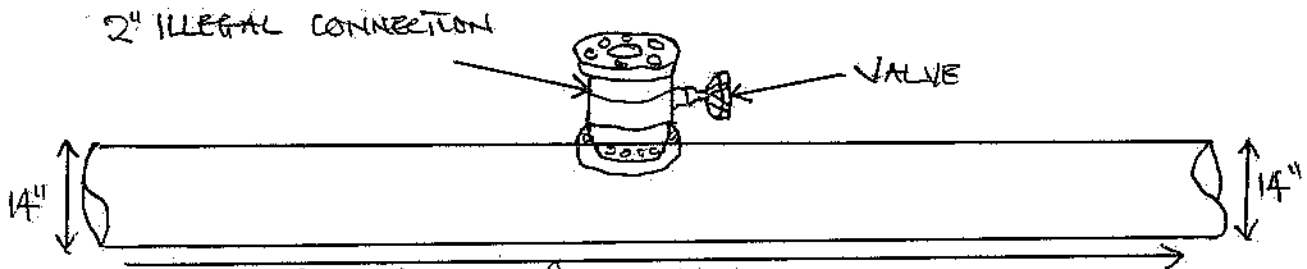
19. Fish/Nets/Ponds

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

20. 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) A SECTION 14" OKORDIA - RUMUEKPE PIPELINE AT AKARA-OLU SHOWING A 2" ILLEGAL CONNECTION (GATE VALVE) INSTALLED AT 12 O'CLOCK POSITION BY UNKNOWN PERSONS.



FROM OKORDIA - RUMUEKPE

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

21. impacted area boundary Coordinates (If more, Print and attach as an appendix) WGS 84

S/N	Northing LATITUDE	Easting LONGITUDE
	5.11155	6.50008
	5.11139	6.50017
	5.11131	6.49957
	5.11124	6.49978
	5.11128	6.49976
	5.11122	6.49986
	5.11115	6.49996
	5.11106	6.50036
	5.111	6.50041
	5.11123	6.50037
	5.11131	6.50052
	5.11138	6.50009
	5.11139	6.50002
	5.11146	6.50007
	5.1114	6.49993
	5.111005	6.49995
	5.111054	6.49981
	5.111144	6.50046
	5.111005	6.500356
	5.11054	6.50065
	5.111144	6.500544
	5.110991	6.500422
	5.110978	6.500366
	5.110964	6.499773
	5.111384	6.499565
	5.111545	6.49986

**ESTIMATION OF OIL SPILL VOLUME**

FID OF 2368826 14°OKORDIA - RUMUEKPE PIPELINE AT AKARA-OLU.

**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

665.00	m <sup>2</sup>
0.00	m <sup>2</sup>
0.00	m <sup>2</sup>

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

- i Estimated Recovered oil (Net)

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

Estimated Recovered oil (Net) V <sub>rec,j</sub>	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%)

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

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
---	-----------

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

4.00	m <sup>2</sup>
1.400	m
Clay	
8	%

- 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	JIV Date	Days on Site
6/9/2019 9:30	6/10/2019 15:00	1
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

0.000	m
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- ix Total depth below ground surface of infiltration of oil

1.400	m
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Estimated Volume of infiltrated oil, V <sub>inf,a</sub>	0.45 m <sup>3</sup>
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Estimated Volume of infiltrated oil, V <sub>inf,a</sub>	2.82 bbls
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**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>e</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

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

- vi Total depth below ground surface of infiltration of oil

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

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

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

- i Total Area covered by the oil (infiltration) 621.00 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 Clay
- iv  $P_e$  (effective porosity of the soil) 8%
- v Average depth below ground surface of infiltration of oil 0.000 m

