THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMTED. JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1021571 (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: 102 | 57 | 2. Type of incident* TL SPILL 3. Name of Location 8" Isimiri - Imo River PIPELI NE 4. Name of nearest community OBIAKPU, 5. State: ABIA 6. LGA UKNA WEST 7. Type of Production facility/Installation OTL PIPELINE 8. Asset owner/District PIPELINE LAND B. INCIDENT INFORMATION: 9. Details of incident a. Date of incident: 8 74 Augus 7, 2813 b. Start date/time of investigation: 9th August, 2513
c. Investigation End date: 9th August, 2513 Actual investigation duration, days: CNE(1) W7
d. Description of spill point environment Recently excavated area Firmed soil Loose soil ☐Under water □ Swampy ☐Exposed pipe surface ☐ Well Platform (on Water) Drill Rig e. Description of leak point (tick as applicable); ☐ Hack saw cut ☐Drilled hole ☐ Tear (______), Inward dent. ☐Well head tampering Complete Rupture ☐ Failed Weld-on illegal hot tap valve, ☐ Failed Clamp ☐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, ☐Surge vessel overflow, ☐ Corrosion ☐ Saver-pit over flow, □Flare System/Bund wall failure □Accidental 3rd party equipment ☐Bulging Outward □Cold vent □com unit failure impact ☐ Valve Failure Relief valve failure Others (specify) f. Incident caused by: Third party interference (Sabotage□; crude theft□; Line theft□; Accidental 3rd party damage□) ☐ Operational Others (including Mystery spills) g. Spill point coordinates Measuring unit metal Northing: (Xn.) 525886.4 97987.53

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C. Ri	SK ASSESSME	NT						
	10. Type	of environment:						
	Land	□Swamp	□Water		Seasonal swamp□Si	horeline/Wat	erfront	
	i. Type of environment to which oil has spread:							
	L and	□Swamp	□Water		River (identify)			
	ii. Weath	er condition						
1	☐Rain 1. Distance from t	Sunny he nearest sensitiv	□Dry e habitat	□Wet	□Windy	□Hot	□cool	
	Government Drinking word Built up are Farmlands Fish Farm/ Fishing net Others (spe	ea Pond	signated prot	ected area	[m, m] [m,] [m,] [m, m] [m, m] [m, m]			
12	2. Containment m	easures put in plac	e;			,		
	□Booms □Others:	Trench	□Dyke		Natural depression	⊠ Pit ·		
1	3. Any pictures or	video coverage?			[Y] [N]			
1	4. Was there any	disruption to the in	vestigation?		[Y] [N]	/		
If yes	give brief descript	ion:						
	No	TA	PP	_((ABL	€.		
	YPE/NUMBERS 5. Structures / P		S, IF ANY,	FOUND	WITHIN THE AREA	A OF SPRE	AD OF OIL	
S/N	Type of Struct		ption Size	:	Number	Comm Mati		

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[]		1	I		1	
1				l		
1				l		
		<u></u>				
•	Crops/Economic Trees					
	Crops/Economic Trees	2				
	o. Clobs/Economic rice:	3				
-	or oropazionno rivo.	•				

S/N	Type of crops	Young	Medium	Matured	Quantity	Comments
	CASSAVA	V			Few	Light
						Impact
						

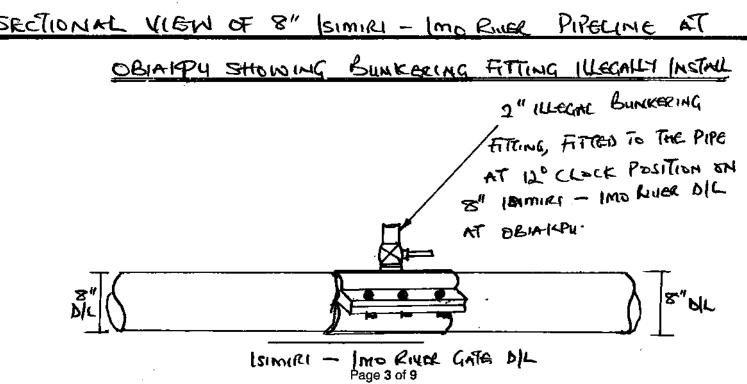
17. Fish/Nets/Ponds

S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments	
-	1 110 1	1 1	<u> </u>		
		ATTHAN 9	* // ^ \	NE I	MPACI
	COLAT-		14	\cup (11110
	-		-		

