



No. 00616

**A. GENERAL INFORMATION:**

1. Spill incident Number: 641066 (POINT 1)
2. Name of Location 24" CANTHORNE CHANNEL - BONNY BLOCK VALVE STATION
3. Name of nearest community KALIBIAMA
4. State RIVER LGA BONNY
5. Type of Production facility/Installation PIPELINE Asset owner /District UIG/P/NESP

**B. INCIDENT INFORMATION:**

6. Details of incident

- a. Date of incident 29<sup>TH</sup> MARCH, 2011
- b. Date/Period of investigation, (1<sup>ST</sup> TO 3<sup>RD</sup>) APRIL, 2011
- c. Description of spill point environment

- |  |          |  |
|--|----------|--|
| <input type="checkbox"/> Firmed soil               | [Y] [N]✓ | BONNY (BVS) BLOCK VALVE STATION AT KALIBIAMA WAS OBSERVED TAMPERED WITH, SOME BOLTS AND NUTS OF FLANGES MISSING. |
| <input type="checkbox"/> Loose soil                | [Y]✓ [N] |  |
| <input type="checkbox"/> Previously excavated area | [Y] [N]✓ |  |
| <input type="checkbox"/> Under water               | [Y] [N]✓ |  |
| <input type="checkbox"/> Swampy                    | [Y]✓ [N] |  |
| <input type="checkbox"/> Exposed pipe surface      | [Y]✓ [N] |  |

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

- |  |          |   |
|--|----------|---|
| <input type="checkbox"/> Drilled hole,                                 | [Y] [N]✓ | AFTER JOINT INVESTIGATION OF THE INCIDENT SPILL WAS FOUND TO BE DUE TO THIRD PARTY INTERFERENCE |
| <input type="checkbox"/> Hack saw cut,                                 | [Y] [N]✓ |   |
| <input type="checkbox"/> Explosive tear,                               | [Y] [N]✓ |   |
| <input type="checkbox"/> Complete Rupture                              | [Y] [N]✓ |   |
| <input type="checkbox"/> Inward dent,                                  | [Y] [N]✓ |   |
| <input type="checkbox"/> Well head tampering                           | [Y] [N]✓ |   |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve,         | [Y] [N]✓ |   |
| <input type="checkbox"/> Missing pipeline (flowline)                   | [Y] [N]✓ |   |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point,    | [Y] [N]✓ |   |
| <input type="checkbox"/> Third party tampering with Clamp Bolt/Nut,    | [Y] [N]✓ |   |
| <input type="checkbox"/> Third party tampering with valve setting,     | [Y]✓ [N] |   |
| <input type="checkbox"/> Third party tampering with flange Nuts/bolts, | [Y]✓ [N] |   |
| <input type="checkbox"/> Corrosion,                                    | [Y] [N]✓ |   |
| <input type="checkbox"/> Saver-pit over flow,                          | [Y] [N]✓ |   |
| <input type="checkbox"/> Surge vessel overflow,                        | [Y] [N]✓ |   |
| <input type="checkbox"/> Outward dent                                  | [Y] [N]✓ |   |
| <input type="checkbox"/> Others (specify). <u>NOT APPLICABLE</u>       |          |   |

e. Spill point coordinates (MINNA MID-BERT)

Northing: (M)

Easting: (M)

SP1:- 51455.96

521227.57

SP2:- 51460.06

521226.49



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C. RISK/DAMAGE ASSESSMENT

7. Type of environment of spill site:

- Land
- Swamp
- water

Type of environment of which oil has spread:

- Land
- Swamp
- water

8. Distance from the nearest sensitive habitat

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

[ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m]  
 [ ,m] } NOT APPLICABLE

9. Containment measures put in place;

- Booms [Y] [N]
- Trench [Y] [N]
- Dyke [Y] [N]

Others: \_\_\_\_\_

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

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

If yes give brief description:

NOT APPLICABLE

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

A. Structures / Properties

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



B. Crops/Economic Trees

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

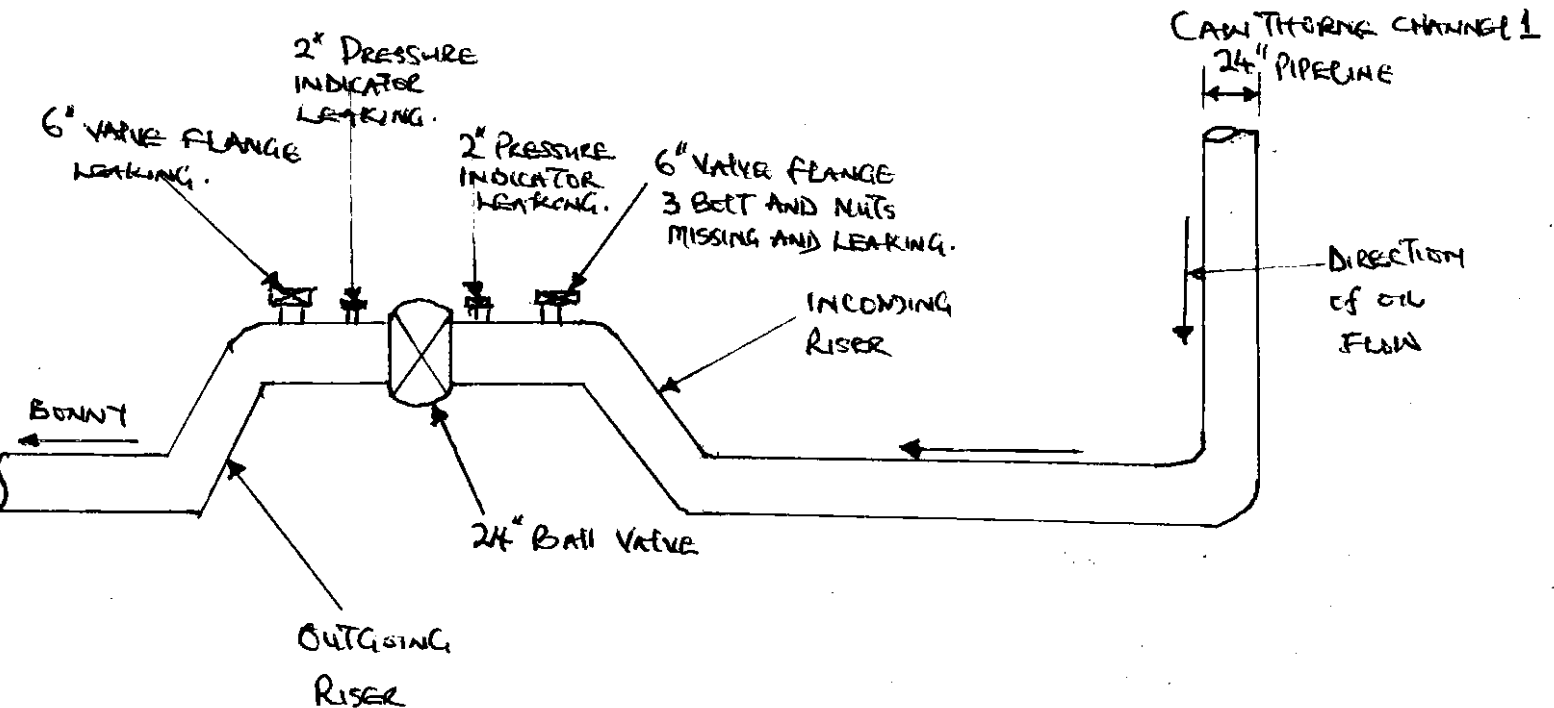
C. Fish/Nets/Ponds

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

D. Others (Specify) i.e. Animal Traps

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

E. GRAPHIC DESCRIPTION OF LEAK POINT (Details should be contained in leak repair report)





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

E. Coordinates (MINNA MID - BIT)

S/N	Northing (METERS)	Easting (METERS)
P1	51462.13	521215.26
P2	51529.69	521218.46
P3	51452.87	521236.82
<del>P4</del>	<del>51531.64</del>	<del>521209.21</del>
P5	51526.64	521209.21
P4	51532.78	521212.30



