

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED.

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 947350 JIV report S/N: 0038

(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: 947350 2. Type of incident* OIL SPILL
 3. Name of Location 12" OGBIA - EGBEMA PIPELINE
 4. Name of nearest community OBIAKPU 5. State: IMO 6. LGA EGBEMA
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District NPE/EGBEMA

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 22ND MARCH, 2013
 b. Start date/time of investigation: 24TH MARCH, 2013 / 9:30 AM
 c. Investigation End date: 24TH MARCH, 2013 Actual investigation duration, days: 1 DAY
 d. Description of spill point environment
 Firmed soil Loose soil Recently excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Drill Rig
 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, Third party tampering with Clamp
 Third party tampering with valve setting, Third party tampering with flange,
 Corrosion Saver-pit over flow, Surge vessel overflow,
 Bulging Outward Flare System/Bund wall failure Accidental 3rd party equipment
 impact Valve Failure com unit failure Cold vent
 Relief valve failure Others (specify) _____

f. Incident caused by:

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

g. Spill point coordinates

Measuring unit (m)		<u>MINNA MID-BELT</u>	
Northing:	<u>174 114.58</u>	Easting:	<u>477944.91</u>

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire.

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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 ^(Strong) 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 [Nil,m]
- Drinking water source [Nil,m]
- Built up area [Nil,m]
- Farmlands [12,m]
- Fish Farm/Pond [1,m]
- Fishing net [Nil,m]
- Others (specify).

12. Containment measures put in place;

- Booms Trench Dyke Natural depression Pit
 Others: _____

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

14. Was there any disruption to the investigation? [Y] NT

If yes give brief description:

NOT APPLICABLE

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

15. Structures / Properties

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

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16. Crops/Economic Trees

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

17. Fish/Nets/Ponds

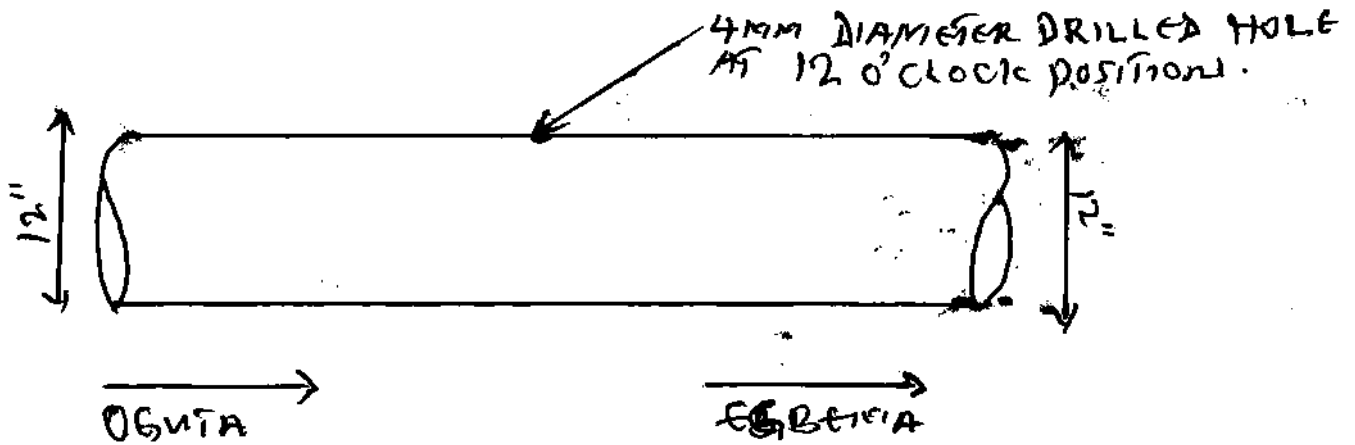
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
2	FISH NETS	SMALL SIZE SET ACROSS THE STREAM	2	CRUDE OIL WAS TRAPPED BY THE FISH NETS.

18. 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)

SECTION OF 12" OGUNIA - EGBEMA PIPELINE AT OBIUKPU SHOWING POSITION OF DRILLED HOLE AT 12 O'CLOCK POSITION.



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F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION
19. Impacted area boundary Coordinates (If more, Print and attach as an appendix)

S/N	Northing	Easting
SEE ATTACHED LIST FOR IMPACTED AREA COORDINATES (APPENDIX A)		

