| THE SHELL PETROLEUM D | EVELOPMENT CON | IPANY OF NIGERIA LIMITED |
|--|-----------------------|--------------------------------------|
| JOINT INVESTIGATION REPO | RT FOR INCIDENT NO | .: <u>0358 - 8</u> 7/986 |
| (Note: As practicable as possible the JIT re | | |
| A. GENERAL INFORMATION: | | |
| 1. Spill incident Number: 8719 | | |
| 3. Name of Location 24" Bomu | | |
| 4. Name of nearest community FREE 1 | OMN 5. State: R | ERS 6. LGA BONNY- ANDEN |
| 7. Type of Production facility/Installation _ | OIL PHELINE 8.A | ASSET OWNER/ DISTRICT NESP SHAMP |
| B. INCIDENT INFORMATION: | | |
| 9. Details of incident a. Date of incident: 27 Th Seption b. Start date/time of investigation: 4 c. Investigation End date: 5 Th occurrence d. Description of spill point environm | Tober, 2012 | |
| Firmed soil | Loose soil | Previously excavated area |
| Under water | ☑ Swampy | Exposed pipe surface |
| ☐ Well Plateform (on Water) | | \square_{Rig} |
| e. Description of leak point (tick as a | _ | 5 |
| □Drilled hole | Hack saw cut | ☐Explosive tear, |
| ☐Complete Rupture | ☐ Inward dent, | Well head tampering |
| ☐Failed Weld-on illegal hot tap | | Missing Pipeline/Flowline) |
| Crude oil theft (illegal) bunker | ing) point, | ☐ Third party tampering with Clamp |
| Third party tampering with val | ve setting, | ☐ Third party tampering with flange, |
| Corrosion | ☐Saver-pit over flow, | ☐ Surge vessel overflow |
| Outward dent | ☐ Flare System/Bund v | vall failure |
| ☐Valve Failure | Com unit failure | ☐ Cold vent |
| Relief valve failure | Others (specify) | |
| f. Incident caused by: | | |
| Third party interference | Operational | □ _{Mystery} |
| Elimid party meriorese | Д Орстановат | — Wystory |
| g. Spill point coordinates Measuring unit March | (MINHA M) | 112 - BEIT) |
| Northing: | , | Easting: |
| 5745 | 1.77 | 530434 34 |
| · • | • | |





THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED 0358 - 871986 JOINT INVESTIGATION REPORT FOR INCIDENT NO: C. RISK ASSESSMENT 10. Type of environment: Swamp Water □ Land ☐ Seasonal swamp í. Type of environment to which oil has spread: Water Swamp □ Land ☐ River (identify)_ ii. Weather condition ☐ Raining 11. Distance from the nearest sensitive habitat ☐ Government reserved and designated protected area ,m] ☐ Drinking water source [m, ☐ Built up area Noi ,m] ☐ Farmlands [m, APPLICABLE. ☐ Fish Farm/Pond ,m] ☐ Fishing net ☐ Others (specify). 12. Containment measures put in place; Booms □ Dyke ☐ Trench JOH APPLICABLE. [N]13. Any pictures or video coverage? 14. Was there any disruption to the investigation? [Y] 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 |
|----------|--------------------|-------------|----------|--------|-----------------|----------|
| | | | | | | |
| X | tax (- 1 | HA | 1 / | 200 | ~ 1 | TAM DAZ |
| | 1017× | 11 11 (1 | * | 1 | VIII | MATCI |
| ' | | 1 | | | | • |
| | · | _ | | | | |

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0358 - 871986

16. Crops/Economic Trees

| MONE WITHIN AREA OF MARCT | S/N Type of crops | Young | Medium | Matured | Quantity | Comments |
|---------------------------|---|-----------|--------|-------------|---------------|----------|
| | - · · · · · · · · · · · · · · · · · · · | | | | | T |
| | MINE | WIITH | AX | A - 3 | }[| TT |
| | T POT Y | Yal litt. | | | <u> </u> | |

