

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0160 753615

(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: 753615 2. Type of incident* SPILL
 3. Name of Location 16" NUN-RIVER - KOLO CREEK PIPELINE
 4. Name of nearest community AGUOBIRI 5. State: BATELSA 6. LGA SOUTHERN IJAW
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/District UIC/P/INESP

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 14TH DECEMBER 2011 **THE JOINT INVESTIGATION TEAM OBSERVED THAT THE SPILL ENVIRONMENT WAS BURNT BY FIRE.**
 b. Date/Period of investigation: 19TH DECEMBER 2011
 c. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy (SEASONAL) 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>MINNA MID BELT</u>	
Northing:	<u>91448.02m</u>	Easting:	<u>409521.65m</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 (SEASONAL) Water River (identify) _____

ii. Weather condition

- Raining Sunny

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 [NO ,m]
 Fish Farm/Pond [NIL ,m]
 Fishing net [NIL ,m]
 Others (specify) [NIL ,m]

12. Containment measures put in place;

- Booms Trench Dyke
 Others: NATURAL DEPRESSION

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

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

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
1	PALM TREES	✓		✓	10	BURNT

17. Fish/Nets/Ponds

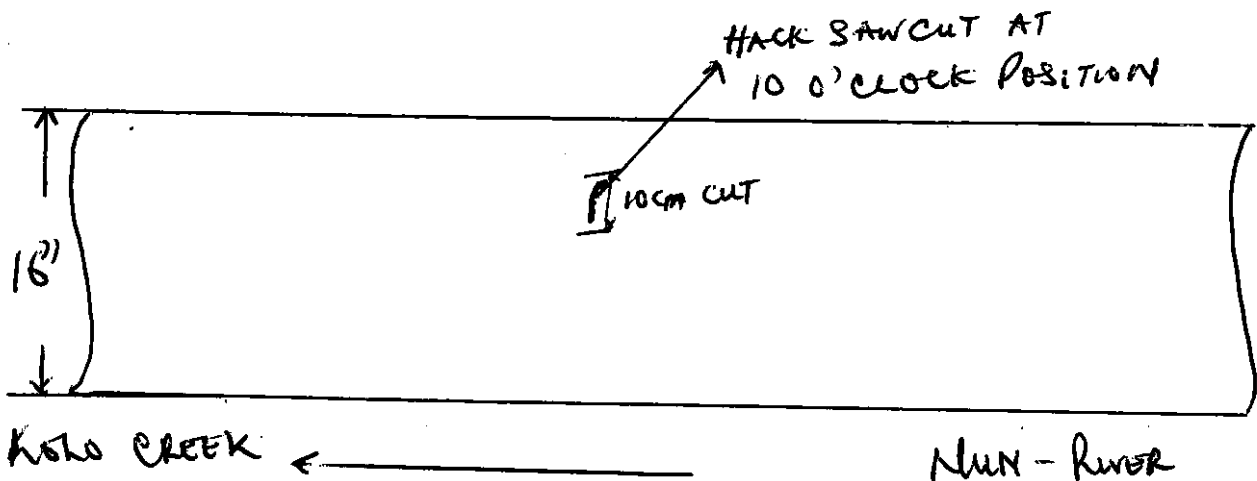
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE	WITHIN AREA OF IMPACT		

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)

A SECTION OF 16" NUN-RIVER - KOLO CREEK PIPELINE AT AQUOBIRI
 HACK SAW CUT
 SHOWING ILLEGAL BUNKERING POINT AT 10 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 than 12 points, Attach as an appendix 2)

MINNA MVD BELT

S/N	Northing	Easting
1.	91521.85m	409503.41m
2.	91546.55m	409469.58m
3.	91733.97m	409488.73m
4.	91724.68m	409510.28m
5.	91794.56m	409579.90m
6.	91785.24m	409628.83m
7.	91690.69m	409562.58m
8.	91527.63m	409608.26m
9.	91503.35m	409518.76m
10.	91457.19m	409534.02m
11.	91460.15m	409567.94m
12.	91447.84m	409574.07m
13.	91472.18m	409645.07m

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 4.88Ha
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

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 (m^2) occupied by pool of free phase oil 1100
- Average Depth (m) of pool of free phase oil 0.001
- Emulsification factor: Nil

iv. Volume of pool of free phase oil. V_{pool} :	<u>6.9</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: 47700
- ii. Area of the pool of free phase oil in touch with soil: —
- iii. Average Depth (m) below ground surface of infiltration of oil: 0.001
- iv. Soil type: 8% CLAY
- v. P_e (effective porosity of the soil): 8%

iv. Volume of infiltrated oil. V_{inf}	<u>24</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: NIL
- ii. Table of average depth of oil on water based on coloration *

	Thickness (mm)	Percentage coverage	Volume (m3)
Barely Visible	0.00004	NOT APPLICABLE	
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</u> bbl

iii. Volume of oil on open water. V_{wat}	<u>NIL</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>10.3</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 $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls) = 10.3 + NIL + 24 + 6.9 + NIL = 41.2$ BARRELS