18. Others (Specify) i.e. Animal Traps

S/N	Others	Description	Quantity/Size	Comments
M	ANF L	WHIN A	1 CA	NE IMPACT.
H	OIYL N		1 × 1	

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 Print and attach as an appendix)

19.	Impacted area boundary Coordinates (If me	ore, Print and attach as an appendix) MID - BC1T
S/N	Northing (MATEC)	Easting (MeTec)
1.	98033.66	525861.85
2.	98036 - 73	52586(.86
3-	98030 - 54	525886 - 49
4.	98024.39	525886·48
5.	98015-10	S25926·52
6.	98005.90	525920-34
η.	9805.93	525904.93
8.	97984 - 43	525901.81
<u></u> -	97969.09	52589.45
10	91978.42	525834.61
u:	98000.10	525741-62
12.	98103 - 17	525741.63
13°	48000.03	525778.59
14.	97987.68	525809 · 38
15.	98003.03	525842-49
<u>l</u> 6,	97996-84	52587.13
_17-	91984:50	525864 - 83
18-	98012.15	525864.89

6. INCIDENT INFORMATION: 20. Impacted Area Details • Total calculated area of impact • Impact within SPDC R.O.W • Impact outside SPDC R.O.W • Impact outside SPDC R.O.W • Impact outside SPDC R.O.W 21. Volume of oil recovered before completion of JIV (V _{recl}): Recovered oil V _{recl} : Barrels 22. Computation of estimated residual volume on site a. Computation of estimated volume of pool of free phase oil i. Area (m²) occupied by pool of free phase oil ii. Average Depth (m) of pool of free phase oil iii. Emulsification factor: 3	INT INVESTIGATION R	EPORT FOR INCIDENT NO: [02157]	JIV report S/N:
20. Impacted Area Details • Total calculated area of impact • Impact within SPDC R.O.W • Impact outside SPDC R.O.W 21. Volume of oil recovered before completion of IIV (V _{real}): Recovered oil V _{real} : Barrels 22. Computation of estimated residual volume on site a. Computation of estimated volume of pool of free phase oil (on land or confined water body). i. Area (m²) occupied by pool of free phase oil (on land or confined water body). ii. Average Depth (m) of pool of free phase oil (V _{real}): Estimated Volume of pool of free phase oil (V _{real}). 10. Estimated Volume of pool of free phase oil (V _{real}). 11. Estimated Volume of infiltrated oil in the soil (V _{real}). 12. Estimated Volume of infiltrated oil at spill point (Vinf a) 13. Area* (m²) of soil covered by the oil: 14. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 'Im iii. Soil type: CLAT iv. Oil type: Estavity (Meshium vii. Oil Residence time on site, day: SNE 1547 13. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 0 - 6DC3m 14. Estimated depth of infiltration around spill point: 1 '15C3m 15. Estimated Volume of infiltrated oil at second spill point [if applicable] (Vinf b) 16. Average Depth (m) above leaking facility i.e. pipeline/flowline: NIL 17. Average Depth (m) above leaking facility i.e. pipeline/flowline: NIL 18. Average Depth (m) above leaking facility i.e. pipeline/flowline: NIL 18. Average Oppth (m) above leaking facility i.e. pipeline/flowline: NIL 18. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NIL 20. Cause of spill: NIL iv. P _e (effective porosity of the soil). NIL 21. V. Cause of spill: NIL iv. P _e (effective porosity of the soil). NIL 22. V. Cause of spill: NIL iv. P _e (effective porosity of the soil). NIL 23. V. Cause of spill: NIL iv. P _e (effective porosity of the soil). NIL 24. V. Cause of spill: NIL 25. Oil Residence time on site, day. NIL 26. Estimated depth of infiltration around spill point: NIL	G. INCIDENT INFOR	MATION:	0167
