

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 8511

(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: 883053 2. Type of incident * OIL SPILL
 3. Name of Location 20 INCH OTUMARA - ESCRAVOS PIPELINE AT ESCRAVOS
 4. Name of nearest community ADJUDIABO 5. State: DELTA 6. LGA WARRI - SOUTH WEST
 7. Type of Production facility/Installation TRUNKLINE 8. Asset owner/ District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24/10/2012
 b. Start date/time of investigation: 25TH AND 30TH OCTOBER, 2012.
 c. Investigation End date: 30/10/2012
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig
 e. Description of leak point (tick as applicable);
 Drilled hole Hack saw cut Explosive tear,
 Complete Rupture Inward dent, Well head tampering
 Failed Weld-on illegal hot tap valve, 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
 Outward dent Flare System/Bund wall failure
 Valve Failure com unit failure Cold vent
 Relief valve failure Others (specify) _____

- f. Incident caused by:
 Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit	
Northing: <u>173403m</u>	Easting: <u>308898m</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

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Raining Sunny

11. Distance from the nearest sensitive habitat

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

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

13. Any pictures or video coverage? [N]

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

If yes give brief description:

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
NONE WITHIN AREA OF IMPACT					

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	PALM TREES		YES			/
	MANGROVE	YES		YES		

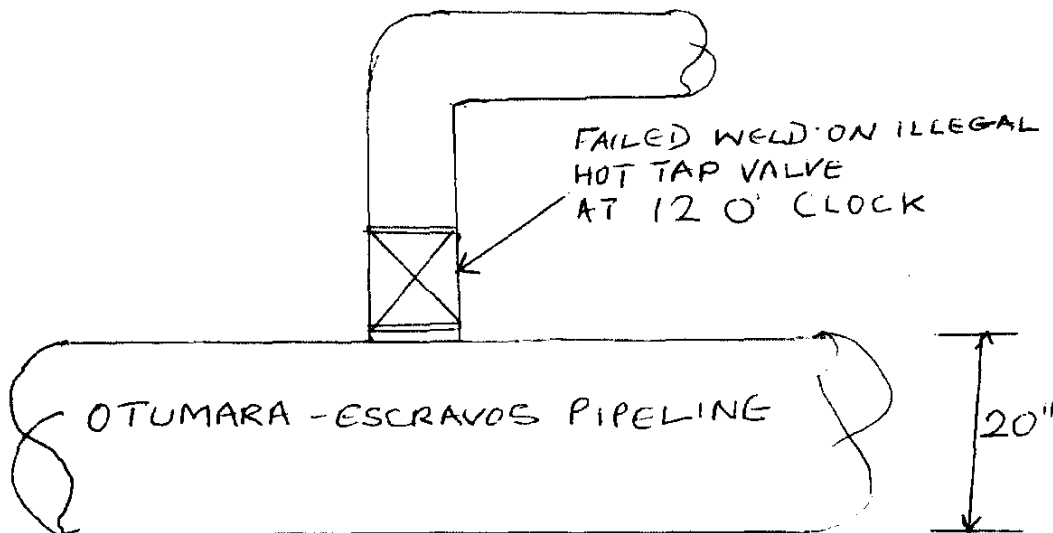
17. Fish/Nets/Ponds

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

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)



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

19. Impacted area boundary Coordinates (If more than 12 points, Attach as an appendix 2)

S/N	Northing	Easting
SP	173403	308898
	173394	308912
	173398	308898
	173401	308883
	173767	308983
	173762	309008
	173767	308983
	173773	308961
	173948	309050
	173979	309058
	173966	309076
	173985	309079
	173938	309071

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 248,585.12 m²
- Impact within SPDC R.O.W 26,955.64 m²
- Impact outside R.O.W 221,629.48 m²

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

Recovered oil V _{rec} :	<u>NIL</u>	barrels
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20. Computation of the residual volume on site

- a. Computation of volume of pool of free phase oil (on land or confined water body).
- Area (m²) occupied by pool of free phase oil NIL
 - Average Depth (m) of pool of free phase oil NOT APPLICABLE

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iii. Emulsification factor: NOT APPLICABLE

iv.