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$V_{Est}(bbls) = 41.2 \text{ BARRELS}$
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recl}(bbls) = 10.9 + Nil + 24 + 6.9 + Nil = 41.2 \text{ BARREL}$
$V_{Est}(bbls) = 41.2 \text{ BARRELS}$

- *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 <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 Signatories

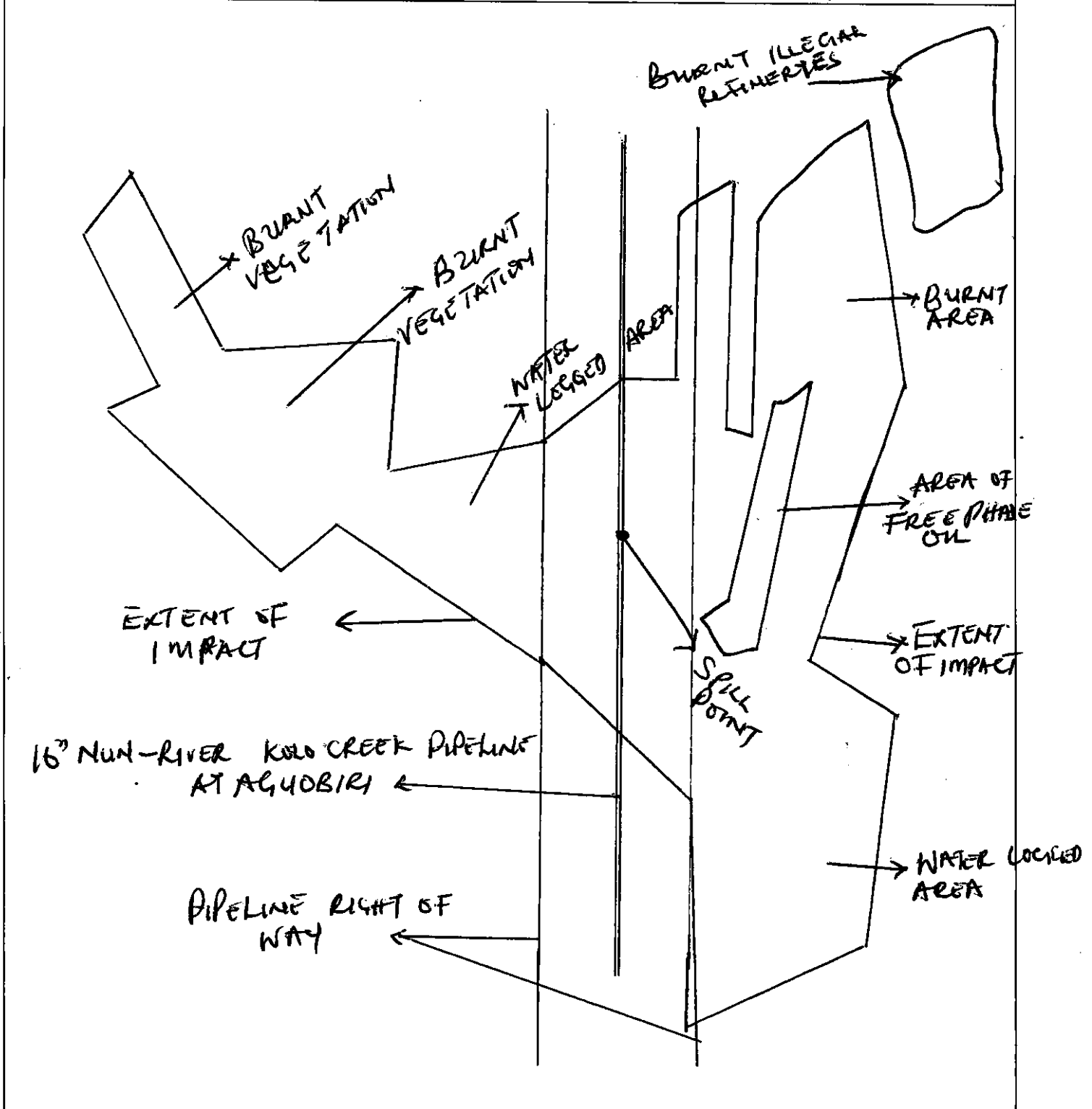
This report was filled and signed on the <u>19/12/2011</u> at incident site by joint investigation representatives from
<ul style="list-style-type: none">• Host Community <input checked="" type="checkbox"/>• Department of Petroleum Resources [DPR]: <input checked="" type="checkbox"/>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

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20. Appendix 1: Overview sketch of the site

Location : 16" Nun-River - Kolo Creek Pipeline AT AGUOBIRI



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

MINNA MID BELT

S/N	Northing	Easting
14	91459.89m	409641.94m
15	91438.57m	409586.37m
16	91429.35m	409586.34m
17	91423.01m	409641.81m
18	91404.45m	409675.66m
19	91377.07m	409595.41m
20	91371.15m	409530.64m
21	91346.58m	409524.39m
22	91328.63m	409382.50m
23	91381.02m	409342.60m
24	91426.59m	409496.92m
25	91451.13m	409509.33m