

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0429 849182

(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: 849182 2. Type of incident \* OIL SPILL  
 3. Name of Location 24" NKPOKU - BOMU PIPELINE  
 4. Name of nearest community KIRA 5. State: RIVERS 6. LGA TAI  
 7. Type of Production facility/Installation OIL PIPELINE 8. Asset owner/ District NPE/PHI

**B. INCIDENT INFORMATION:**

**9. Details of incident**

- a. Date of incident: 2ND AUGUST, 2012.  
 b. Start date/time of investigation: 16TH AUGUST, 2012.  
 c. Investigation End date: 17TH AUGUST, 2012.  
 d. Description of spill point environment  
 Firmed soil  Loose soil  Previously excavated area  
 Under water  Swampy  Exposed pipe surface  
 Well Platform (on Water) **(SEASONAL)**  Rig  
 e. 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,  
 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) \_\_\_\_\_

- f. Incident caused by:  
 Third party interference  Operational  Mystery \_\_\_\_\_

g. Spill point coordinates Minna - Mid belt

Measuring unit	
Northing: (m) SP 80854.968	Easting: (m) 533314.417

\*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

- |  |   |     |                             |
|--|---|-----|-----------------------------|
| <input type="checkbox"/> Government reserved and designated protected area | [ | ,m] |                             |
| <input type="checkbox"/> Drinking water source                             | [ | ,m] |                             |
| <input type="checkbox"/> Built up area                                     | [ | ,m] |                             |
| <input checked="" type="checkbox"/> Farmlands                              | [ | ,m] | FARMLAND IMPACTED BY SPILL. |
| <input type="checkbox"/> Fish Farm/Pond                                    | [ | ,m] |                             |
| <input type="checkbox"/> Fishing net                                       | [ | ,m] |                             |
| <input type="checkbox"/> Others (specify).                                 | [ | ,m] |                             |

12. Containment measures put in place;

- Booms       Trench       Dyke
- Others: BUND WALLS

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
<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	CASSAVA		✓			IMPACTED
2	RAFFIA PALM			✓	NUMEROUS	WITHIN AND
3	BAMBOD			✓		OUTSIDE
4	PALM TREES			✓		FARMLAND

17. Fish/Nets/Ponds

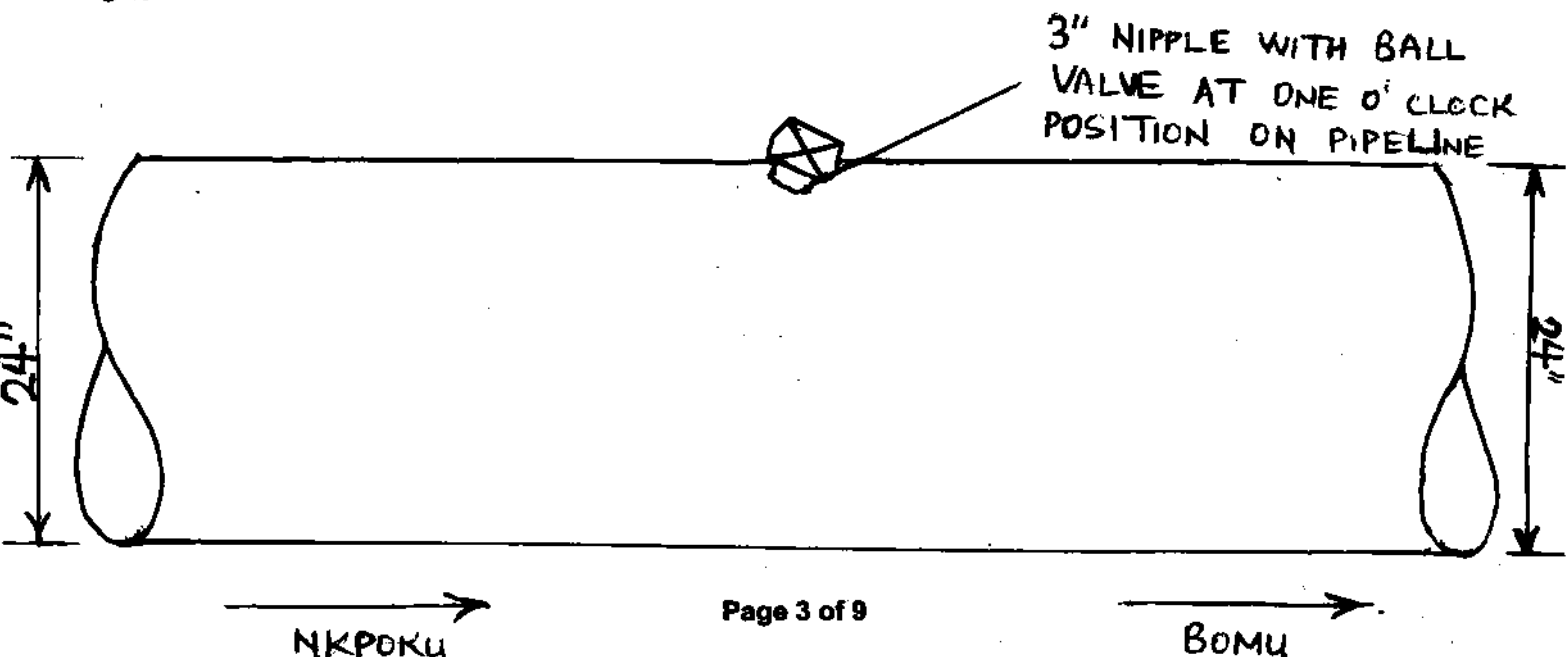
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
1	FISH MESH	LINEAR	1 NO.	WITHIN IMPACTED REGION.

