

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0104 706505

(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: 706505 2. Type of incident\* OIL SPILL  
 3. Name of Location 20" KOLOCREEK - RUMUEKPE PIPELINE  
 4. Name of nearest community OGBOGOLO 5. State: RIVERS 6. LGA AHOADA - WEST  
 7. Type of Production facility/Installation PIPELINE 8. Asset owner/District NESP/KOLOCREEK

**B. INCIDENT INFORMATION:**

9. Details of incident

- a. Date of incident: 29TH AUGUST, 2011  
 b. Date/Period of investigation: 4TH, 9TH TO 11TH SEPTEMBER, 2011

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) FAILED CLAMP

e. Incident due to:

- Third party interference  Operational  Others (specify) NOT APPLICABLE

f. Spill point coordinates (MINNA MID-BELT)

Measuring unit <u>M</u>	
Northing: <u>104913.44</u>	Easting: <u>454951.03</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) NOT APPLICABLE

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). NOT APPLICABLE

12. Containment measures put in place;

- Booms       Trench       Dyke

Others: NATURAL DEPRESSION

13. Any pictures or video coverage?

[Y]  [N]

14. Was there any disruption to the investigation?

~~NO~~ [Y]  [N]

ON THE 4TH OF AUGUST, 2011, THE SOURCE OF LEAK COULDN'T BE CONVINCINGLY LINKED TO THE PIPELINE AND THE JIV WAS TERMED INCONCLUSIVE. OPENING UP AND PRESSURIZATION OF THE LINE ON THE 5TH OF AUGUST 2011 REVEALED FURTHER LEAK NECESSITATING A RE-SCHEDULED JIV WHICH COULD ONLY COMMENCE ON THE 9TH SEPTEMBER, 2011 DUE TO TECHNICAL HITCHES. BY THIS TIME, CRUDE OIL WAS OBSERVED LEAKING FROM ONE NO. 20" X 24" FAILED CLAMP WITH BROKEN SEAL.