Impact within SPDC R.O.W Impact outside SPDC R.O.W Recovered oil V _{recl} : Barrels 22. Computation of estimated residual volume on site a. Computation of estimated volume of pool of free phase oil (on land or confined water body). i. Area (m²) occupied by pool of free phase oil (700m² ii. Average Depth (m) of pool of free phase oil (700m² iv. Estimated Volume of pool of free phase oil. V _{pool} : 37 · 42 barrels b. Computation of estimated volume of infiltrated oil in the soil (V _{carl}). 1. Estimated Volume of infiltrated oil at spill point (Vinf a) i. Area* (m²) of soil covered by the oil: 4m² ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 · 1 m iii. Soil type: CLAT iv. P _c (effective porosity of the soil). v. Cause of spill: Intro Pract vi. Oil type: Borney measure vii. Oil Residence time on site, day: 5 · 16 · 1 viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 6 · 5 · 5 · 5 · 5 · 5 · 5 · 5 · 5 · 5 ·	20. Impacted Area	a Details	
• Impact outside SPDC R.O.W 21. Volume of oil recovered before completion of IIV (V _{recl}): Recovered oil V _{recl} : Barrels		~ 1 ~ ~ *	
Recovered oil V _{reci} : Barrels 22. Computation of estimated residual volume on site a. Computation of estimated volume of pool of free phase oil (on land or confined water body). i. Area (m²) occupied by pool of free phase oil (TCOM) iii. Average Depth (m) of pool of free phase oil (TCOM) iii. Emulsification facfor: 3c % iv. Estimated Volume of pool of free phase oil. V _{pool} : 37 · 42 barrels b. Computation of estimated volume of infiltrated oil in the soil (V _{tur}). 1. Estimated Volume of infiltrated oil at spill point (Vinf a) i. Area* (m²) of soil covered by the oil: 4 m² ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 · 1 m iii. Soil type: CLAT iv. P _e (effective porosity of the soil). v. Cause of spill: IntraD PM(7) vi. Oil type: Sound Medium vii. Oil Residence time on site, day: SNE 16 AT viii. Average depth of infiltration around spill point: 1 · 1 to 3 m x. Estimated depth of infiltrated oil at spill point. V _{ar(xi}) 2 · 21 barr 2. Estimated Volume of infiltrated oil at second spill point [if applicable] (Vinf b) i. Area* (m²) of soil covered by the oil: NtL iii. Average Depth (m) above leaking facility i.e. pipeline/flowline: NtL v. Cause of spill: NtL vi. Oil type: NtL vii. Oil Residence time on site, day: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NtL		700	· ·
Recovered oil V _{nc.j} : a. Computation of estimated residual volume on site a. Computation of estimated volume of pool of free phase oil (on land or confined water body). i. Area (m²) occupied by pool of free phase oil 1700m² ii. Average Depth (m) of pool of free phase oil 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
a. Computation of estimated volume of pool of free phase oil (on land or confined water body). i. Area (m²) occupied by pool of free phase oil (700 m²). ii. Average Depth (m) of pool of free phase oil 0.005 m iii. Emulsification factor: 30 % iv. Estimated Volume of pool of free phase oil. Vpool: 37 · 42 barrels b. Computation of estimated volume of infiltrated oil in the soil (Vpool: 37 · 42 barrels) b. Computation of estimated volume of infiltrated oil in the soil (Vpool: 37 · 42 barrels) i. Area* (m²) of soil covered by the oil: 4 m² ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 · 1 m iii. Soil type: 1 · 1 v. Pe (effective porosity of the soil). v. Cause of spill: 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1			Barrels
a. Computation of estimated volume of pool of free phase oil (on land or confined water body). i. Area (m²) occupied by pool of free phase oil (700 m²). ii. Average Depth (m) of pool of free phase oil 0.005 m iii. Emulsification factor: 30 % iv. Estimated Volume of pool of free phase oil. Vpool: 37 · 42 barrels b. Computation of estimated volume of infiltrated oil in the soil (Vpool: 37 · 42 barrels) b. Computation of estimated volume of infiltrated oil in the soil (Vpool: 37 · 42 barrels) i. Area* (m²) of soil covered by the oil: 4 m² ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 · 1 m iii. Soil type: 1 · 1 v. Pe (effective porosity of the soil). v. Cause of spill: 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1	Ļ		