Volume of pool of free phase oil. V_{pool} :	NIL
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 barrels

b. Computation of volume of infiltrated oil in the soil (V_{inf}):

- i Area *(m²) covered by the oil: NIL
 - ii Area of the pool of free phase oil in touch with soil: NIL
 - iii Average Depth (m) below ground surface of infiltration of oil: NOT APPLICABLE
 - iv Soil type: NOT APPLICABLE
 - v P_e (effective porosity of the soil): NOT APPLICABLE
- iv.

Volume of infiltrated oil. V_{inf}	NIL
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 barrels

21. Computation of volume of oil on open water based on standard coloration.

- i. Total area of oil on open water: 248,585.12 m²
- ii. Table of average depth of oil on water based on coloration **

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004	5%	0.0004971702
Silvery	0.00008	15%	0.0029830214
Slight Color	0.00015	/	/
Bright Color	0.0003	/	/
Dull	0.001	5%	0.0124292560
Dark	0.002	10%	0.0497170240
Black oil	0.1	20%	4.9717024
Emulsion (30% Oil)	1	45%	111.863304
Percent Total		100%	Total Volume <u>116.90 m³</u>

iii.

Volume of oil on open water. V_{wat} :	735.22
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 barrels

22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM
- ii. E-Factor: 15%

iii.

Volume of evaporated oil. V_{evap} :	129.75
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 barrels

Oil Type	Days on site	Bonny Light	Bonny Medium
Period Since Oil Spill	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

*If area is not same as the total area of impact, please indicate in the overview sketch
 ** Spill Factor from USCG FOG (2000 Edition)

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23. Gross Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{in}(bbls) + V_{pool}(bbls) + V_{rec}(bbls)$ $V_{Est}(bbls) = 865 BBLs$
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{in}(bbls) + V_{pool}(bbls) + V_{rec}(bbls)$ $V_{Est}(bbls) = 571 BBLs$

*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 Total volume VT (m3) x 6.29
*Emulsification factor for spill on water to consider is 60% of volume of oil

25. 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"/>

26 REPRESENTATIVES

This report was filled and signed on the 25/30/10/2012 at incident site by joint investigation representatives from

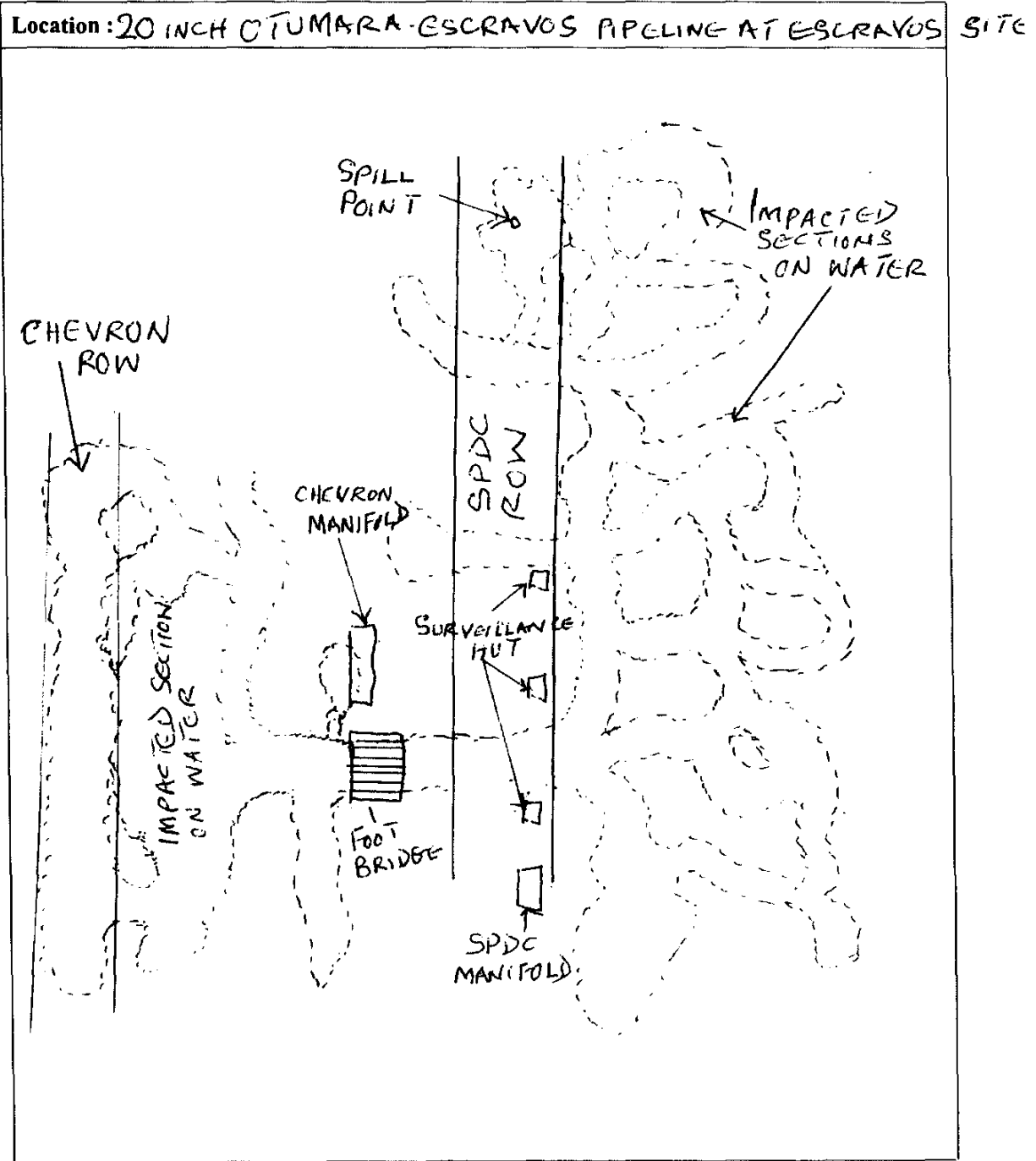
- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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27. Appendix 1: Overview sketch of the site