17. Fish/Nets/Ponds

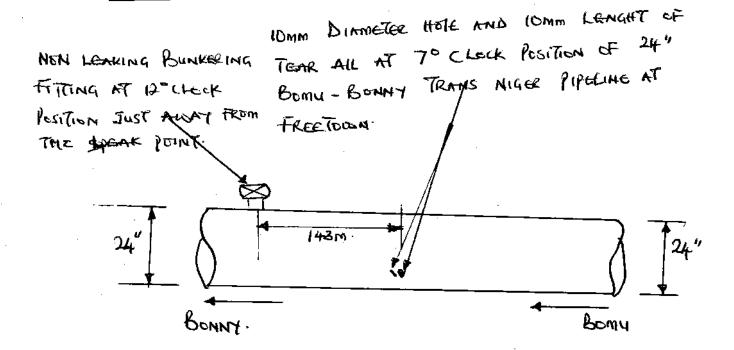
| NONE WITHIN AREA OF IMPACT | S/N | Fish/Nets/Ponds | Description | | Quantity/Size | Comments |
|----------------------------|----------|-----------------|-------------|----------|---------------|---|
| NONE WITHIN AREA OF MYNCH | 3714 | | | <u> </u> | 1 | (Or 67 |
| | 4 | INAF WI | HIPN - | AKE: | A OF IN | (|
| | <u> </u> | 10111- 0 FL | 10014 | (. 4- | | |

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

| S/N Others | Description | Quant | ity/Size | Comments |
|------------|-------------|-------|----------|----------|
| NONE AL | HIN | ARCA | 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)

SHOWING A SECTIONAL VIEW OF LEAKAGE ON 24" BOMY-BUINT TRANS NIGER PIPELINE AT FREETOWN.



Page 3 of 9

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED JOINT INVESTIGATION REPORT FOR INCIDENT NO: 1358-87/986

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 |
|--------|-----------|------------|
| WP034 | 57346.67 | 530341.67 |
| WPOZS | 57347.80 | 530334.94 |
| WP 036 | 57.351.40 | 530335.67 |
| WP037 | 57 456.98 | 530431.26 |
| W038 | 57 445 99 | 530 437.57 |
| WP 039 | 57346.74 | 530349.75 |
| | | |
| | | |
| | | |
| | | - |
| | | |
| | | |
| | | |

G. INCIDENT INFORMATION:

| 20. | Ĭm | nacte | ed A | rea | Det | ails |
|-----|----|-------|------|-----|-----|------|
| | | | | | | |

| | Total calculated area of impact Impact within SPDC R.O.W | 0 18 Ha | | |
|-----------|--|--|--------|-----------------------------|
| | Impact outside R.O.W | 7FC | | |
| 21. | Volume of oil recovered before comple | etion of JIV (V _{rec.J)} : | | |
| | Recove | ered oil V _{rec} r. | NıL | barrels |
| 20. a. | Computation of the residual volume on Computation of volume of pool of free pha i. Area (m²) occupied by pool of ii. Average Depth (m) of pool of other pool of the computation of the residual volume on the computation of volume of pool of free phases. | se oil (on land or confined water book f free phase oil | ty). T | fected by " idea effect" |

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED 0358-87/986 JOINT INVESTIGATION REPORT FOR INCIDENT NO: Volume of pool of free phase oil. V_{pool} Volume of pool of free phase oil. V_{pool} of Infiltrated oil in the soil (V_{inf}). i Area *(m²) covered by the oil: ii Area of the pool of free phase oil. V_{pool} Area of the pool of free phase oil. V_{pool} Area *(m²) covered by the oil: Area of the pool of free phase oil. V_{pool} Area of the pool of free phase oil. V_{pool} Area *(m²) covered by the oil: Area of the pool of free phase oil. V_{pool} Area of the pool of free phase oil. V_{pool} Area *(m²) covered by the oil: Area *(m²) covered by the oil: Area *(m²) covered by the oil: computation of white Volume of pool of free phase oil. V peol: NIL barrels 1796 m2 NIL Area of the pool of free phase oil in touch with soil: Average Depth (m) below ground surface of infiltration of oil:____ Achave = 1.0084 Berin $P_{\rm e}$ (effective porosity of the soil). Volume of infiltrated oil. Vinf 3-61 barre1s 21. Computation of volume of oil on open water based on standard coloration. Total area of oil on open water:___ MIL. Table of average depth of oil on water based on coloration ** Thickness Percentage Volume (m3) coverage (mm) Barely Visible 0.00004 Silvery 80000.0 Slight Color 0.00015 **Bright Color** 0.0003 0.001 Dull Dark 0.002 Blackoil 0.1 Emulsion (30% Oil) 1 100% bbl **Total Volume** Percent Total Volume of oil on open water. Vwa barrels iii. NIL 22. Calculation of evaporated volume: Oil type: BENNY LIGHT 40% E-Factor: ii.

| Evapor | ration Factors (E-Fa | actor) for SPDC Crue | de 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% | |

iii.