Estimated Volume of infiltrated oil, $V_{inf c}$	0.01 m <sup>3</sup>
Estimated Volume of infiltrated oil, $V_{inf c}$	0.09 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) 0.00 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 0.000 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, $V_{inf}$	0.46 m <sup>3</sup>
Estimated Total Volume of infiltrated oil, $V_{inf}$	2.90 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)
<a href="#">Barely Visible</a>	0.00004		0.0000
<a href="#">Silvery</a>	0.00008		0.0000
<a href="#">Slight Color</a>	0.00015		0.0000
<a href="#">Bright Color</a>	0.0003		0.0000
<a href="#">Dull</a>	0.001		0.0000
<a href="#">Dark</a>	0.002		0.0000
<a href="#">Black oil</a>	0.1		0.0000
<a href="#">Emulsion (30% Oil)</a>	1		0.0000
Percent Total:		0%	0.0000

Estimated Volume of oil on open water, $V_{wat}$	0.00 m <sup>3</sup>
Estimated Volume of oil on open water, $V_{wat}$	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 3.16 bbls
- iii E-factor 15%

Estimated Volume of evaporated oil, $V_{evap}$	0.56 bbls
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Net Total Estimated Spilled Volume, $V_{Est}$	3.71 bbls
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**G. INCIDENT INFORMATION:**

**a. Impacted Area Details**

- Total calculated area of impact 0.06653Ha
- 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>NIL</u>	Barrels
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Controlled recovery/evacuation from source with no impact to environment:

<u>NIL</u>	Barrels
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<b>c. Net Estimated Spilled Volume <math>V_{Est}(bbls)^*</math> =</b>	<u>3.71 BARRELS</u>
<b>Estimated Reported Volume** <math>V_{rep}(bbls)</math> =</b>	<u>4 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:

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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## 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

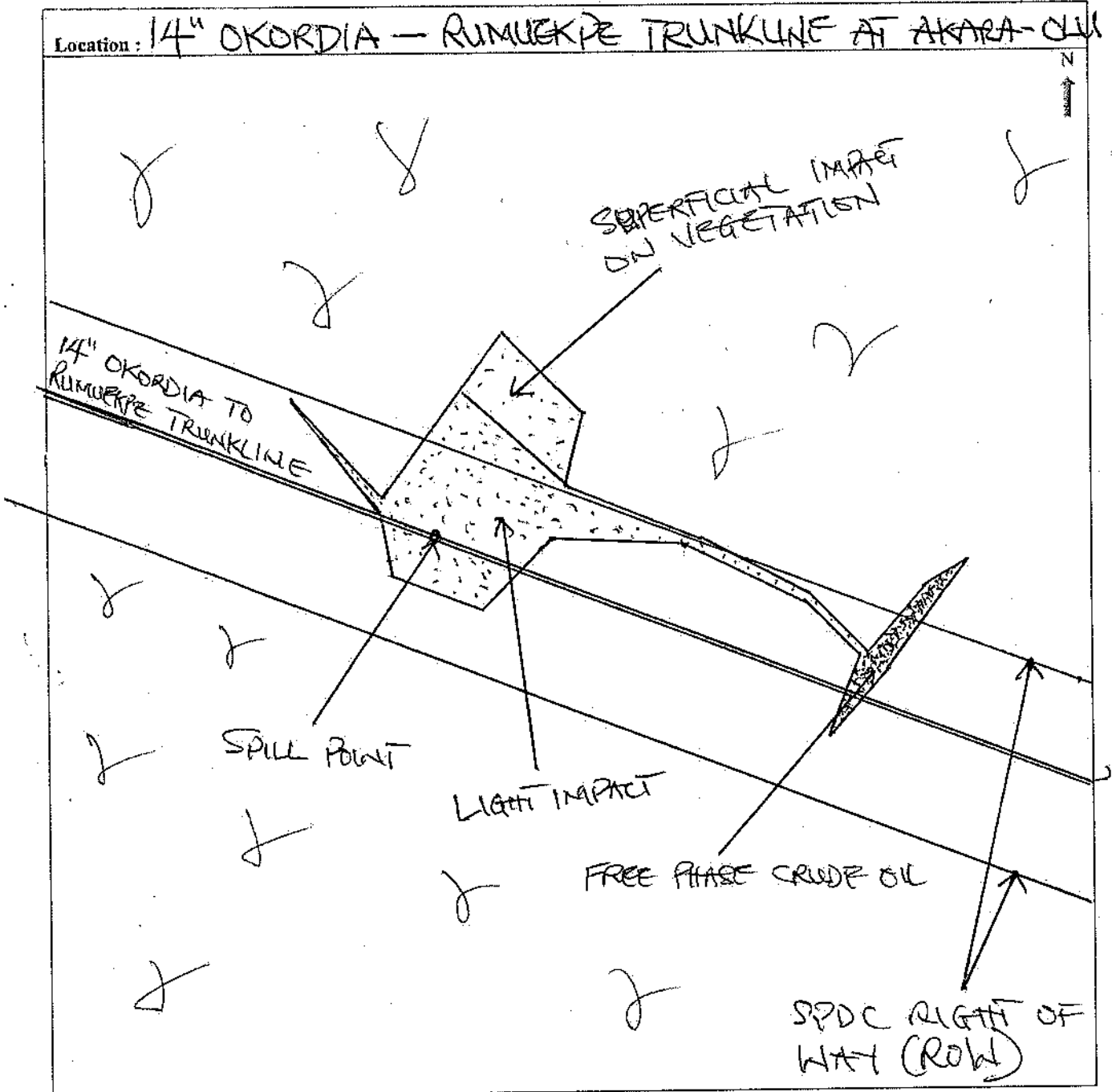
<p>This report was <u>filled</u>, <u>agreed</u> and <u>signed</u> by the following joint investigation team representatives:</p> <ul style="list-style-type: none"><li>• Host Community: <input checked="" type="checkbox"/></li><li>• Department of Petroleum Resources [DPR]: <input checked="" type="checkbox"/>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



