

JOINT INVESTIGATION REPORT

INCIDENT NO: 1483075 JIV report S/N: Nº 0000053

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

A. GENERAL INFORMATION:

1. Spill incident Number: 1483075 2. Type of incident* OIL SPILL
 3. Name of Location DIEBU CREEK WELL 1ST WELL HEAD
 4. Name of nearest community PERMABIRI 5. State: BAYELSA 6. LGA SOUTHERN IJAWI
 7. Type of Production facility/Installation WELL HEAD
 8. Asset owner/District SPDC / LAND 2

B. INCIDENT INFORMATION:

9. Details of incident
 a. Date of incident: 22ND AUGUST, 2015
 b. Start date/time of investigation: 14TH SEPTEMBER, 2015 / 14:06PM
 c. Investigation End date: 14TH SEPTEMBER 2015 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: DURING THE JOINT INVESTIGATION VISIT, OIL STAINS WERE OBSERVED ON THE BODY OF THE WELL HEAD. LIGHT OIL SHEEN WAS ALSO NOTICE.

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

- | | | |
|---|---|--|
| ☐ Drilled hole | ☐ Hack saw cut | ☐ Tear (_____), |
| ☐ Complete Rupture | ☐ Inward dent, | ☐ Well head tampering |
| ☐ Failed Weld-on illegal hot tap valve | ☐ Failed Clamp, | ☐ Missing Pipeline/Flowline |
| ☐ Crude oil theft (illegal bunkering) point, | ☐ Saver-pit over flow | ☐ Third party tampering with Clamp |
| ☐ Third party tampering with valve setting | ☐ Bulging Outward | ☐ Third party tampering with flange, |
| ☐ Flare System/Bund wall failure | ☐ Cold vent | ☐ Surge vessel overflow, |
| ☐ Valve Failure | ☐ Relief valve failure | ☐ Accidental 3 rd party equipment impact |

☒ Others(specify) CARRIER CONTROL UNIT WITH OPERATOR UNIT THAT OPERATE THE VALVE WAS REMOVED BY UNKNOWN PERSON.

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.

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g. Spill point coordinates

h. Measuring unit

Northings: <u>LAT</u>	Easting: <u>LONG</u>
<u>4.661969</u>	<u>6.065287</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

☐ Government reserved and designated protected area [,m]
☐ Drinking water source [,m]
☐ Built up area NONE SEEN [,m]
☐ Farmlands WITHIN VICINITY [,m]
☐ Fish Farm/Pond [,m]
☐ Fishing net [,m]
☐ 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:

REPAIR WORK PLANNED.

