



No. 00113

A. GENERAL INFORMATION:

1. Spill incident Number: 655645
2. Name of Location 24" ALAKIRI - BONNY GPHSL
3. Name of nearest community CREEK 6
4. State RIVERS LGA BONNY
5. Type of Production facility/Installation PIPELINE Asset owner /District UCG/RINESP

B. INCIDENT INFORMATION:

6. Details of incident

- a. Date of incident 2ND MAY, 2011
- b. Date/Period of investigation, 7TH MAY, 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] |

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: _____ | | |
| <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>EXTERNAL GRIND-OUT</u> | [Y] | [N] ✓ |

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

e. Spill point coordinates

Northing: (MINNA MID BEPT) Easting:

55373.23 METER 517553.89 METER



No. 0113

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:

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				



No. 0113

B. Crops/Economic Trees

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

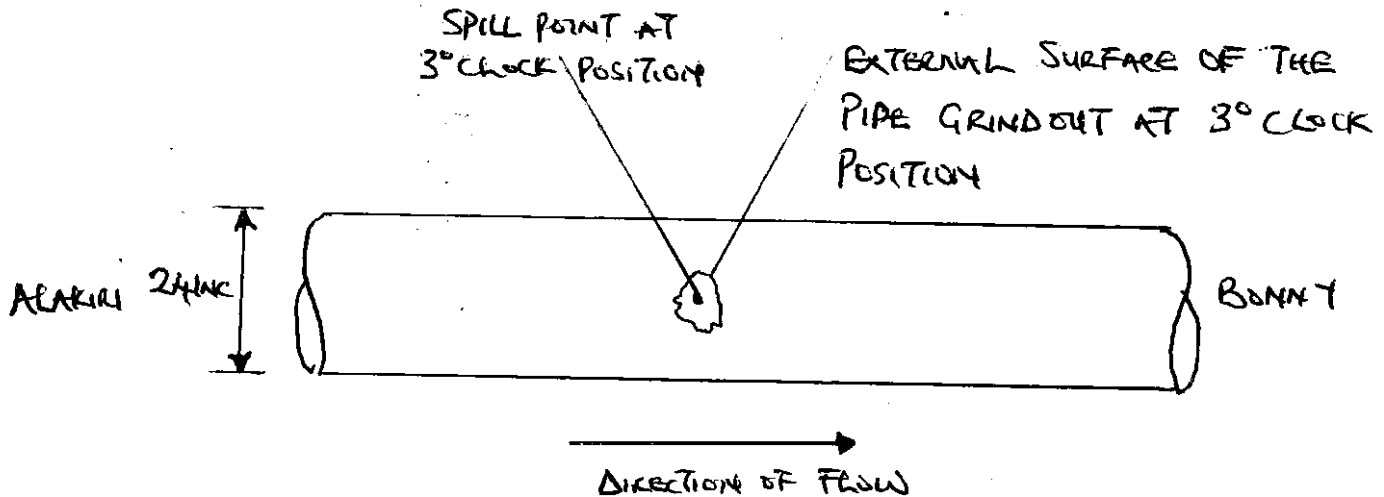
C. Fish/Nets/Ponds

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)



A SECTION OF 24" ALAKIRI - BONNY GPHSL AT CREEK SIX(6)



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

E. Coordinates (MINNA MID-BEIT)

S/N	Northing	Easting
PT1	55377.39 m	517558.92 m
PT2	55381.08 m	517558.68 m
PT3	55380.96 m	517551.07 m
PT4	55377.03 m	517551.07 m
PT5	55375.92 m	517523.96 m
PT6	55369.67 m	517524.08 m
PT7	55370.53 m	517558.80 m



No. 0113

G INCIDENT INFORMATION:

17 Impacted Area Details

- a. Total calculated area of impact 0.0257 Ha
- Impact within SPDC R.O.W 0.0257 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).
- Area (m^2) occupied by pool of free phase oil 29 m^2
 - Average Depth (m) of pool of free phase oil 0.0064 m^2
 - | | | |
|--|-------------|---------|
| Volume of pooled of free phase oil. V_{pool} : | <u>0.07</u> | barrels |
|--|-------------|---------|

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

- Area (m^2) covered by the oil: 257 m^2
- Average Depth (m) below ground surface of infiltration of oil: 0.0001
- Soil type: CLAY
- p_e (effective porosity of the soil): 8%
- | | | |
|--|-------------|---------|
| | <u>0.01</u> | barrels |
|--|-------------|---------|

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	100	2.29×10^4
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>0.001</u> bbl

APPROXIMATE AREA OF SHEEN IN WATER BODY IS 229 m^2

Spill Factors from USCG FOG (2000 Edition)



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 655645

No. 0113

Volume of oil on open water, V_{wat} : 0.001 barrels

21. Calculation of evaporated volume:

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

Volume of evaporated oil, V_{vap} : 0.03 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 $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 0.03 + 0.001 + 0.01 + 0.07 = 0.11$ BARREL