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21. Appendix 2: TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION

S/N	Northing	Easting
	175538	309679
	175552	309544
	175218	309681
	175339	309381
	175249	309273
	175211	309277
	175178	309205
	175182	309144
	174963	309205
	175208	309262
	175028	309201
	175099	309217
	175132	309201
	175164	309175
	175130	309206
	175081	309273
	174815	309250
	174266	309030

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0510

(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: 883053 2. Type of incident * OIL SPILL
 3. Name of Location 20 INCH OTUMARA - ESCRAVOS PIPELINE AT SAGHARA
 4. Name of nearest community UGBOEGUNGUN 5. State: DELTA 6. LGA WARRI SOUTH WEST
 7. Type of Production facility/Installation TRUNKLINE 8. Asset owner/ District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24/10/2012
 b. Start date/time of investigation: 25/10/2012 AT 1310 HRS
 c. Investigation End date: 25/10/2012
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig
 e. Description of leak point (tick as applicable):
 Drilled hole Hack saw cut Explosive tear,
 Complete Rupture Inward dent, Well head tampering
 Failed Weld-on illegal hot tap valve, 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
 Outward dent Flare System/Bund wall failure
 Valve Failure com unit failure Cold vent
 Relief valve failure Others (specify) _____

- f. Incident caused by:
 Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit	
Northing: <u>179825m</u>	Easting: <u>304295m</u>

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

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C. RISK ASSESSMENT

10. Type of environment:

- Land Swamp Water Seasonal swamp

i. Type of environment to which oil has spread:

- Land Swamp Water River (identify) _____

ii. Weather condition

- Raining Sunny

11. Distance from the nearest sensitive habitat

- Government reserved and designated protected area [.m]
 Drinking water source [.m]
 Built up area [.m]
 Farmlands [.m]
 Fish Farm/Pond [.m]
 Fishing net [.m]
 Others (specify) _____

12. Containment measures put in place:

- Booms Trench Dyke
 Others: _____

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

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

If yes give brief description:

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
NONE WITHIN AREA OF IMPACT					

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16. Crops/Economic Trees

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

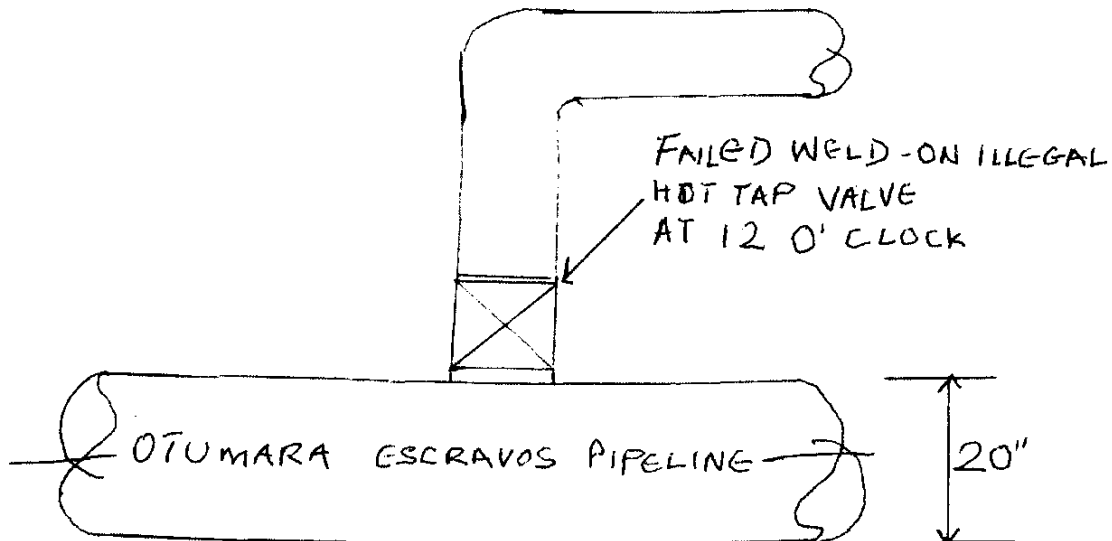
17. Fish/Nets/Ponds

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

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)



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iii. Emulsification factor: NOT APPLICABLE

iv.

Volume of pool of free phase oil. V_{pool} :	0.01	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i Area *(m²) covered by the oil: 51.36 m²
- ii Area of the pool of free phase oil in touch with soil: NIL
- iii Average Depth (m) below ground surface of infiltration of oil: 0.1m
- iv Soil type: CLAY
- v P_e (effective porosity of the soil): 8%

iv.

Volume of infiltrated oil. V_{inf}	2.58	barrels
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21. Computation of 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**

	Thickness (mm)	Percentage coverage	Volume (m ³)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Color	0.00015		
Bright Color	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>NIL m³</u>

NOT APPLICABLE

iii.

Volume of oil on open water. V_{wat}	NIL	barrels
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22. Calculation of evaporated volume:

- i. Oil type: BONNY MEDIUM
- ii. E-Factor: 15%

iii.

Volume of evaporated oil. V_{evap} :	0.46	barrels
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Evaporation Factors (E-Factor) for SPDC Crude oil			
Oil Type	Days on site	Bonny Light	Bonny Medium
Period Since Oil Spill	< 1 day	10%	5%
	1-7 days	25%	15%
	> 7 days	40%	25%

*If area is not same as the total area of impact, please indicate in the overview sketch
 ** Spill Factor from USCG FOG (2000 Edition)

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23. Gross Total Estimated Spilled Volume

$$V_{EST}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{int}(bbls) + V_{pool}(bbls) + V_{recd}(bbls)$$

$V_{EST}(bbls) =$ 3 BBLs

24. Net Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{int}(bbls) + V_{pool}(bbls) + V_{recd}(bbls)$$

$V_{Est}(bbls) =$ 3 BBLs

*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 Total volume VT (m3) x 6.29

*Emulsification factor for spill on water to consider is 60% of volume of oil.

25. 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

B. Investigation of the incident site showed that there is residual impact on site requiring further works

26 REPRESENTATIVES

This report was filled and signed on the 25/10/2012 at incident site 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]:

Tick as applicable

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0510 883053

27. Appendix 1: Overview sketch of the site

Location: 20 INCH OTUMARA - ESCRAVOS PIPELINE SPILL SITE