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**G. INCIDENT INFORMATION:**

17 Impacted Area Details

- a. Total calculated area of impact 0.11 Ha.
- Impact within SPDC R.O.W 0.11 Ha.
  - Impact outside R.O.W NIL

18 Volume of oil recovered before completion of JIV ( $V_{rec}$ ):

Recovered oil $V_{rec}$ :	<u>NIL</u>	barrels
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19. Computation of the residual volume on site

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

- i. Area ( $m^2$ ) occupied by pool of free phase oil \_\_\_\_\_
- ii. Average Depth (m) of pool of free phase oil \_\_\_\_\_
- iii.

Volume of pooled of free phase oil. $V_{pool}$ :	<u>NIL</u>	barrels
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iv.

b. Computation of volume of infiltrated oil in the soil ( $V-3$ ).

- i Area ( $m^2$ ) covered by the oil: \_\_\_\_\_
- ii Average Depth (m) below ground surface of infiltration of oil: \_\_\_\_\_
- iii Soil type: \_\_\_\_\_
- iv.  $p_e$  (effective porosity of the soil): \_\_\_\_\_
- v.

Volume of infiltrated oil in the soil $V-3$ :	<u>NIL</u>	barrels
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20. Computation of volume of oil on open water based on standard coloration.

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004		
Silvery	0.00008		
Slight Colour	0.00015		
Bright Colour	0.0003		
Dull	0.001		
Dark	0.002		
Black oil	0.1	<u>100</u>	<u>0.11m<sup>3</sup></u>
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>0.69</u> bbl

Spill Factors from USCG FOG (2000 Edition)



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED  
JOINT INVESTIGATION REPORT FOR INCIDENT NO: 84/866

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Volume of oil on open water - $V_{wat}$	0.69	barrels
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21. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%
- iii.

Volume of evaporated oil - $V_{vap}$	0.23	barrels
--------------------------------------	------	---------

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

9. Gross Total Estimated Spilled Volume  $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 0.23 + 0.69 + NIL + NIL = 0.92 bbls$

10. Net Total Estimated Spilled Volume  $V_{Est}(bbls) = V_{vap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 0.23 + (0.69 * 0.6) + NIL + NIL = 0.64 bbls$

- \* Calculation of the respective estimated volume is to done using the new spill estimation software on site
- \* Conversion of m3 to barrel is Total volume VT (m3) x6.29
- \* Emulsification factor for spill on water to consider is 60% of volume of oil.

This report was filled and signed on the 03 / 04 / 20 11 at incident site by joint investigation representative 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



No. 00621

**A. GENERAL INFORMATION:**

1. Spill incident Number: 6410EE (POINT 2)
2. Name of Location 24<sup>th</sup> ALAKIRI - BONNY PIPELINE
3. Name of nearest community KALIBIAMA
4. State RIVERS LGA BONNY
5. Type of Production facility/Installation PIPELINE Asset owner /District UIG/P/NESP

**B. INCIDENT INFORMATION:**

6. Details of incident

- a. Date of incident 29<sup>th</sup> MARCH, 2011
- b. Date/Period of investigation (4<sup>th</sup> TO 8<sup>th</sup>), APRIL 2011

c. Description of spill point environment

- |  |      |      |
|--|------|------|
| <input type="checkbox"/> Firmed soil               | [Y]  | [N]✓ |
| <input type="checkbox"/> Loose soil                | [Y]✓ | [N]  |
| <input type="checkbox"/> Previously excavated area | [Y]  | [N]✓ |
| <input type="checkbox"/> Under water               | [Y]  | [N]✓ |
| <input type="checkbox"/> Swampy                    | [Y]✓ | [N]  |
| <input type="checkbox"/> Exposed pipe surface      | [Y]✓ | [N]  |

TEAM INVESTIGATION OBSERVED AROUND SPILL POINT, THERE WERE TWO (2) DENIS CAUSE BY UNSUCCESSFUL ATTEMPT.