Total Area Impacted (Light impact)		
wp162	477942.06	174151.03
wp160	477948.19	174141.8
wp161	477951.24	174132.57
wp165	477951.23	174126.43
wp167	477949.29	174113.42
wp169	477941.95	174111.09
wp153	477938.87	174111.1
wp154	477935.8	174114.18
wp155	477938.89	174117.25
wp156	477941.99	174126.46
wp157	477942.02	174135.67
wp158	477938.98	174147.97
wp170	477932.83	174151.06
Impact On Water		
wp171	477871.42	174115.09
wp172	477850.34	174116.13
wp173	477823.2	174130.33
wp174	477793.56	174124.69
wp175	477758.7	174092.75
wp176	477615.71	174090.67
wp177	477540.98	174059.98
wp178	477468.13	174082.53
wp179	477425.54	174075.43
wp180	477352.58	174097.35
wp181	477273.05	174106.53
wp182	477252.8	174072.51
wp183	477210.22	174036.18
wp184	477025.9	174077.1
wp185	476983.1	174072.09
wp186	476938.64	174086.7
wp187	476863.49	174087.33
wp188	476731.14	174131.16
wp189	476732.61	174135.34
wp190	476864.09	174092.55
wp191	476939.47	174091.5
wp192	476983.52	174075.64
wp193	477026.1	174082.11
wp194	477209.38	174039.94
wp195	477250.3	174075.85
wp196	477271.59	174111.54
wp197	477354.46	174100.9
wp198	477425.85	174080.02
wp199	477468.86	174087.12
wp200	477541.08	174063.95
wp201	477615.19	174094.84
wp202	477757.34	174097.56
wp203	477793.46	174131.37
wp204	477823.31	174135.34
wp205	477851.28	174120.31

wp206	477870.07	174119.26
wp207	477945.01	174161.64

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G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.6817 Ha.
- Impact within SPDC R.O.W YES
- Impact outside SPDC R.O.W YES

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

Recovered oil V_{rec} :	<u>20</u>	Barrels
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22. Computation of estimated residual volume on site

a. Computation of estimated volume of pool of free phase oil (on land or confined water body).

- i. Area (m^2) occupied by pool of free phase oil 5,678
- ii. Average Depth (m) of pool of free phase oil 0.006
- iii. Emulsification factor: NIL

iv.

Estimated Volume of pool of free phase oil. V_{pool} :	<u>214.29</u>	barrels
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b. Computation of estimated volume of infiltrated oil in the soil (V_{inf}).

1. Estimated Volume of infiltrated oil at spill point ($V_{inf a}$)

- i. Area* (m^2) of soil covered by the oil: 4
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1.2
- iii. Soil type: CLAY iv. P_e (effective porosity of the soil): 8%
- v. Cause of spill: THIRD PARTY INTERFERENCE vi. Oil type: BONNARY LIGHT
- vii. Oil Residence time on site, day: 2 DAY
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0.0005
- ix. Estimated depth of infiltration around spill point: 1.2005

x.

Estimated Volume of infiltrated oil at spill point. $V_{inf a}$:	<u>2.42</u>	barrels
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2. Estimated Volume of infiltrated oil at second spill point [if applicable] ($V_{inf b}$)

- i. Area* (m^2) of soil covered by the oil: NIL
- ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NIL
- iii. Soil type: NIL iv. P_e (effective porosity of the soil): NIL
- v. Cause of spill: NIL vi. Oil type: NIL
- vii. Oil Residence time on site, day: NIL
- viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NIL
- ix. Estimated depth of infiltration around spill point: NIL

Estimated Volume of infiltrated oil at spill point. $V_{inf b}$:	<u>NIL</u>	barrels
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3. Estimated Volume of infiltrated oil outside immediate spill point(s) region ($V_{inf c}$)

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- i. Area (m²) of soil covered by the oil: 283
- ii. Area (m²) of the pool of free phase oil in touch with soil: 52
- iii. Average Depth (m) below ground surface of infiltration of oil: _____
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%
- vi.

Estimated Volume of infiltrated oil. At V _{inf} :	<u>0.09</u>	barrels
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23. Computation of estimated volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: NIL
- ii. Table of average depth of oil on water based on coloration **Spill Factors from USCG FOG (2000 Edition)

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015	NIL	
Bright Color	0.0003		
Dull	0.001	APPLICABLE	
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		

- iii.

Percent Total	100%
Estimated Volume of oil on open water. V _{wat} :	<u>NIL</u>

Barrels

24. Calculation of evaporated volume:

- i. Estimated Volume available for evaporation within surface area: 216.8
- ii. E-Factor: 25%
- iii.

Estimated Volume of evaporated oil. V _{evap} :	<u>72.27</u>	Barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Oil Residence time	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

25. Net Estimated Spilled Volume V_{est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls) =

72.27 + NIL + 2.51 + 214.29 + 20

= 309.07 BARRELS

Estimated Reported Volume V_{ren}(bbls) =** 310 BARRELS.

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*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 m³ to barrels is Volume (m3) 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 column estimation; record the calculation in a plain sheet of paper and attach to the JIV report.

26. GENERAL STATUS OF THE SITE

A. Joint investigation of the incident site found that there is no residual impact after the initial response and therefore recommend that the site be closed out <input type="checkbox"/>
B. Investigation of the incident site showed that there is residual impact on site requiring further works <input checked="" type="checkbox"/>

27. REPRESENTATIVES

This report was filled, agreed and signed on the 24 / 03 / 2013 by joint investigation representatives from

- Host Community:
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings

Tick as applicable

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28. Appendix 1: Overview sketch of the site