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
NONE WITHIN AREA OF IMPACT						

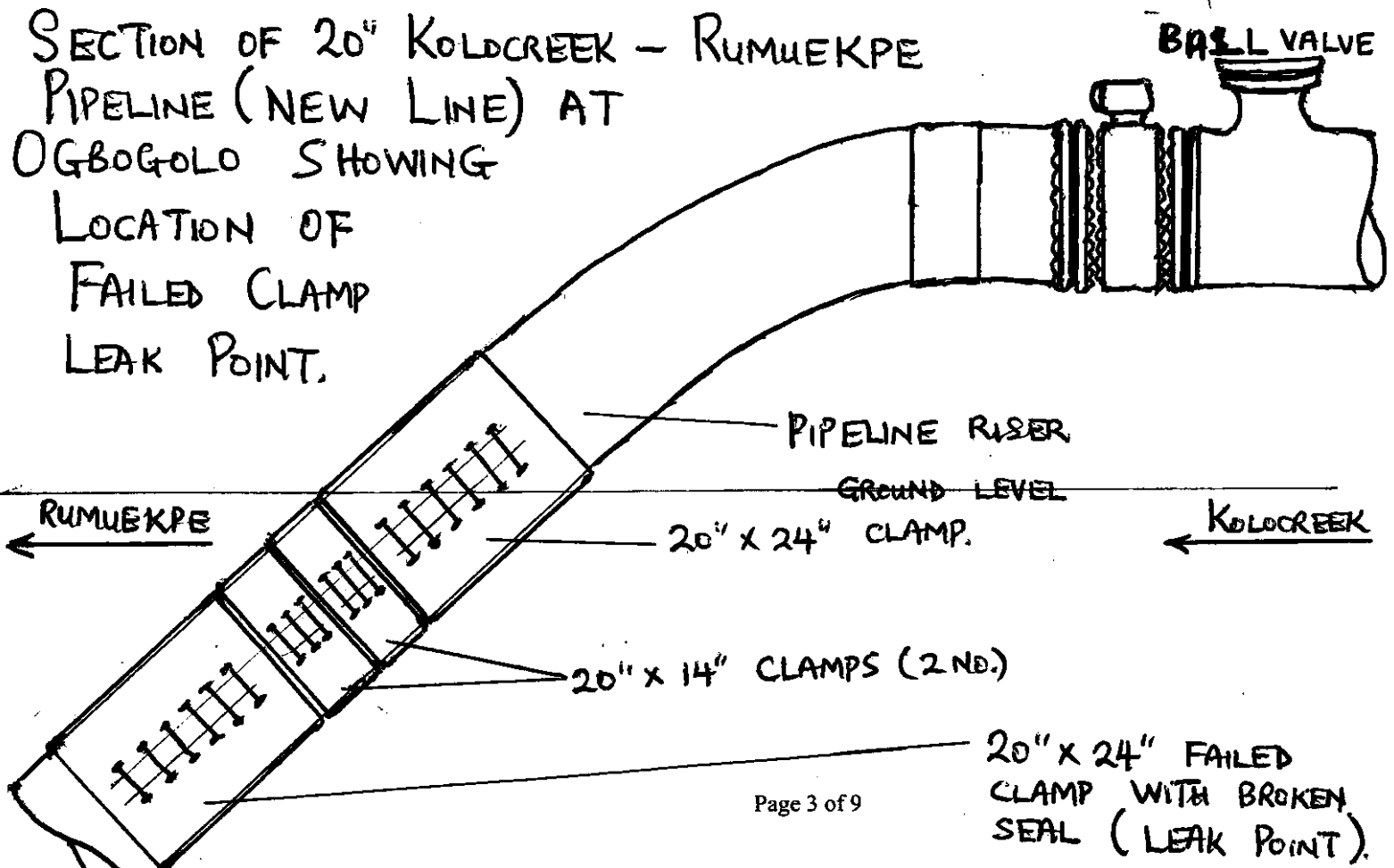
17. Fish/Nets/Ponds

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 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) (MINNA MID-BELT)

S/N	Northing (M)	Easting (M)
305	104910.26	454987.99
306	104910.25	454991.08
307	104907.16	454997.24
308	104904.23	454998.06
309	104901.01	454997.22
310	104901.04	454987.97
311	104901.06	454978.73
312	104902.54	454967.09
313	104907.27	454957.17
314	104910.36	454954.10
315	104910.37	454947.94
316	104913.45	454947.95
317	104913.42	454957.19

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.04 Ha
- Impact within SPDC R.O.W 0.04 Ha
- Impact outside R.O.W NIL

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

Recovered oil $V_{rec}$ :	<u>51.89</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 390
- Average Depth (m) of pool of free phase oil 0.004
- Emulsification factor: NIL

iv. Volume of pool of free phase oil. $V_{pool}$ :	<u>9.81</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: 24
- 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: 0.018
- iv. Soil type: CLAY
- v.  $P_e$  (effective porosity of the soil): 8%

iv. Volume of infiltrated oil, $V_{inf}$	<u>0.22</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	<b>NOT APPLICABLE</b>	
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>20.64</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  $V_{Est}(\text{bbbls}) = V_{evap}(\text{bbbls}) + V_{wat}(\text{bbbls}) + V_{inf}(\text{bbbls}) + V_{pool}(\text{bbbls}) + V_{recJ}(\text{bbbls}) = 20.64 + \text{NIL} + 0.22 + 9.81 + 51.89 = 82.56 \text{ BARRELS}$

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<u>V<sub>Est</sub>(bbls)=</u>	<b>82.6 BARRELS</b>
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recf}(bbls) = 20.64 + NL + 0.22 + 9.81 + 51.89 =$	
	<b>82.56 BARRELS</b>
<u>V<sub>Est</sub>(bbls)=</u>	<b>82.6 BARRELS</b>

