

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0287 / 831677

(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: 831677 2. Type of incident * OIL AND GAS SPILL
 3. Name of Location IMO RIVER 3 WELL 5 FLOWLINE
 4. Name of nearest community IGRUKWU 5. State: ABIA 6. LGA UKWA-WEST
 7. Type of Production facility/Installation FLOWLINE 8. Asset owner/ District NEL 1

B. INCIDENT INFORMATION:

9. Details of incident

- a. Date of incident: 24th JUNE, 2012
 b. Start date/time of investigation: 26th JUNE, 2012
 c. Investigation End date: 26th JUNE, 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) CLAMP FAILURE

f. Incident caused by:

- Third party interference Operational Mystery _____

g. Spill point coordinates

Measuring unit <u>METRE</u> (<u>MINNA MID-BETT</u>)	
Northing: (m) <u>524102</u> <u>108834.45</u>	Easting: (m) <u>524099.43</u>

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO: _____

0287/83/677

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
- Drinking water source
- Built up area
- Farmlands
- Fish Farm/Pond
- Fishing net
- Others (specify).

[.m]
[.m]
[.m]
[.m]
[.m]
[.m]
} NOT APPLICABLE

12. Containment measures put in place;

- Booms Trench Dyke

Others: _____

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.				

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0237/831677

16. Crops/Economic Trees

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

17. Fish/Nets/Ponds

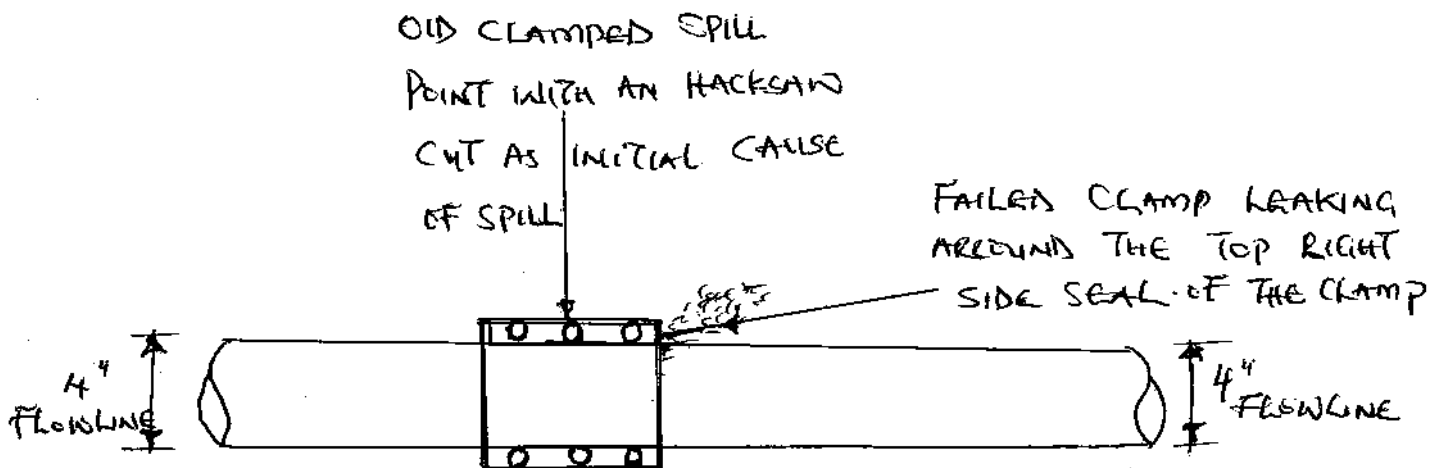
S/N	Fish/Nets/Ponds	Description	Quantity/Size	Comments
	NONE WITHIN AREA OF IMPACT			

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 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)

IMO RIVER 3 WELL 5 FLOWLINE AT IGRUKWU SECTIONAL VIEW:



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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 (m)	Easting (m)
202	108840.59	524099.44
203	108840.59	524102.52
205	108837.53	524096.35
206	108834.46	524096.35
207	108831.38	524096.84
208	108831.37	524093.26
209	108828.32	524090.17
210	108825.25	524093.25
211	108819.16	524087.08
212	108816.03	524093.23
213	108812.95	524096.80
214	108763.23	524092.74
215	108787.27	524092.00

G. INCIDENT INFORMATION:

20. Impacted Area Details

- Total calculated area of impact 0.07 Ha
- Impact within SPDC R.O.W YES
- Impact outside R.O.W NO

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 100 m²
 - Average Depth (m) of pool of free phase oil 0.02 m

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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0287/831677

iii. Emulsification factor: 30%

iv.

Volume of pool of free phase oil, V_{pool} :	8.81	barrels
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b. Computation of volume of infiltrated oil in the soil (V_{int}).

- i Area *(m²) covered by the oil: 600m²
- ii Area of the pool of free phase oil in touch with soil: 0.01m
- iii Average Depth (m) below ground surface of infiltration of oil: 0.01m
- iv Soil type: SAND MEDIUM
- v P_c (effective porosity of the soil): 25%

iv.

Volume of infiltrated oil, V_{int}	9.44	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	NOT APPLICABLE	
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: 15%

iii.