Volume of evaporated oil. V evep:

08

barrels

^{*}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

JOINT INVESTIGATION REPORT FOR INCIDENT NO: 0358 -87/986

23. Gross Total Estimated Spilled Volume

 $V_{\text{Est}}(bbls) = V_{\text{evap}}(bbls) + V_{\text{war}}(bbls) + V_{\text{inf}}(bbls) + V_{\text{pool}}(bbls) + V_{\text{recJ}}(bbls)$

VEST (bbls) = 3.08+ NIL + (3.61+ 1.0064) + NIL + MIL = 7.70 BARRELS.

24. Net Total Estimated Spilled Volume

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

VEST(bbls)= 7.70 BARKELS.

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 <u>65/10/2012</u> 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

^{*}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

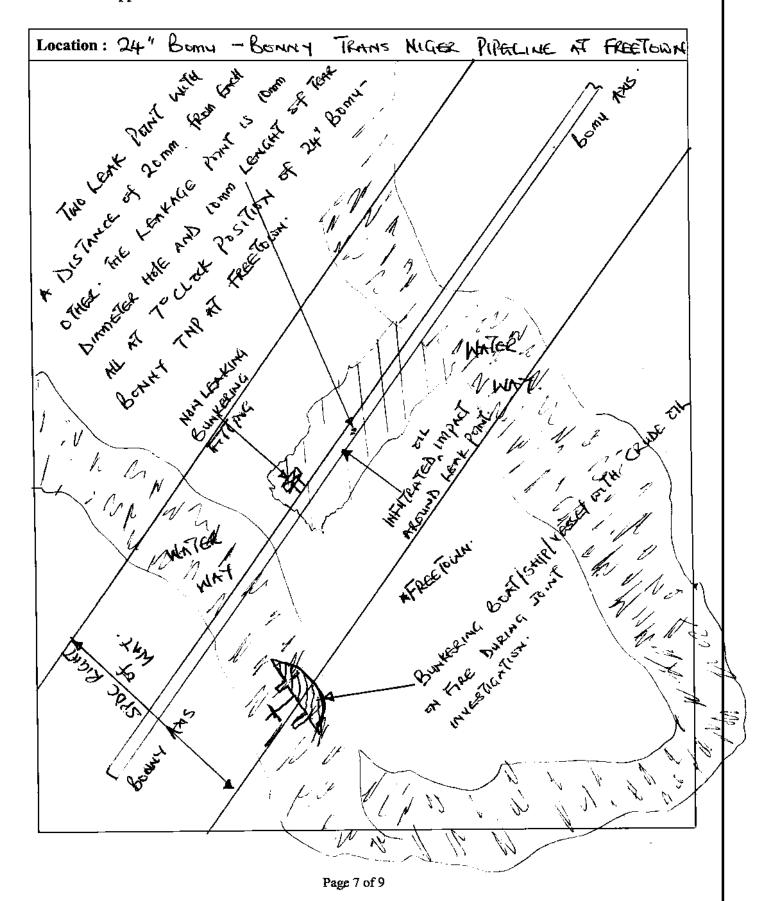
^{*}Conversion of m3 to barrels is Total volume VT (m3) x 6.29

^{*}Emulsification factor for spill on water to consider is 60% of volume of oil.

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO:__

27. Appendix 1: Overview sketch of the site



21. Appendix 2:TABLE SHOWING ADDITIONAL COORDINATES TAKEN DURING JIV FOR AREA CALCULATION (MINHA MID - BEIT) S/N Northing Easting

THE SHELL PETROLEUM DEVELOPMENT COMPANY OF NIGERIA LIMITED

JOINT INVESTIGATION REPORT FOR INCIDENT NO:_____