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

$V_{Est}(bbls) = 0.03 + (0.001 * 0.6) + 0.01 + 0.07 = 0.11$ BARREL

- *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 07 / 05 / 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. 00623

A. GENERAL INFORMATION:

1. Spill incident Number: 655645
2. Name of Location 24" ALAKIRI - BONNY GPHSL
3. Name of nearest community KALIBIAMA
4. State RIVERS LGA BONNY
5. Type of Production facility/Installation PIPELINE Asset owner /District UIG/P/INESP

B. INCIDENT INFORMATION:

6. Details of incident

- a. Date of incident 2ND MAY, 2011
- b. Date/Period of investigation, 3RD MAY, 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] |

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> | [Y] | [N] ✓ |

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

e. Spill point coordinates

Northing: (MINNA MID-BETT) Easting:

54605.82m

520533.58m



No. 0623

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

NOT APPLICABLE.

9. Containment measures put in place;

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

Others: NOT APPLICABLE

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				



No. 0623

B. Crops/Economic Trees

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

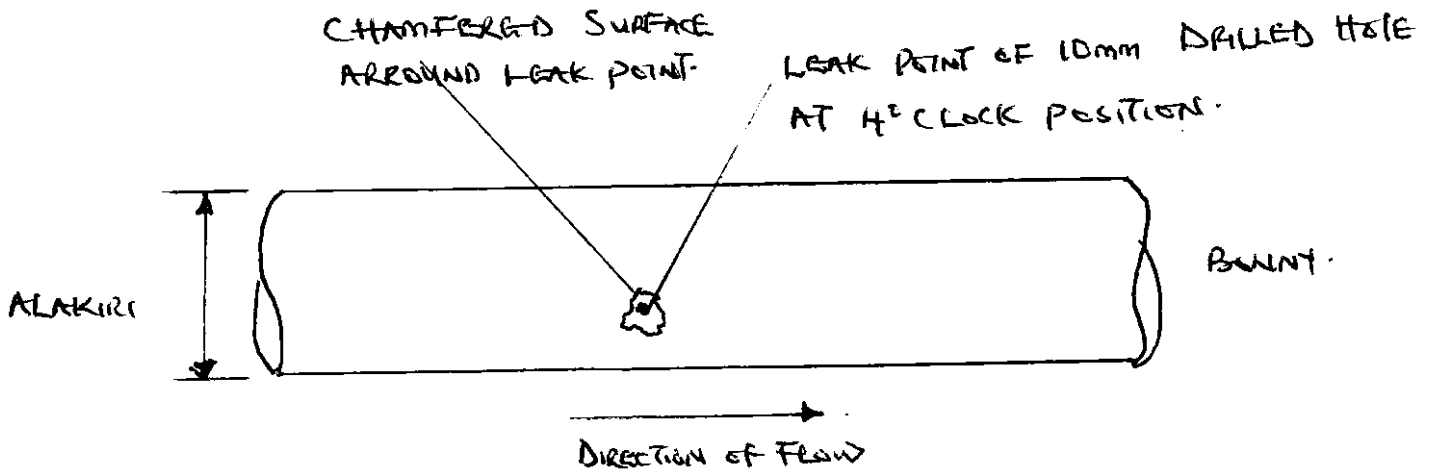
C. Fish/Nets/Ponds

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)



A SECTION OF 24" ALAKIRI - BUNNY QPHSL PIPELINE AT KALIBATTAN.



No. **0623**

G. INCIDENT INFORMATION:

17 Impacted Area Details

- a. Total calculated area of impact 0.0572 Ha
- Impact within SPDC R.O.W 0.0572 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 289 m^2
- ii. Average Depth (m) of pool of free phase oil 0.004 m
- iii.

Volume of pooled of free phase oil V_{pool}	<u>0.73</u>	barrels
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b. Computation of volume of infiltrated oil in the soil ($V-3$).

- i. Area (m^2) covered by the oil: 458 m^2
- ii. Average Depth (m) below ground surface of infiltration of oil: 0.001 m
- iii. Soil type: CLAY
- iv. p_e (effective porosity of the soil): 8%
- v.

	<u>0.02</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>100</u>	<u>0.000283 m³</u>
Dark	0.002		
Black oil	0.1		
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume

NOTE THE TOTAL AREA OF IMPACT ON OPEN WATER IS APPROXIMATELY 283 m^2

0.002 bbl

Spill Factors from USCG FOG (2000 Edition)



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 655645

No. 0623

Volume of oil on open water V_{wat} :

0.002

barrels

21. Calculation of evaporated volume:

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

Volume of evaporated oil, V_{vap} :

0.25

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 $V_{Est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$

$V_{Est}(bbls) = 0.25 + 0.002 + 0.02 + 0.73 = 1.002 \text{ barrel} \approx 1 \text{ barrel}$

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

$V_{Est}(bbls) = 1 \text{ barrel}$

- *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 / 05 / 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