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 *(While detail report of the leak point should be contained in the Leak report, overview sketch of the site should be added as an appendix 1)*

SECTION OF 24" NKPOKU - BOMU PIPELINE AT KIRA SHOWING POSITION OF 1 NO. CRUDE OIL THEFT POINT.



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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)
SP	80854.968	533314.417
FH1	80888.756	533314.478
FH2	80864.183	533314.434
FH3	80905.400	533257.747
FH4	80916.473	533274.465
FH5	80854.973	533311.335
FH6	80753.614	533308.072
FH7	80873.491	533262.062
FH8	80885.761	533271.329
LR1	80756.708	533295.751
LR2	80762.890	533274.190
LR3	80744.465	533271.075
LR4	80873.536	533237.408

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 2.38508 ha
- Impact within SPDC R.O.W Yes
- Impact outside R.O.W Yes

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

Recovered oil ( $V_{rec}$ )	<u>20</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 21465
  - Average Depth (m) of pool of free phase oil 0.001

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iii. Emulsification factor: NIL

iv. 

Volume of pool of free phase oil, $V_{pool}$ :	135.01	barrels
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b. Computation of volume of infiltrated oil in the soil ( $V_{int}$ ).

COMPUTATION OF VOLUME OF OIL-INFILTRATION WITHIN SPILL POINT:-

AREA OF OIL-INFILTRATION WITHIN SPILL POINT

= 3M<sup>2</sup>.  
AVERAGE DEPTH OF INFILTRATED OIL = 2.4M.

VOLUME = 3 x 2.4 x

8% (EFFECTIVE POROSITY OF CLAY SOIL) x 6.29 =

3.62 BARRELS

- i Area \*(m<sup>2</sup>) covered by the oil: 2382
- 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: 0.019
- iv Soil type: CLAY
- v  $P_e$  (effective porosity of the soil): 8%

VOLUME OF OIL-INFILTRATION OUTSIDE SPILL POINT = 22.77 BARRELS

iv. 

Volume of infiltrated oil, $V_{int}$ (TOTAL)	3.62 + 22.77 = 26.39	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, $V_{wat}$ :	NIL	barrels
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22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 25%

iii. 

Volume of evaporated oil, $V_{evap}$ :	60.47	barrels
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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%

\*If area is not same as the total area of impact, please indicate in the overview sketch  
\*\* Spill Factor from USCG FOG (2000 Edition)

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<b>23. Gross Total Estimated Spilled Volume</b>	<b>= 60.47 + NIL + 26.39 + 135.01 + 20 = 241.87</b>
$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$	
$V_{Est}(bbls) =$	<b>242 BARRELS</b>
<b>24. Net Total Estimated Spilled Volume</b>	<b>= 60.47 + NIL + 26.39 + 135.01 + 20 = 241.87</b>
$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recJ}(bbls)$	
$V_{Est}(bbls) =$	<b>242 BARRELS</b>

\*Calculation of the respective estimated volume is to be done on site as far as practicable using the new spill volume 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

