

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0166 741104

(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: 741104 2. Type of incident* OIL SPILL
- 3. Name of Location KRAKAMA WELL 13
- 4. Name of nearest community BILLE 5. State: RIVERS 6. LGA DEGEMA
- 7. Type of Production facility/Installation WELL HEAD 8. Asset owner/District NESI/CAWTHORNE CHANNEL

B. INCIDENT INFORMATION:

9. Details of incident

a. Date of incident: 14TH NOVEMBER, 2011.

b. Date/Period of investigation: 28TH NOVEMBER, 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) STRUCTURAL FAILURE DUE TO WELL HEAD SUBSIDENCE.

e. Incident due to:

- Third party interference Operational Others (specify) NOT APPLICABLE

f. Spill point coordinates

Measuring unit <u>M</u> <u>MINNA M/D BELT</u>	
Northing: <u>59664.89m</u>	Easting: <u>494977.18m</u>

*This can be: a) Oil Spill b) Drilling fluid/Chemical c) Siltation d) construction e) Encroachment f) Fire,

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0166
741104

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). **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					

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0166 741104

16. Crops/Economic Trees

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

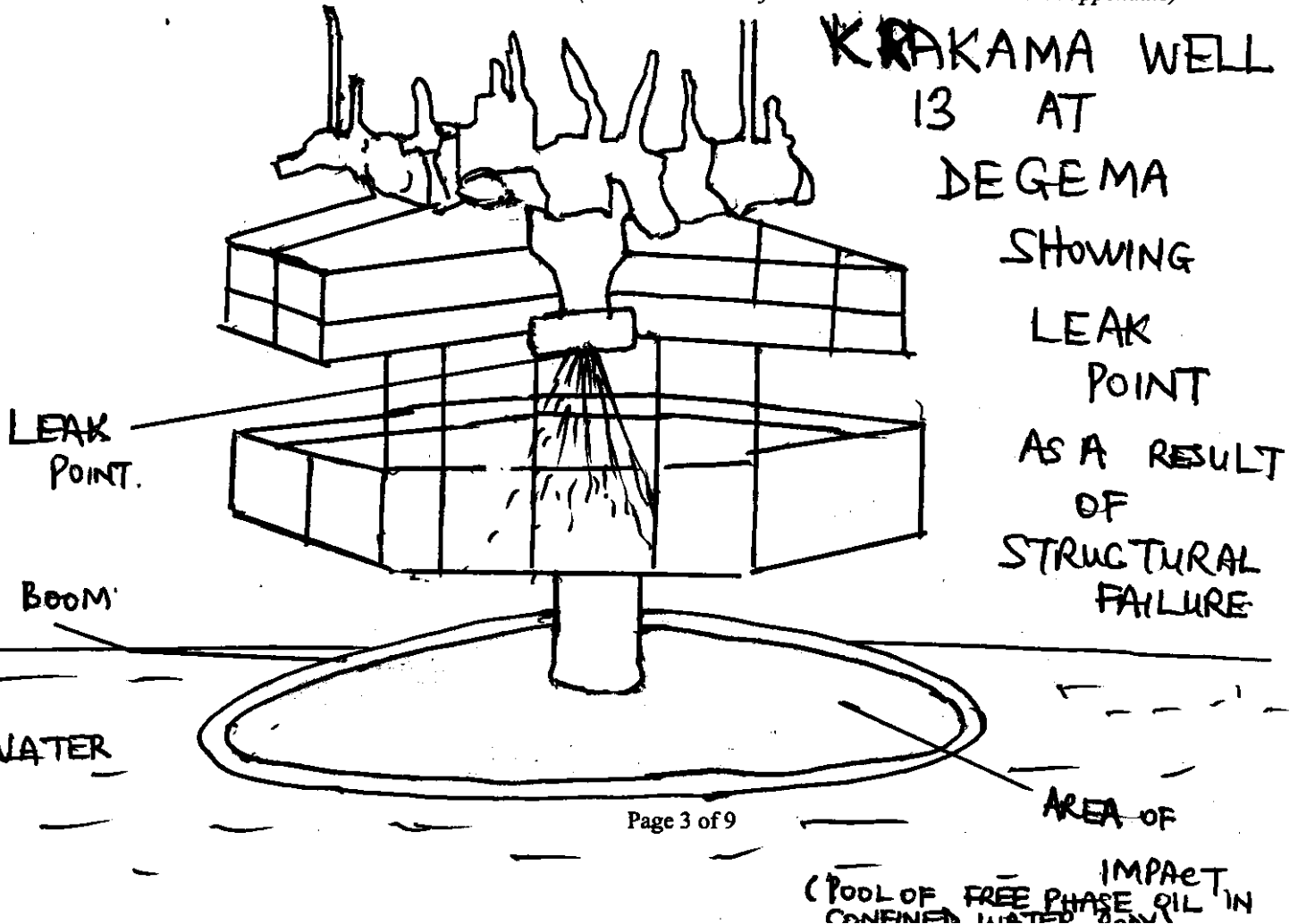
17. Fish/Nets/Ponds

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)



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0166741104

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)
1	59666.40m	494975.40
2	59667.31m	494977.64
3	59666.28m	494980.15m
4	59663.40m	494980.06m
5	59661.53m	494977.81m
6	59662.15m	494974.53m
7	59664.67m	494973.13m

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 28 m²
- Impact within SPDC R.O.W _____
- Impact outside R.O.W _____

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

Recovered oil V _{rec.J} :	<u>14 (GROSS)</u>	barrels
------------------------------------	-------------------	---------

20. Computation of the residual volume on site

a. Computation of volume of pool of free phase oil (on land or confined water body).

- i. Area (m²) occupied by pool of free phase oil 28
- ii. Average Depth (m) of pool of free phase oil 0.017
- iii. Emulsification factor: Nil

iv. Volume of pool of free phase oil. V _{pool} :	<u>2.99</u>	barrels
---	-------------	---------

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0166 741104

b. Computation of volume of infiltrated oil in the soil (V_{inf}).

- i. Area (m^2) covered by the oil: _____
- ii. Area of the pool of free phase oil in touch with soil: NOT APPLICABLE
- iii. Average Depth (m) below ground surface of infiltration of oil: _____
- iv. Soil type: NOT APPLICABLE
- v. P_e (effective porosity of the soil): APPLICABLE

iv. Volume of infiltrated oil. V_{inf}	<u>NIL</u>	barrels
--	------------	---------

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	<u>NOT APPLICABLE</u>	
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> </u> bbl

iii. Volume of oil on open water. V_{wat}	<u>NIL</u>	barrels
---	------------	---------

22. Calculation of evaporated volume:

- i. Oil type: BONNY LIGHT
- ii. E-Factor: 40%

iii. Volume of evaporated oil. V_{evap}	<u>11.33</u>	barrels
---	--------------	---------

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 $V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recd}(bbls) = 11.33 + NIL + NIL + 2.99 + 14 = 28.32$

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO:

0166 741104

$V_{Est}(bbls)=$	28.3 BARRELS
24. Net Total Estimated Spilled Volume $V_{Est}(bbls) = V_{evap}(bbls) + 0.6 \cdot V_{oil}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rec}(bbls) = 11.33 + NIL + NIL + 2.99 + (0.6 \times 14) = 22.72$	
$V_{Est}(bbls)=$	22.7 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>28/11/2011</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 type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0166741104

20. Appendix 1: Overview sketch of the site

