

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0312 839838

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 [0 ,m]
 Fish Farm/Pond [5 ,m]
 Fishing net [,m]
 Others (specify). (SHEEP PEN) [10 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] []

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

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16. Crops/Economic Trees

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
01	PALM	/	/	✓	LOT	IMPACTED
02	RUBBER	/	/	✓	LOT	IMPACTED
		/	/	/	/	/

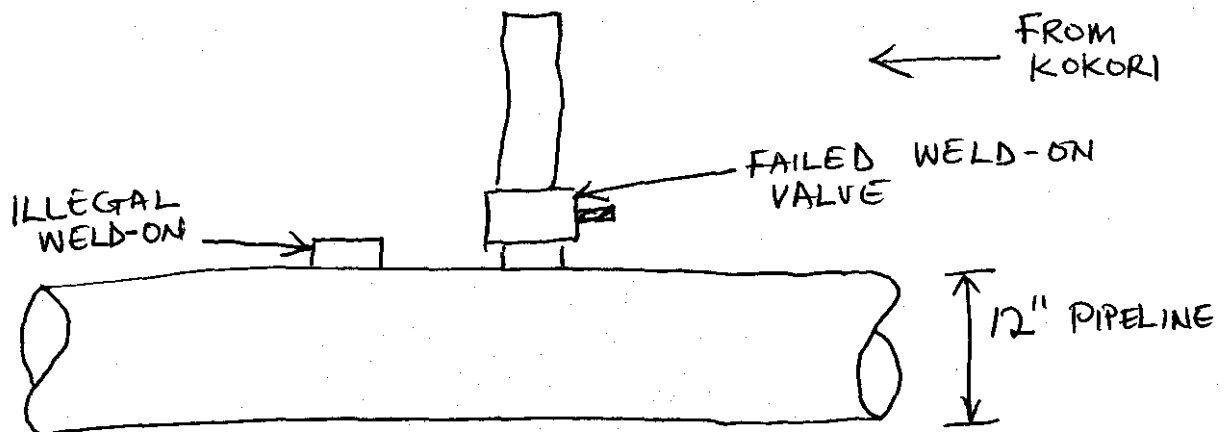
17. Fish/Nets/Ponds

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 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)



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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)

S/N	Northing	Easting
	172715	403485
	172716	403485
	172717	403481
	172713	403481
	172713	403482
	172715	403483
	172728	403486
	172729	403490
	172712	403490
	172684	403488
	172611	403485
	172610	403480
	172580	403482

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 20576 m²
- Impact within SPDC R.O.W 1394 m²
- Impact outside R.O.W 19182 m²

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

Recovered oil V_{rec}	15	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 19109 m²
 - Average Depth (m) of pool of free phase oil 0.003 m

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iii. Emulsification factor: 60%

iv.

Volume of pool of free phase oil, V_{pool}	144.22	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{inf}).

i. Area *(m²) covered by the oil: 1458 m²

ii. Area of the pool of free phase oil in touch with soil: 9 m²

iii. Average Depth (m) below ground surface of infiltration of oil: 0.05 m

iv. Soil type: SAND (MEDIUM)

v. P_c (effective porosity of the soil): 25%

iv.

Volume of infiltrated oil, V_{inf}	115.33	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		
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 bb1

NOT APPLICABLE

iii.

Volume of oil on open water, V_{wat}		barrels
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22. Calculation of evaporated volume:

i. Oil type: BONNY MEDIUM

ii. E-Factor: 15%

iii.

Volume of evaporated oil, V_{evap}	48.45	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%

*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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23. Gross Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 323 \text{ BBLs}$$

24. Net Total Estimated Spilled Volume

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

$$V_{Est}(bbls) = 323 \text{ BBLs}$$

*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 13 / 07 / 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]:

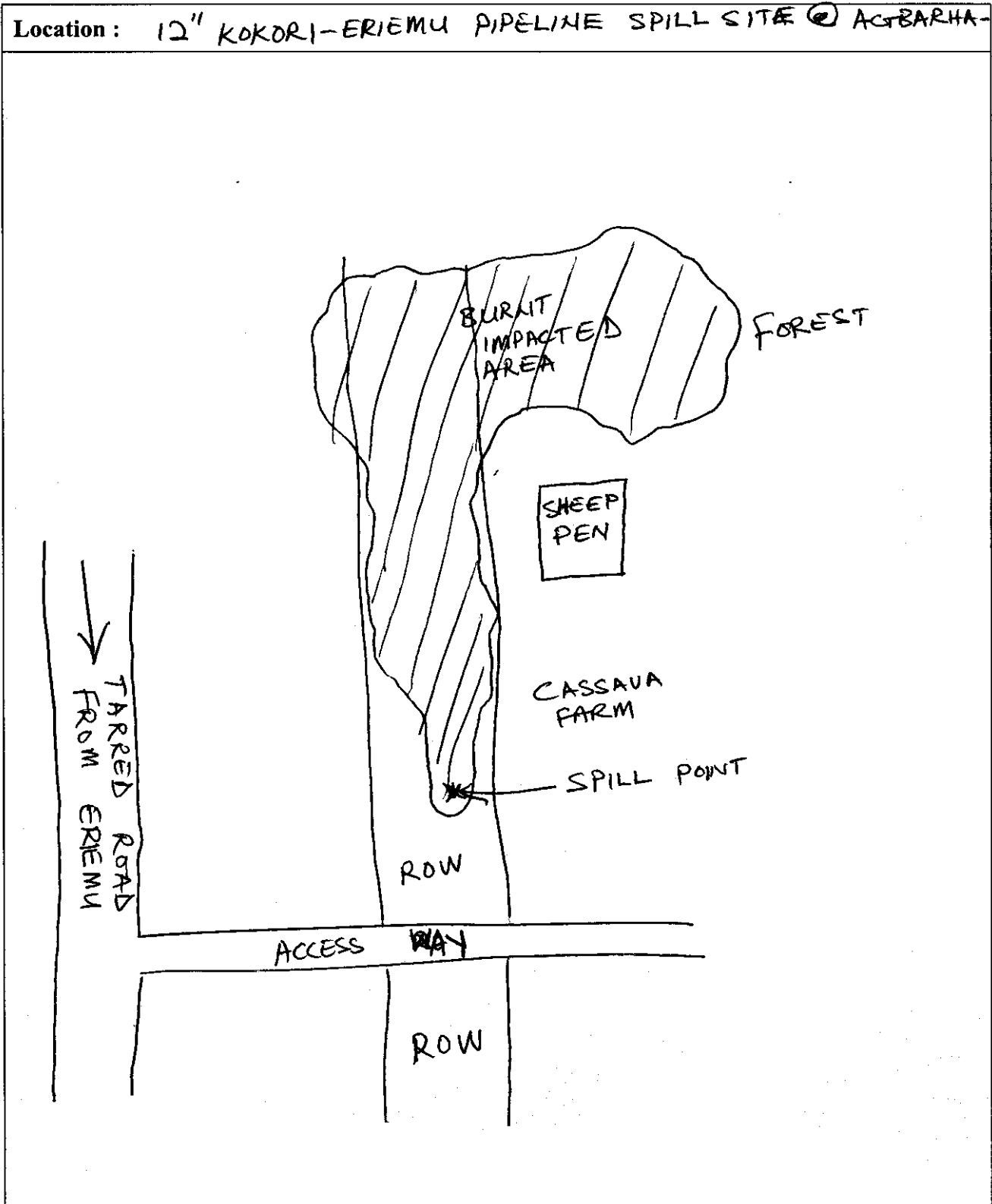
Tick as applicable

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27. Appendix 1: Overview sketch of the site

Location: 12" KOKORI-ERIEMU PIPELINE SPILL SITE @ AGBARHA-OTOR



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

S/N	Northing	Easting
	172581	403479
	172509	403480
	172485	403459
	172517	403429
	172537	403419
	172410	403454
	172335	403433
	172674	403481
	172674	403477
	172714	403479
	172450	403339
	172450	403339
	172444	403460
	172514	403470
	172479	403473
	172522	403365
	172337	403395
	172359	403363