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	

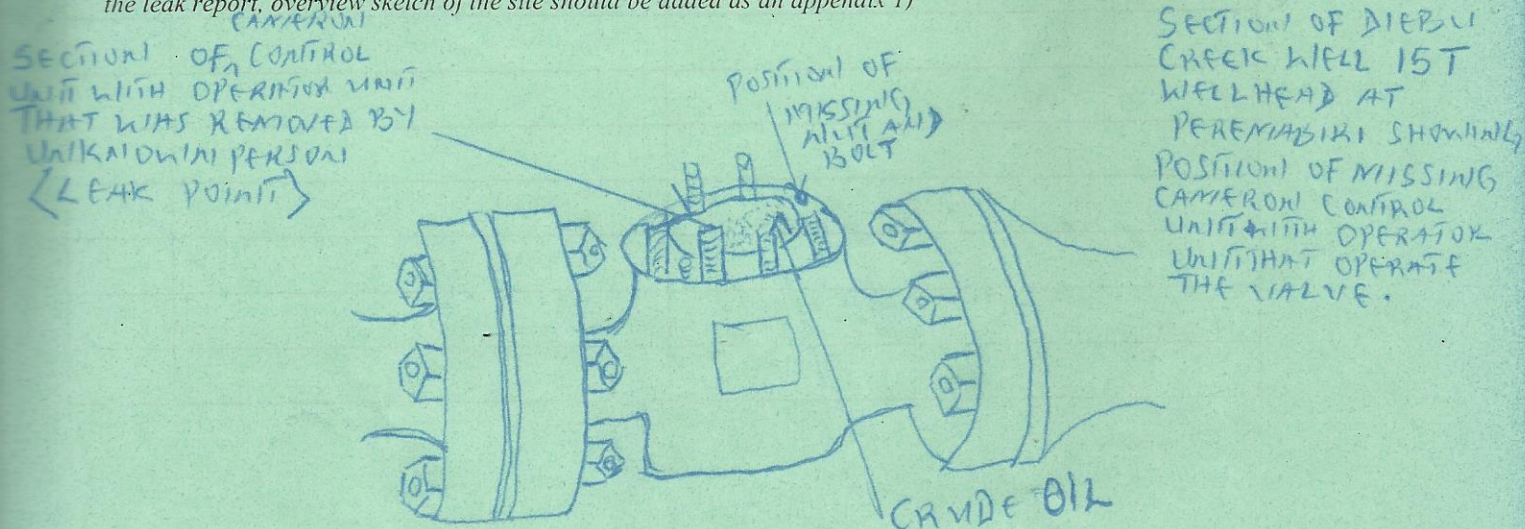
18. Fishing Nets/Fish Ponds

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)



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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)

[illegible]

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

7.00	m ²
	m ²
	m ²

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

- i Estimated Recovered oil (Net)

	bbls
--	------

Estimated Recovered oil (Net) $V_{rec,j}$	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
- ii Average depth of pool of free phase oil
- iii Emulsification factor (If applicable, else 0%)

7.00	m ²
0.001	m
0	%

Estimated Volume of pool of free phase oil, V_{pool}	0.01 m ³
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Estimated Volume of pool of free phase oil, V_{pool}	0.04 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)

	m ²
	m
- Select -	
0	%

- 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
8/22/2015 12:00	9/4/2015 14:06	13
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 Light

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

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

- ix Total depth below ground surface of infiltration of oil

0.000	m
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Estimated Volume of infiltrated oil, $V_{inf,a}$	0.00 m ³
--	---------------------

Estimated Volume of infiltrated oil, $V_{inf,a}$	0.00 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
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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
 iii Soil type
 iv P_e (effective porosity of the soil)
 v Average depth below ground surface of infiltration of oil

m²
 m²
 - Select -
 %
 m

Estimated Volume of infiltrated oil, $V_{inf c}$	0.00 m ³
Estimated Volume of infiltrated oil, $V_{inf c}$	0.00 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)
 ii Total Area of the pool of free phase oil in touch with soil
 iii Average depth below ground surface of infiltration of oil

m²
 m²
 m

Estimated Volume of infiltrated oil, $V_{inf d}$	0.00 m ³
Estimated Volume of infiltrated oil, $V_{inf d}$	0.00 bbls

Estimated Total Volume of infiltrated oil, V_{inf}	0.00 m ³
Estimated Total Volume of infiltrated oil, V_{inf}	0.00 bbls

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

- i Total area of oil on open water
 ii Table of average depth of oil on water based on coloration

m²

[Link to Coverage Visual Aid](#)

Spill Factors from USCG FOG (2000 Edition)

	Thickness (mm)	Percentage coverage (%)	Volume (m3)
<u>Barely Visible</u>	0.00004		0.0000
<u>Silvery</u>	0.00008		0.0000
<u>Slight Color</u>	0.00015		0.0000
<u>Bright Color</u>	0.0003		0.0000
<u>Dull</u>	0.001		0.0000
<u>Dark</u>	0.002		0.0000
<u>Black oil</u>	0.1		0.0000
<u>Emulsion (30% Oil)</u>	1		0.0000
Percent Total:		0%	0.0000

Estimated Volume of oil on open water, V_{wat}	0.00 m ³
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?
 ii Estimated volume available for evaporation

No
 bbls

iii **E-factor**

%

Estimated Volume of evaporated oil, V_{evap}	0.03 bbls
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Net Total Estimated Spilled Volume, V_{Est}	0.07 bbls
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G. INCIDENT INFORMATION:

a. Impacted Area Details

- Total calculated area of impact 0.0007119
- Impact within R.O.W 125
- Impact outside R.O.W NIL

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

Recovered oil $V_{rec.I}$:	<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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c. Net Estimated Spilled Volume $V_{Est}(bbls)^* =$

0.07 BARREL

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

0.1 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:

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.