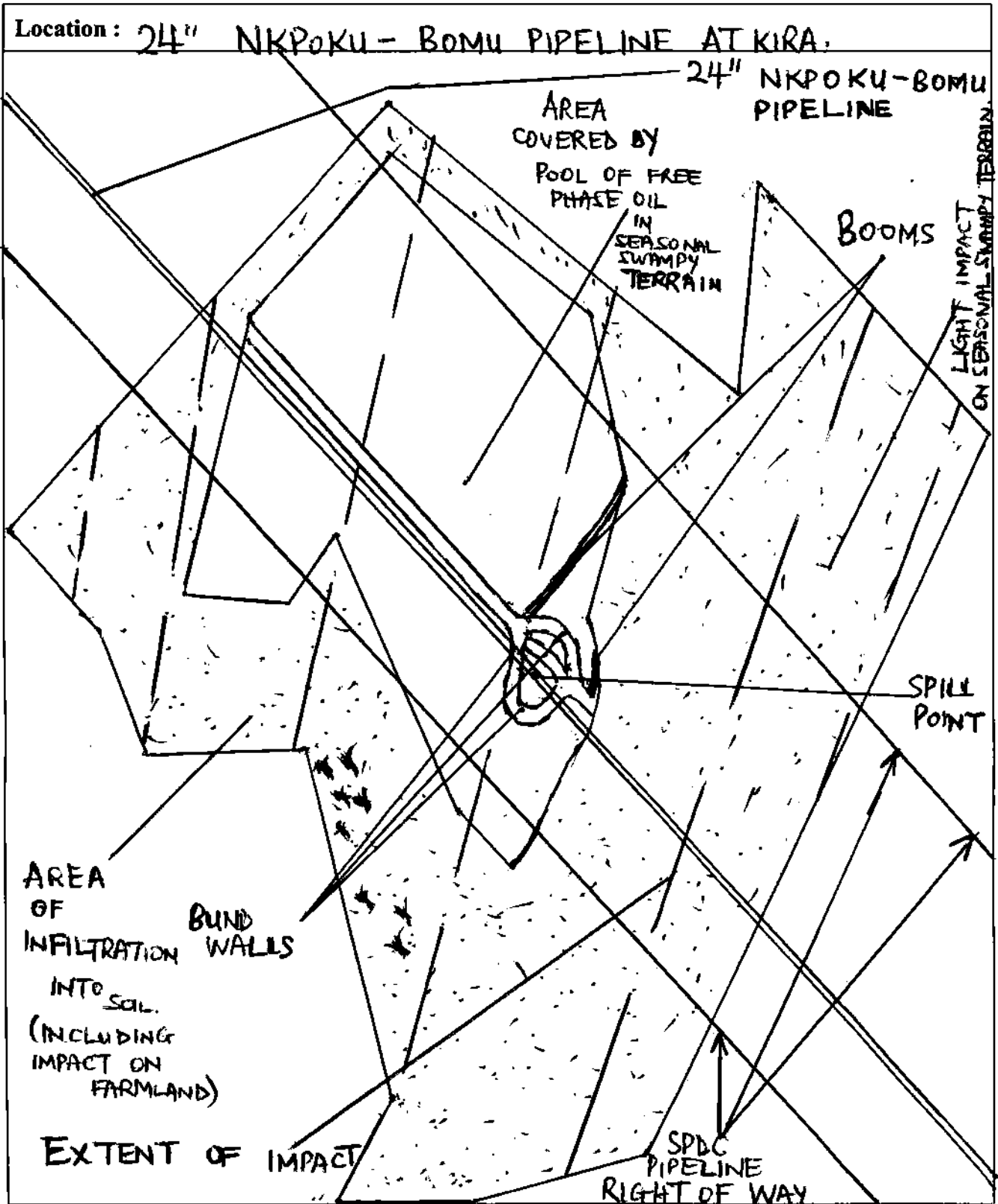
**26 REPRESENTATIVES**

This report was filled and signed on the 17/08/2012 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*

27. Appendix 1: Overview sketch of the site



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

Minna - (Mid-belt)

S/N	Northing (M)	Easting
SP	<del>533314.417</del> <sup>2521</sup>	<del>80854.968</del> <sup>2521</sup>
FHH	5	
<sup>2521</sup> BR1	80919.544	533274.471
BR2	80861.034	533357.572
BR3A	80901.942	533366.948
BR2C	80841.860	533413.435
BR3	80879.734	533206.602
BR4	80861.277	533221.978
BR5	80839.758	533231.184
BR6	80830.494	533258.903
BR7	80735.278	533255.651
BR8	80707.660	533204.193
BR9	80701.462	533270.998
BR9A	80702.837	533311.690
PT1	80833.488	533302.052
PT2	80842.714	533295.905