

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0501

(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: 870292 2. Type of incident * OIL SPILL
 3. Name of Location 20 INCH OPUKUSHI - BRASS CREEK TRUNKLINE
 4. Name of nearest community AMABULOU 5. State: BAYALSA 6. LGA EKEREMO
 7. Type of Production facility/Installation TRUNKLINE 8. Asset owner/ District PIPELINE

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24/9/2012
 b. Start date/time of investigation: 28/9/2012 AT 1440
 c. Investigation End date: 29/9/2012
 d. Description of spill point environment
 Firmed soil Loose soil Previously excavated area
 Under water Swampy Exposed pipe surface
 Well Platform (on Water) 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

Measuring unit	
Northing: <u>104475</u>	Easting: <u>361155</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: 0501 870292

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 [10 ,m]
 Fishing net [,m]
 Others (specify). [,m]

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

13. Any pictures or video coverage? [N]

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

If yes give brief description:

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: 0501 870292

16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
1	PALM TREE	/	YES	YES	LOT	/
2	MANGROOVE	/	YES	YES	LOT	/
	/	/	/	/	/	/

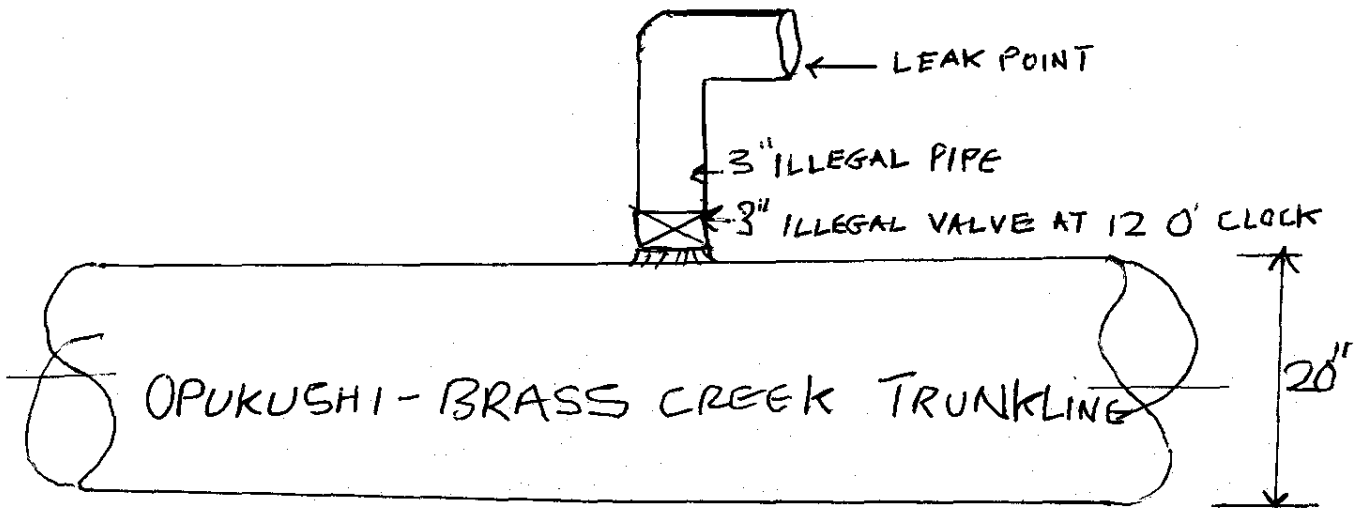
17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
1	FISH NET	/	1	/
2	FISH TRAP	/	5	/
	/	/	/	/

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)*



THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0501870292

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)

S/N	Northing	Easting
	104579	361116
	104334	360887
	104212	360790
	103965	360517
	103844	360340
	103844	360340
	102627	359871
	102541	360000
	102004	359601
	102606	360782
	101219	359970
	101234	359805
	103681	360430

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 20,521 m²
- Impact within SPDC R.O.W 3615 m²
- Impact outside R.O.W 16906 m²

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

Recovered oil V _{rec}	NIL	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 (m²) occupied by pool of free phase oil NIL
 - Average Depth (m) of pool of free phase oil NOT APPLICABLE

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0501870292

iii. Emulsification factor: NOT APPLICABLE

iv.

Volume of pool of free phase oil, V_{pool} :	<u>NIL</u>
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 barrels

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

i. Area (m^2) covered by the oil: NIL

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: NOT APPLICABLE

iv. Soil type: NOT APPLICABLE

v. P_e (effective porosity of the soil): NOT APPLICABLE

iv.

Volume of infiltrated oil, V_{inf} :	<u>NIL</u>
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 barrels

21. Computation of volume of oil on open water based on standard coloration.

i. Total area of oil on open water: 20,521 m^2

ii. Table of average depth of oil on water based on coloration**

	Thickness (mm)	Percentage coverage	Volume (m^3)
Barely Visible	0.00004	70%	0.000574588
Silvery	0.00008	2%	0.0000328336
Slight Color	0.00015		
Bright Color	0.0003	3%	0.000184689
Dull	0.001		
Dark	0.002	10%	0.0041042
Black oil	0.1		
Emulsion (30% Oil)	1	15%	3.07815
Percent Total		100%	Total Volume <u>3.08 m^3</u>

iii.