iii. Emulsification facfor: 3c % iv. Estimated Volume of pool of free phase oil. Vpool: 37 · 42 barrels b. Computation of estimated volume of infiltrated oil in the soil (Viat). 1. Estimated Volume of infiltrated oil at spill point (Vinf a) i. Area* (m²) of soil covered by the oil: 4m² ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: 1 · 1m iii. Soil type: CLAT iv. Profit vi. Oil type: Bonny medium vi. Cause of spill: 1trred Profit vi. Oil type: Bonny medium vii. Oil Residence time on site, day: 5c 1647 viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: 6 · 0003m ix. Estimated depth of infiltrated oil at spill point: 1 · 1003m X. Estimated Volume of infiltrated oil at second spill point: 1 · 1003m 2. Estimated Volume of infiltrated oil at second spill point [if applicable] (Vinf b) i. Area* (m²) of soil covered by the oil: 11 Average Depth (m) above leaking facility i.e. pipeline/flowline: 12 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 · 100 ·	22. <u>Computation of</u> a. Computation of i. A	of estimated residual volume on site f estimated volume of pool of free phase oil (on land or rea (m²) occupied by pool of free phase oil	confined water body).
b. Computation of estimated volume of infiltrated oil in the soil (V _{int}). 1. Estimated Volume of infiltrated oil at spill point (Vinf a) i. Area* (m²) of soil covered by the oil:	ii. A	average Depth (m) of pool of free phase oil	005M
b. Computation of estimated volume of infiltrated oil in the soil (V _{int}). 1. Estimated Volume of infiltrated oil at spill point (Vinf a) i. Area* (m²) of soil covered by the oil:	iii. Ei	mulsification factor: 30 %	
i. Area* (m²) of soil covered by the oil:	iv.	Estimated Volume of pool of free phase oil. V _{pool} :	37 · 42 barrels
Estimated Volume of infiltrated oil at spill point. V _{inf_a} : 2. Estimated Volume of infiltrated oil at second spill point [if applicable] (Vinf b) i. Area* (m²) of soil covered by the oil: ii. Average Depth (m) above leaking facility i.e. pipeline/flowline: iii. Soil type:	ii. A iii. Sc v. Ci vii. O viii. A	verage Depth (m) above leaking facility i.e. pipeline/flood type: CLAT iv. P_e (effective porosity of ause of spill: Threb PMTT vi. Oil type: Bonn't verage depth of infiltration below leaking facility i.e. proven the strength of the st	ipeline/flowline: 0.0002m
i. Area* (m²) of soil covered by the oil:	,	Estimated Volume of infiltrated oil at spill point	. V _{inf_a} : 2.21 ba
ii. Average Depth (m) above leaking facility i.e. pipeline/flowline:			olicable] (Vinf b)
iii. Soil type: iv. Pe (effective porosity of the soil) NIL v. Cause of spill: vi. Oil type: NIL vii. Oil Residence time on site, day: NIL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NIL ix. Estimated depth of infiltration around spill point: NIL		•	
v. Cause of spill: vi. Oil type: N(L			
vii. Oil Residence time on site, day: NIL viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NIL ix. Estimated depth of infiltration around spill point: NIL		· -	
viii. Average depth of infiltration below leaking facility i.e. pipeline/flowline: NLL ix. Estimated depth of infiltration around spill point: NLL			
ix. Estimated depth of infiltration around spill point: NL		·	ineline/flowline: NIL
25 Indiana depart of introduction are the post-		1.	
MCIMIGIAN VALUMA AT INTINTIATED AND TANKE V			