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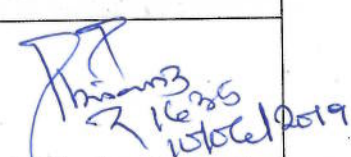
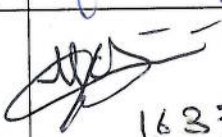
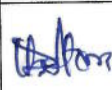
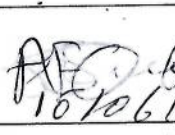

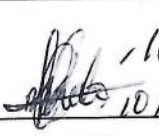

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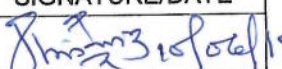

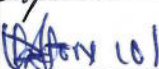

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**g. SIGNATORIES: JOINT INVESTIGATION TEAM MEMBERS**

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	UGWOR, EMEKA BARNABAS	DEPARTMENT OF PETROLEUM RESOURCES (DPR)	HIGHER TECHNICAL OFFICER II	 16:35 10/06/2019
2	EMENONYE UCHENWA DONALD	NATIONAL OIL SPILL DETECTION AND RESPONSE AGENCY (NOSDRA)	ESI	 1637 HRS 10-06-2019
3	IBITORU DASO	STATE MIN. OF ENVIRONMENT	ONR SC OFFICER	 10/06/19
4	EMMANUEL CHIDIEBERE	HOST COMMUNITY REPRESENTATIVE	P.A.T.O H.R.H.	 1635 HRS 10/06/2019
5	OPARA FREEDOM	THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIG.(SPDC)	JIT LEAD	 1635 HRS 10/06/2019
6	IME EFFIONG PROGRESS	NIGERIA POLICE FORCE	CID (JIV)	 1636 HRS 10/06/19
	EMMANUEL	HOST COM	REP	 1636 HRS 10/06/19

ACKNOWLEDGEMENT OF RECEIPT OF JIV REPORT COPIES			
S/N	ATTESTATION	NAME	SIGNATURE/DATE
1	DPR copy received by:	UGWOR, EMEKA B.	 10/06/19
2	NOSDRA copy received by:	EMENONYE UCHENWA D.	 10/6/19
3	STATE MINISTRY OF ENVIRONMENT copy received by	IBITORU DASO	 10/06/19
4	HOST COMMUNITY copy received by:	EMMANUEL CHIDIEBERE	 10/6/19

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