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

- |  |      |      |
|--|------|------|
| <input type="checkbox"/> Drilled hole,                                 | [Y]✓ | [N]  |
| <input type="checkbox"/> Hack saw cut,                                 | [Y]  | [N]✓ |
| <input type="checkbox"/> Explosive tear,                               | [Y]  | [N]✓ |
| <input type="checkbox"/> Complete Rupture                              | [Y]  | [N]✓ |
| <input type="checkbox"/> Inward dent,                                  | [Y]  | [N]✓ |
| <input type="checkbox"/> Well head tampering                           | [Y]  | [N]✓ |
| <input type="checkbox"/> Failed Weld-on illegal hot tap valve,         | [Y]  | [N]✓ |
| <input type="checkbox"/> Missing pipeline (flowline)                   | [Y]  | [N]✓ |
| <input type="checkbox"/> Crude oil theft (illegal bunkering) point,    | [Y]  | [N]✓ |
| <input type="checkbox"/> Third party tampering with Clamp Bolt/Nut,    | [Y]  | [N]✓ |
| <input type="checkbox"/> Third party tampering with valve setting,     | [Y]  | [N]✓ |
| <input type="checkbox"/> Third party tampering with flange Nuts/bolts, | [Y]  | [N]✓ |
| <input type="checkbox"/> Corrosion,                                    | [Y]  | [N]✓ |
| Type: <u>NOT APPLICABLE</u>  |      |      |
| <input type="checkbox"/> Saver-pit over flow,                          | [Y]  | [N]✓ |
| <input type="checkbox"/> Surge vessel overflow,                        | [Y]  | [N]✓ |
| <input type="checkbox"/> Outward dent                                  | [Y]  | [N]✓ |
| <input type="checkbox"/> Others (specify). <u>NOT APPLICABLE</u>       |      |      |

AFTER JOINT INVESTIGATION OF THE INCIDENT, SPILL WAS FOUND TO BE DUE TO THIRD PARTY INTERFERENCE.

e. Spill point coordinates

Northing: (MINNA MID-BEIT) Easting: 520727.61m  
 (Spill point) 54507.16m



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C. RISK/DAMAGE ASSESSMENT

7. Type of environment of spill site:

- Land
- Swamp ✓
- water ✓

Type of environment of which oil has spread:

- Land
- Swamp ✓
- water ✓

8. Distance from the nearest sensitive habitat

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

[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
[ ,m]  
} NOT APPLICABLE

9. Containment measures put in place;

- Booms [Y] ✓ [N]
- Trench [Y] [N] ✓
- Dyke [Y] [N] ✓

Others: \_\_\_\_\_

10. Any pictures or video coverage? [Y] ✓ [N]

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

If yes give brief description:

"THE KALIBIAMA COMMUNITY AS REPRESENTED BY THE LEADERSHIP OF THE (CDC) COMMUNITY DEVELOPMENT COMMITTEE CLAIM THE CAUSE OF SPILL ON 24" ALAKIRI-BENNY TRUNKLINE TO BE CORROSION, WHILE JOINT INVESTIGATION TEAM OBSERVED THE CAUSE TO BE DUE TO DRILLED HOLE AND ASSESSMENT OF IMPACTED AREA AND RECOVERY WORK WAS DISRUPTED BY THE KALIBIAMA COMMUNITY."