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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]: ☒
- Asset Owner: ☒
- Signatories agree with reported findings: ☒
- Separate DPR form has been filled out with same findings: ☒

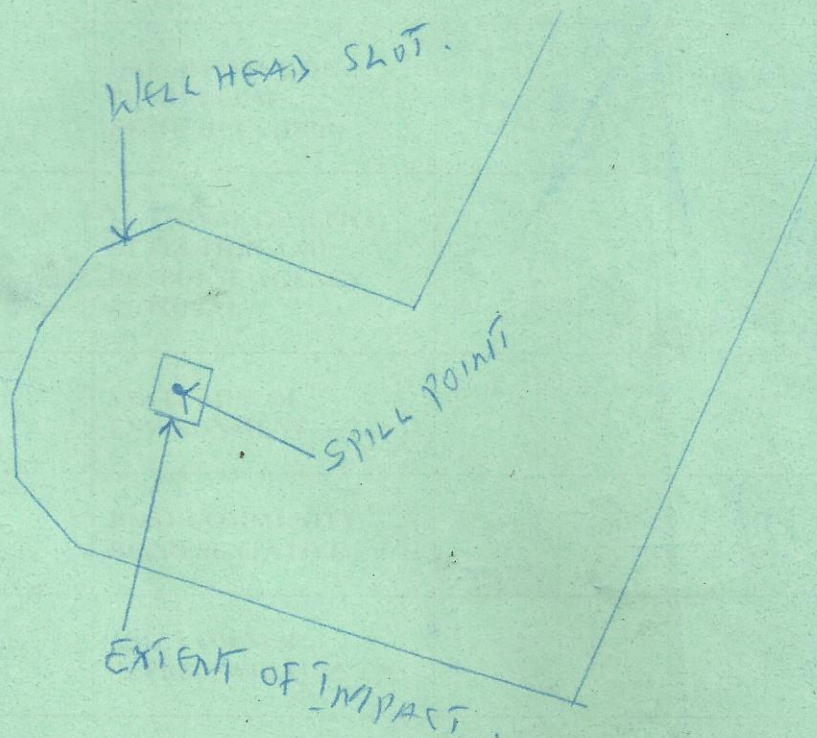
Tick as applicable

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f. Appendix 1: Overview sketch of the site

Location: DIEBU CREEK WELLS 1ST WELLS HEAD AT PEREMABIRI.

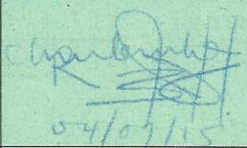
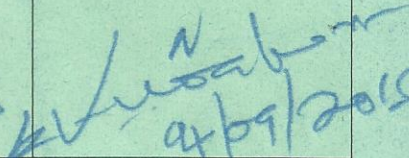
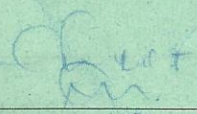
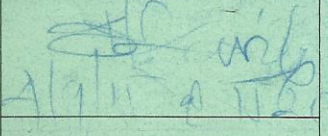
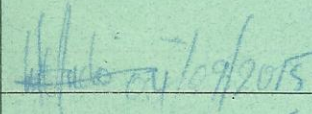


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g. SIGNATORIES: JOINT INVESTIGATION TEAM MEMBERS

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	CHIBUIKE CHIBUZO	DEPARTMENT OF PETROLEUM RESOURCES (DPR)	HSE	 04/09/15
2	KOMI ASAM	NATIONAL OIL SPILL DETECTION AND RESPONSE AGENCY (NOSDRA)	SFS	 04/09/2015
3	Timi Timi TARIWARI	STATE MIN. OF ENVIRONMENT	REGULATORY	FF 04/09/15
4	Chief Noel ungbila	HOST COMMUNITY REPRESENTATIVE	Chief Peremabari	 04/09/15
5	Aliso, Stl	ASSET OWNER REPRESENTATIVE	TL	 04/09/15
6	Imf Effiong	NIDE	CPL	 04/09/2015