

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0139/729994

(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: 729994 2. Type of incident* OIL SPILL OKPONIA - ANA
 3. Name of Location 28th AWIOBA - CANTHORNE CHANNEL 1 (NCTL) PIPELINE AT
 4. Name of nearest community BRIGIDE ^{OKPONIA - ANA} 5. State: RIVERS 6. LGA DEGEMA
 7. Type of Production facility/Installation PIPELINE 8. Asset owner/District NESP

B. INCIDENT INFORMATION:

9. Details of incident
 a. Date of incident: 22ND OCTOBER, 2011
 b. Date/Period of investigation: 26TH TO 31ST OCTOBER, 2011 / 20TH TO 24TH FEBRUARY, 2012
 c. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) Rig
 d. 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,
 External Corrosion Internal 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) _____
 e. Incident due to:
 Third party interference Operational Others (specify) _____

f. Spill point coordinates

Measuring unit <u>METRE</u> (<u>MINNA AND BEIT</u>)	
Northing: (m)	Easting (m)
<u>63198.43</u>	<u>507661.31</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). [,m]

} NOT APPLICABLE.

12. Containment measures put in place;

- Booms Trench Dyke

Others: NOT APPLICABLE.

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

14. 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

15. Structures / Properties

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

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0139/729994

16. Crops/Economic Trees

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

17. Fish/Nets/Ponds

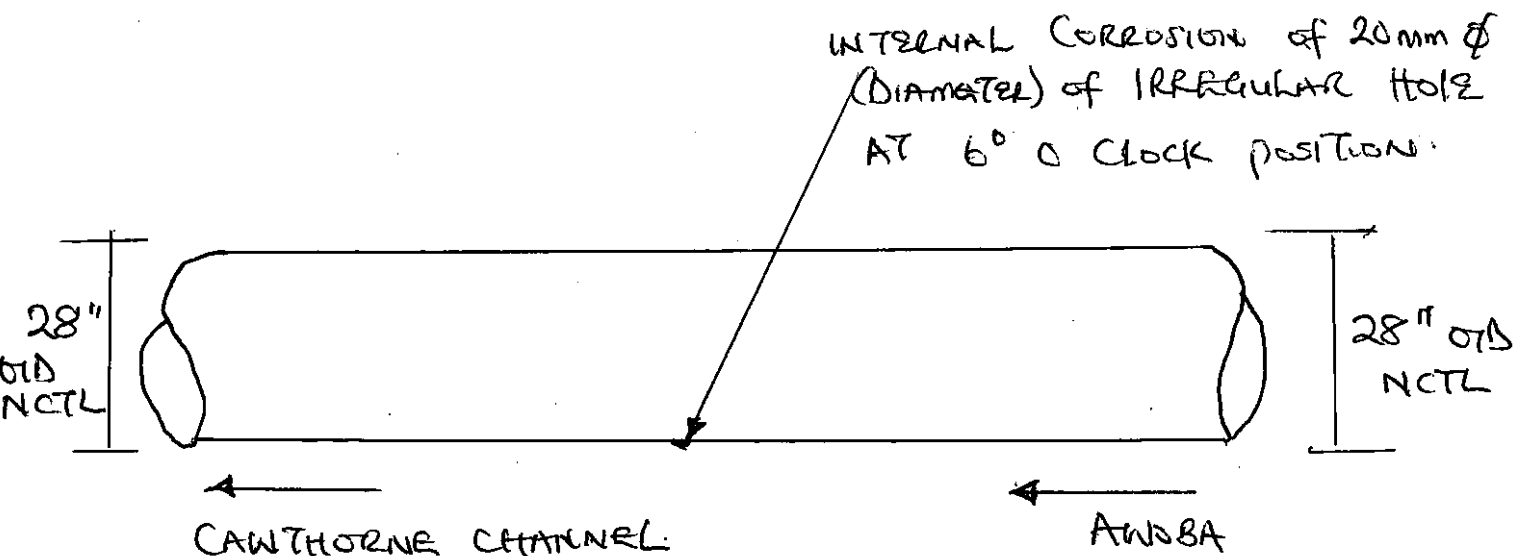
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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 (Overview sketch of the site should be added as an appendix)

SECTION OF 28" ANOBA - CAWTHORNE CHANNEL (NAMBE CREEK TRUNKLINE AT BRIDGE SHOWING CAUSE OF SPILL



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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0139 | 729994

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)

(MINNA MID - BEIT)

S/N	Northing (meter)	Easting (meter)
47	63146.24	507837.6
48	63083.61	507844.3
49	63088.77	507797.6
50	63048.65	507819.9
51	63031.81	507748.4
52	63037.39	507743.1
53	63071.14	507705.5
54	63084.77	507679.5
55	63032.2	507626.3
56	62997.3	507620.0
57	63062.87	507587.3
58	63078.28	507592.7
59	63118.52	507597.7