A. Structures / Properties

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





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B. Crops/Economic Trees

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

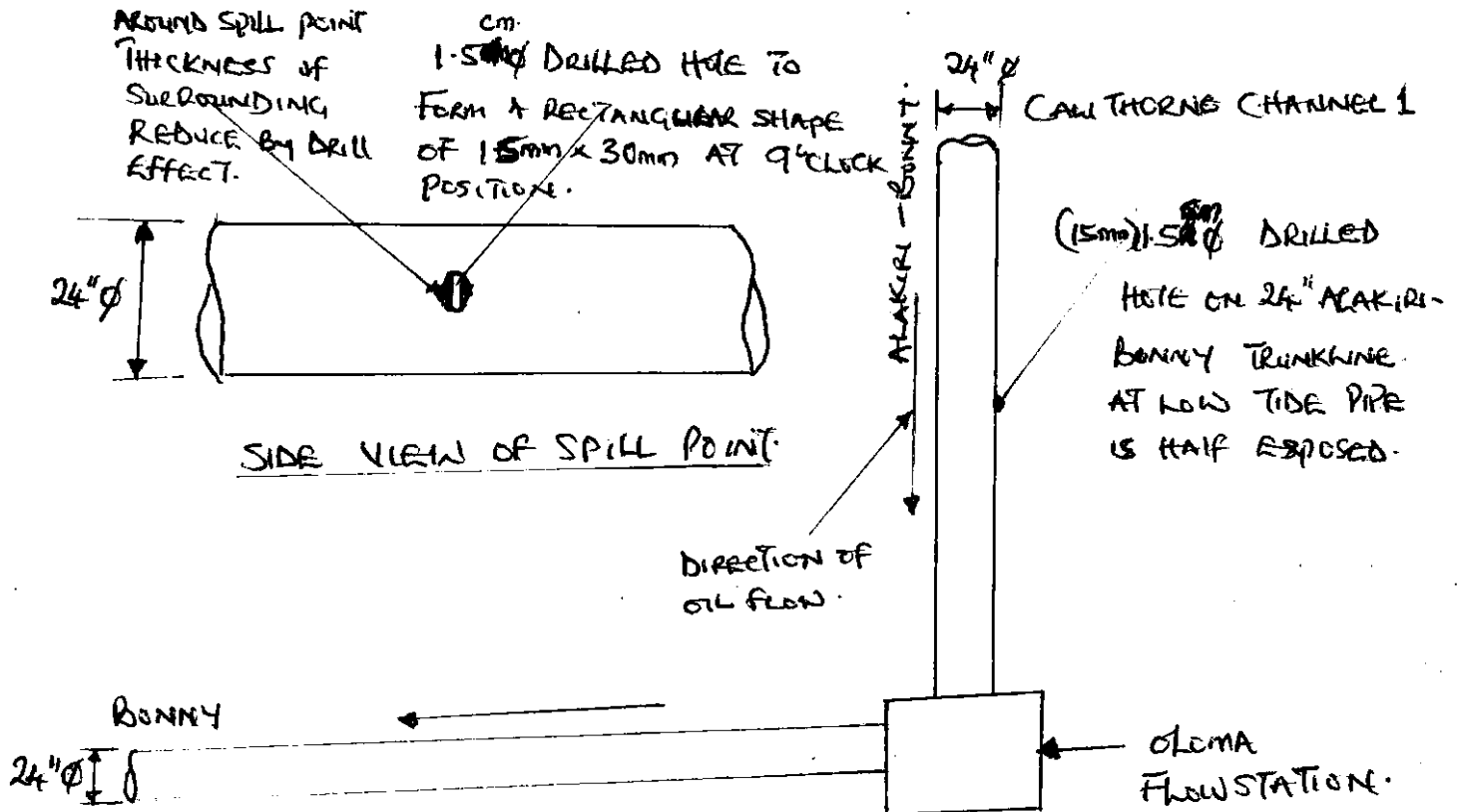
C. Fish/Nets/Ponds

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

D. Others (Specify) i.e. Animal Traps

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

E. GRAPHIC DESCRIPTION OF LEAK POINT (Details should be contained in leak repair report)





F: TABLE SHOWING SOME OF COORDINATES TAKEN DURING JIV FOR AREA CALCULATION  
E. Coordinates (MINNA MID-BELT)