INT INVESTIGATION R	EPORT FOR IN	ICIDENT NO: (D)	1571 JIV 1	eport S/N:			
		overed by the oil:	1988 m2	<u>, 0161</u>			
		ool of free phase oil in	touch with soil:	·	_		
	9 7						
iv. Soil type: CLAY							
		sity of the soil)	·) 3				
	•	ed Volume of infiltrate		0.27	barrels		
				1 0 21	<u> </u>		
-			water based on star	adard coloration.			
	of oil on open wat						
ii. <u>Table of a</u>	verage depth of oi	l on water based on c	oloration (**Spili Edition	l Factors from USCG F)	'OG (2000		
	Thickness (mm)	Percentage coverage	Volume (m3)				
Barely Visible	0.00004						
Silvery	0.00008	AD DA	C N				
Slight Color	0.00015	UITE SIN	LIT				
Bright Color	0.0003						
Dull	0.001	ITHIN					
Dark	0.002						
Black oil	0.1	CINICA	•				
Emulsion (30% Oil)	1						
_	Percent Total	100%					
iii.	Estimated Volume	me of oil on open wat	er. Vwat: Not A	PPLICABLE Bar	πels		
24. Calculation of	of evaporated vo	lume:			•		
i. Estir	nated Volume a	vailable for evapora	ntion within surface	area: 39.918	MAREL		
	actor: 15 %						
iii.	EstimatedVo	olume of evaporated of	oil. V _{evap} : 7	Bai	rrels		
Evan	oration Factors	(E-Factor) for SPD	C Crude oil				
Oil Type	Days on site	Bonny Light	Bonny Medium				
Oil Residence time	< 1 day	10%	5%				
	1-7 days	25%	15%				
	> 7 days	40%	25%				
25 Not Fetimes	ted Spilled Vol	umo V. (bbls) = '	$\overline{V_{\text{evap}}(bbls) + V_{\text{wat}}}$ (hbls) + V (bbls)	+ V _{mont}		
(bble) ± V	· (bbis) = 🍑 🖼	U + Airi + 9.	49 + 37.43		poor		
(UUIS) T Y rec.) (UUIS) - . U	7 1 1410 · 2	Lazaere	-			
		= 46.46	DUKKE L				
Estimated Reported	Volume** V _{ree} (b	$= 46.96$ $\frac{\text{bls}}{47}$	enerels.				

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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 m^3 to barrels is Volume (m3) x 6.29; **Round up estimated volume to next whole number using the following rules:

- Any spill volume in excess of 1 bbl is rounded up to the next whole number.
- Any spill volume in less than I bbl. is rounded up to the next 0.1 bbl.

Examples: Calculated volume = 15.3 bbl ------ Reported volume = 16 bbl Calculated volume = 0.35 bbl ------ Reported volume = 0.4 bbl Calculated volume = 0.01 bbl ------ Reported volume = 0.1 bbl.

Wherever this estimation tool is not applicable please refer to paragraph 6c (Deviations) of the IIV procedure to use appropriate steps for column estimation; record the calculation in a plain sheet of paper and attach to the IIV report.

26. 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

27. REPRESENTATIVES

This report was filled, agreed and signed on the 5/2013 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]: \(\nabla\)
- Nigeria Police Force [NPF]: T
- Shell Petroleum Development Company [SPDC]: S
- Signatories agree with reported findings:
- Separate DPR form has been filled out with same findings□

Tick as applicable

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28. Appendix 1: Overview sketch of the site