Volume of evaporated oil, V_{evap} :	3.22	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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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0287/831677

23. Gross Total Estimated Spilled Volume
$V_{Est}(bbls) = V_{evap}(bbls) + V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recj}(bbls)$
$V_{Est}(bbls) = 3.22 + NIL + 9.44 + 8.8 + NIL = 21.46 \text{ BARRELS}$
24. Net Total Estimated Spilled Volume
$V_{Est}(bbls) = V_{evap}(bbls) + 0.6 * V_{wat}(bbls) + V_{inf}(bbls) + V_{pool}(bbls) + V_{recj}(bbls)$
$V_{Est}(bbls) = 21.5 \text{ BARRELS}$

*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.

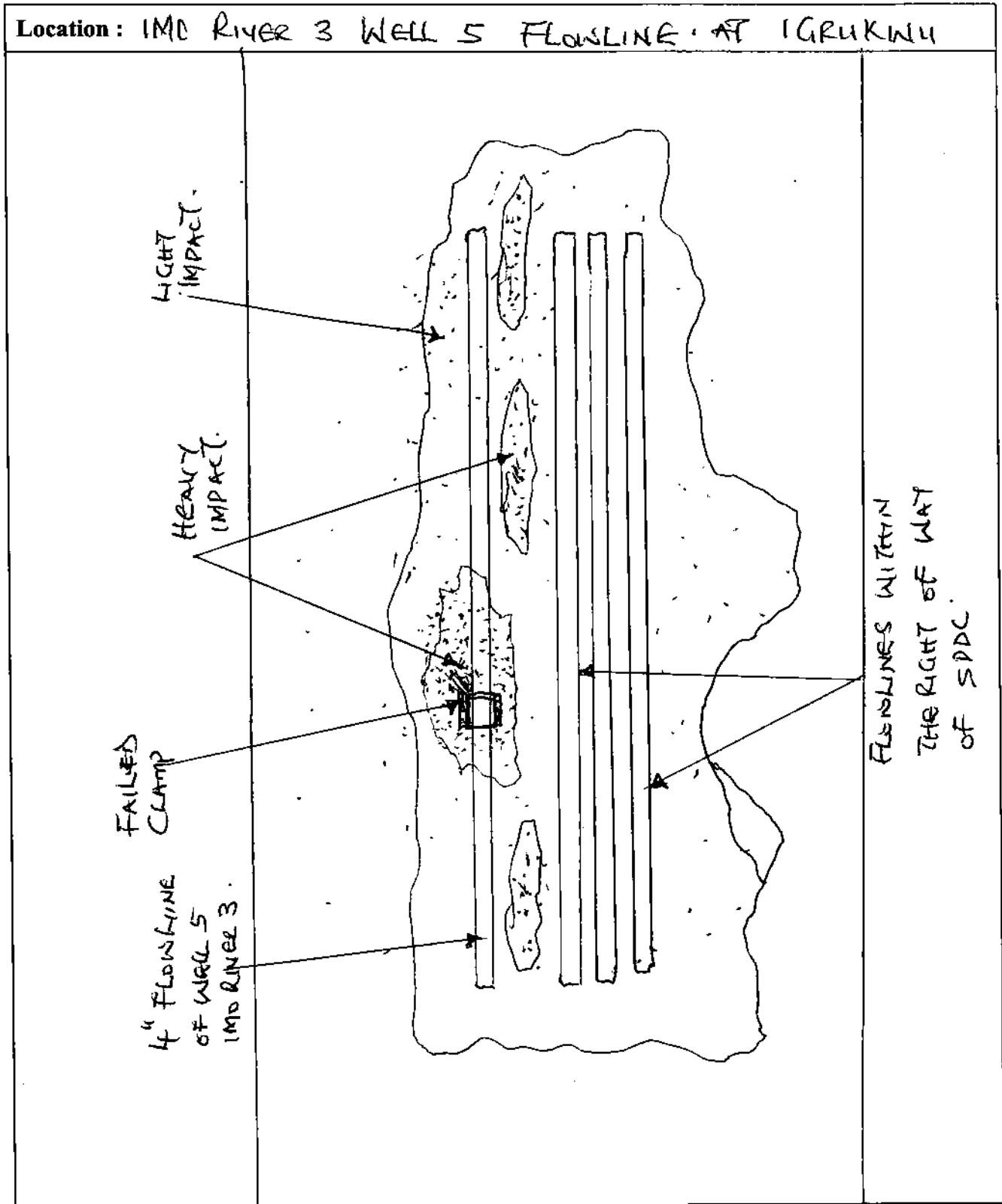
25. GENERAL STATUS OF THE SITE

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 <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 REPRESENTATIVES

This report was filled and signed on the <u>26/06/2012</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 type="checkbox"/>• Nigeria Police Force [NPF]: <input type="checkbox"/>• Shell Petroleum Development Company [SPDC]: <input checked="" type="checkbox"/>
<i>Tick as applicable</i>

27. Appendix 1: Overview sketch of the site



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JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0287 / 831677

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

S/N	Northing (m)	Easting (m)
216	108762.32	529102.46