S/N	Northing (Meters)	Easting (Meters)
Pt 1	53839.514	520840.472
Pt 2	54239.85	520764.112
Pt 3	54454.954	520721.351
Pt 5	54531.852	520666.002
Pt 6	54568.655	520696.899
Pt 7	54491.724	520770.745
Pt 8	54461.264	520830.449
Pt 9	54436.406	520827.727
Pt 10	54481.029	520758.357
Pt 11	54310.428	520798.155
Pt 15	54070.794	520822.373
a 3	53526.362	520903.192
a 4	53523.887	520892.267
b 1	53786.414	521485.295
b 3	53703.439	521426.005
b 10	53556.500	521049.948
b 12	53715.065	521418.253
c 1	54969.196	520938.128
c 2	54977.192	520977.493
c 3	54935.171	521086.610
c 4	54859.713	521165.704
c 5	54923.423	521083.940
c 7	54964.008	520995.293



No. **0621**

**G INCIDENT INFORMATION:**

17 Impacted Area Details

- a. Total calculated area of impact 3.86 Ha.
- Impact within SPDC R.O.W 1.74 Ha.
  - Impact outside R.O.W 2.12 Ha.

18 Volume of oil recovered before completion of JIV ( $V_{rec}$ ):

Recovered oil $V_{rec}$ :	<u>NIL</u>	barrels
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19. Computation of the residual volume on site

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

- i. Area ( $m^2$ ) occupied by pool of free phase oil 5340  $m^2$
- ii. Average Depth (m) of pool of free phase oil 0.001m
- iii.

Volume of pooled of free phase oil. $V_{pool}$ :	<u>33.59</u>	barrels
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iv.

b. Computation of volume of infiltrated oil in the soil ( $V_3$ ).

- i. Area ( $m^2$ ) covered by the oil: 23,160  $m^2$
- ii. Average Depth (m) below ground surface of infiltration of oil: 0.0012m
- iii. Soil type: CLAY
- iv.  $P_e$  (effective porosity of the soil): 8%
- v.

Volume of infiltrated oil in the soil. $V_3$ :	<u>13.98</u>	barrels
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20. Computation of volume of oil on open water based on standard coloration.

	Thickness (mm)	Percentage coverage	Volume ( $m^3$ )
Barely Visible	0.00004		
Silvery	0.00008		
Slight Colour	0.00015		
Bright Colour	0.0003		
Dull	0.001	<u>80%</u>	<u>0.021 <math>m^3</math></u>
Dark	0.002	<u>20%</u>	<u>0.011 <math>m^3</math></u>
Black oil	0.1		
Emulsion (30% Oil)	1		
	Percent Total	100%	Total Volume

NOTE: - AREA OF IMPACT  
 ON OPEN WATER IS  
 APPROXIMATELY  
26700  $m^2$

0.2885 bbl

Spill Factors from USCG FOG (2000 Edition)



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Volume of oil on open water  $V_{wat}$

0.2

barrels

21. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 25%
- iii.

Volume of evaporated oil  $V_{vap}$

15.93

barrels

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

9. Gross Total Estimated Spilled Volume  $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 15.93 + 0.2 + 13.98 + 33.59 = 63.69$  BARRELS

10. Net Total Estimated Spilled Volume  $V_{Est}(bbls) = V_{vap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 15.93 + (0.2 \times 0.6) + 13.98 + 33.59 = 63.72$  BARRELS

- \* Calculation of the respective estimated volume is to done using the new spill estimation software on site
- \* Conversion of m3 to barrel is Total volume VT (m3) x6.29
- \* Emulsification factor for spill on water to consider is 60% of volume of oil.

This report was filled and signed on the 08 / 04 / 20 11 at incident site by joint investigation representative 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