Volume of oil on open water, V_{wat} :	<u>19.39</u>
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 barrels

22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 15%

iii.

Volume of evaporated oil, V_{evap} :	<u>3.42</u>
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 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%

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

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

0501 870292

JOINT INVESTIGATION REPORT FOR INCIDENT NO: _____

23. Gross Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rej}(bbls)$$

$V_{Est}(bbls) = 22.81 \text{ BBLs}$

24. Net Total Estimated Spilled Volume

$$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{rej}(bbls)$$

$V_{Est}(bbls) = 15 \text{ BBLs}$

*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

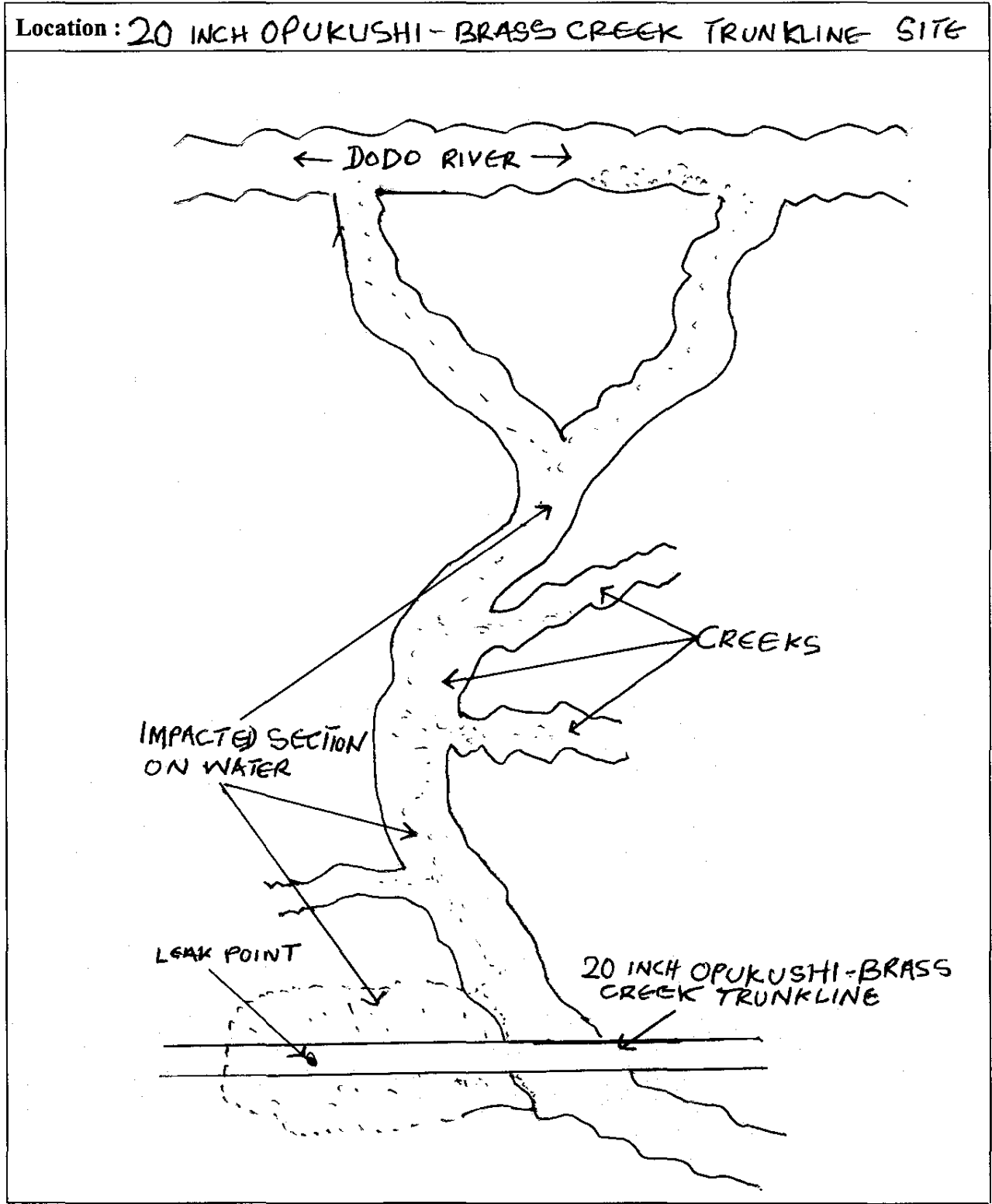
26 REPRESENTATIVES

This report was filled and signed on the 28th 29th 9 /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



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

S/N	Northing	Easting
	103981	360611
	103981	360612
	103655	360399
	103664	360404
	103675	360409
	103173	360039
	103163	360038
	103153	360036
	103027	360091
	103019	360089
	103010	360085
	102101	359873
	102109	359879
	102110	359880
	102110	359879
	102322	359621
	102325	359624
	102327	359625