\*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"/>

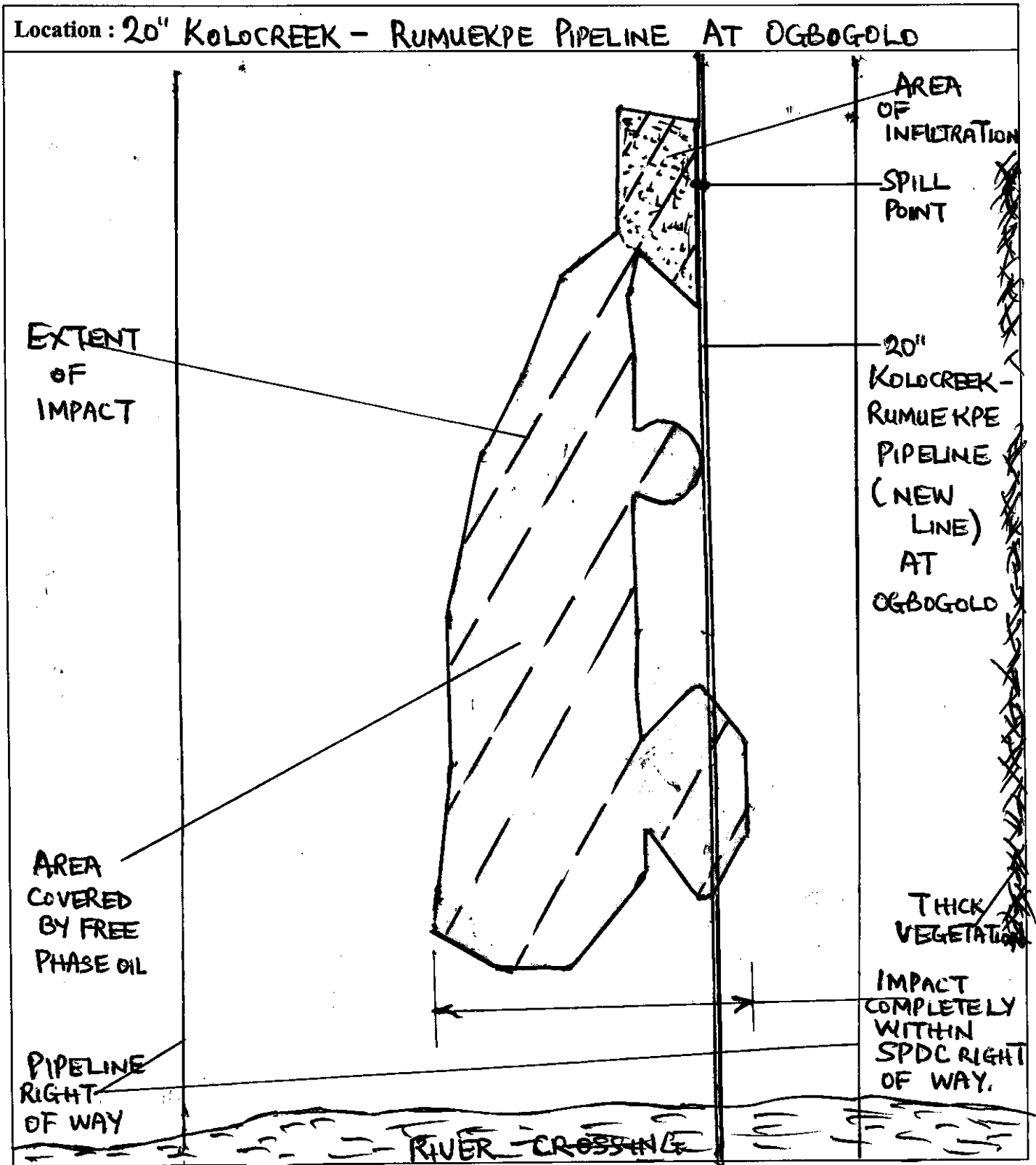
**26 Signatories**

This report was filled and signed on the <u>11 / 09 / 20 11</u> at incident site by joint investigation representatives from
<ul style="list-style-type: none"><li>• Host Community <input checked="" type="checkbox"/></li><li>• Department of Petroleum Resources [DPR]: <input checked="" type="checkbox"/></li><li>• National Oil Spill Detection and Response Agency [NOSDRA]: <input checked="" type="checkbox"/></li><li>• State Ministry of Environment [SME]: <input checked="" type="checkbox"/></li><li>• Nigeria Police Force [NPF]: <input checked="" type="checkbox"/></li><li>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/></li></ul>
<i>Tick as applicable</i>

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20. Appendix 1: Overview sketch of the site



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21. Appendix 2: TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION (IMPACTED AREA BOUNDARY COORDINATES - MINNA MIDBELT)

S/N	Northing (M)	Easting (M)
318	104911.07	454954.86
319	104910.35	454957.18
320	104910.34	454960.26
321	104910.33	454963.35
322	104911.94	454963.01
323	104913.40	454963.35
324	104914.01	454964.64
325	104913.39	454966.44
326	104912.01	454966.65
327	104910.32	454966.43
328	104910.28	454978.75
329	104910.27	454981.84
330	104913.36	454978.76
331	104916.42	454981.85
332	104916.40	454988.02
333	104913.32	454991.09