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 8.5855 Ha.
- Impact within SPDC R.O.W YES
- Impact outside R.O.W YES

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

Recovered oil V_{recJ} :	<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). 2200m²
- Area (m²) occupied by pool of free phase oil 2200m²
 - Average Depth (m) of pool of free phase oil 0.502m
 - Emulsification factor: NIL

iv. Volume of pool of free phase oil. V_{pool} :	<u>27.7</u>	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: 40,000 m^2
- 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: 0.001 m
- iv. Soil type: CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>20.13</u>	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: _____
- 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	<u>80</u>	<u>0.0698 m^3</u>
Black oil	0.1	<u>20</u>	<u>0.873 m^3</u>
Emulsion (30% Oil)	1		
Percent Total		100%	Total Volume <u>5.94</u> bbl

iii. Volume of oil on open water. V_{wat}	<u>5.94</u>	barrels
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22. Calculation of evaporated volume:

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

iii. Volume of evaporated oil. V_{evap}	<u>17.92</u>	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%

23. Gross Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls)$
 $17.92 + 5.94 + 20.13 + 27.48 = 71.67$ BBL

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0139/729994

$$V_{Est}(bbls) = 17.92 + 5.94 + 20.13 + 27.68 = 71.67 \text{ Barrels}$$

24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls)$

$$V_{Est}(bbls) = 17.92 + (5.94 \times 0.60) + 20.13 + 27.68 = 69.29 \text{ Barrels}$$

*Calculation of the respective estimated volume is to be done using the new spill 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 Signatories

This report was filled and signed on the 24/02/2012 at incident site by joint investigation representatives from

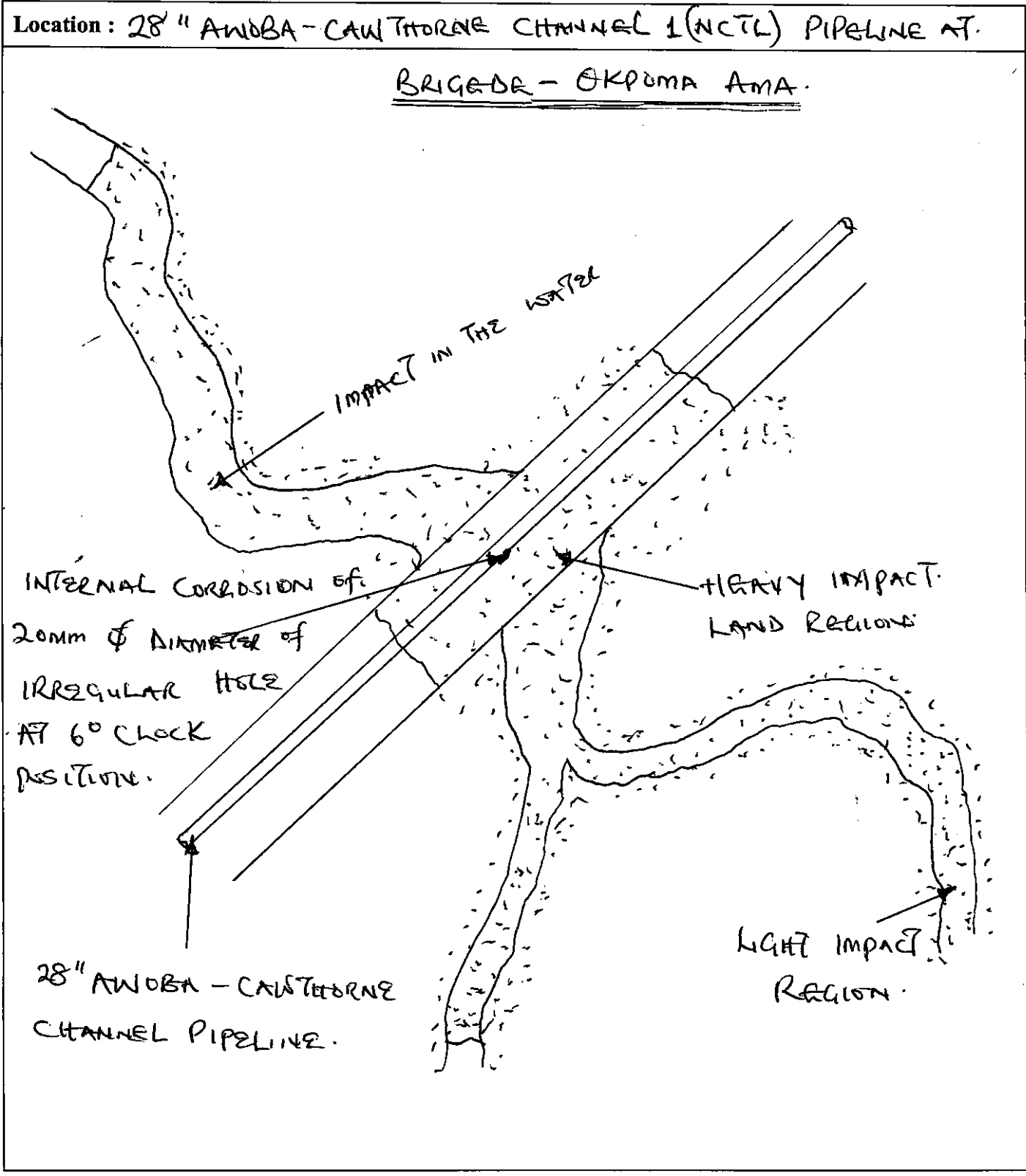
- Host Community
- Department of Petroleum Resources [DPR]:
- National Oil Spill Detection and Response Agency [NOSDRA]:
- State Ministry of Environment [SME]:
- Nigeria Police Force [NPF]:
- Shell Petroleum Development Company [SPDC]:

Tick as applicable

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0139 / 729994

20. Appendix 1: Overview sketch of the site



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO:

0139/729994

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

(MINNA MID-BELT)

S/N	Northing (meter)		Easting (meter)		
S/N	Northing	Easting		Northing	Easting
60	63163.95	507621.9	25	63046.48	507995.6
61	63210.68	507620.4	26	62981.57	508052.1
62	63244.76	507598.1	27	62962.1	508015.1
63	63284.55	507652.4	28	63014.67	507968.3
64	63239.54	507683.7	29	63082.17	507857.3
65	63175.63	507836.0	31	63003.64	507845.0
66	63167.85	507801.5	32	62973.14	507803.5
67	63146.24	507837.6	37	62908.88	507604.2
13	63287.92	507569.8	38	62869.94	507607.5
14	63329.45	507621.1	39	62843.33	507593.8
18	63128.25	507867.7	40	62832.95	507569.8
19	63088.66	507920.7	41	62814.77	507481.6
20	63084.72	507959.2	42	62813.47	507451.7
21	63084.77	508007.9	43	62849.82	507237.5
22	63096.93	508029.0	44	62849.17	507202.5
23	63076.33	508059.2	45	62795.3	507129.8
24	63052.97	508033.9	1	62800.49	507072.7
2	62886.17	507172	8	63055.56	507584.7
3	62895.9	507209.6			
4	62856.31	507460.8			
5	62871.89	507547.8			
6	62885.52	507563.3			
7	62910.18	507561.4			

TOTAL AREA OF IMPACT
8.5855 Ha.

Minna Mid-Belt

name Easting (m) Northing (m)

Suspected Spill Point

Suspected : 507658.2 63192.29

Heavy Impact

47 507837.6 63146.24
48 507844.3 63083.61
49 507797.6 63088.77
50 507819.9 63048.65
51 507748.4 63031.81
52 507743.1 63037.39
53 507705.5 63071.14
54 507679.5 63084.77
55 507626.3 63032.2
56 507620 62997.3
57 507587.3 63062.87
58 507592.5 63078.28
59 507597.7 63118.52
60 507641.9 63163.95
61 507620.4 63210.68
62 507598.1 63244.76
63 507652.4 63284.55
64 507683.7 63239.54
65 507736 63175.63
66 507801.5 63167.85
67 507837.6 63146.24

Light Impact

13 507569.8 63287.92
14 507621.1 63329.45
63 507652.4 63284.55
62 507598.1 63244.76

Light Impact

48 507844.3 63083.61
47 507837.6 63146.24
18 507867.7 63128.25
19 507930.7 63088.66
20 507959.2 63084.12
21 508007.9 63084.77
22 508028 63091.91
23 508059.2 63076.33
24 508033.9 63052.97
25 507995.6 63046.48
26 508052.1 62981.57
27 508015.1 62962.1
28 507968.3 63014.67
29 507857.3 63082.17

Light Impact

51	507748.4	63031.81
50	507819.9	63048.65
31	507845	63003.64
32	507803.5	62973.14

Light Impact

57	507587.3	63062.87
56	507620	62997.3
37	507604.2	62908.88
38	507607.5	62869.94
39	507593.8	62843.33
40	507569.8	62832.95
41	507481.6	62814.77
42	507451.7	62813.47
43	507237.5	62849.82
44	507202.5	62849.17
45	507129.8	62795.3
1	507072.7	62800.49
2	507172	62886.17
3	507209.6	62895.9
4	507460.8	62856.31
5	507547.8	62871.89
6	507563.3	62885.52
7	507561.4	62910.18
8	507584.7	63055.56