A. GENERAL INFORMATION:

1. Spill Incident Number: E41066

2. Name of Location: 24" CAUThERINE CHANNEL - BENNY BLOCK VALVE STATION

3. Name of nearest community: KALIBIAMA

4. State: RIVER LGA: BENNY

5. Type of Production facility/Installation: Pipeline Asset owner/District: ULC/PINESP

B. INCIDENT INFORMATION:

6. Details of incident:
   a. Date of incident: 29th March, 2011
   b. Date/Period of investigation: 1st to 3rd April, 2011
   c. Description of spill point environment:
      - Firmed soil: [Y] [N]
      - Loose soil: [Y] [N]
      - Previously excavated area: [Y] [N]
      - Under water: [Y] [N]
      - Swampy: [Y] [N]
      - Exposed pipe surface: [Y] [N]

   d. Description of leak point (tick as applicable):
      - Drilled hole: [Y] [N]
      - Hack saw cut: [Y] [N]
      - Explosive tear: [Y] [N]
      - Complete Rupture: [Y] [N]
      - Inward dent: [Y] [N]
      - Well head tampering: [Y] [N]
      - Failed Weld-on illegal hot tap valve, [Y] [N]
      - Missing pipeline (flowline) [Y] [N]
      - Crude oil theft (illegal bunkering) point, [Y] [N]
      - Third party tampering with Clamp Bolt/Nut, [Y] [N]
      - Third party tampering with valve setting, [Y] [N]
      - Third party tampering with flange Nuts/bolts, [Y] [N]
      - Corrosion, [Y] [N]
      - Saver-pit over flow, [Y] [N]
      - Surge vessel overflow, [Y] [N]
      - Outward dent, [Y] [N]
      - Others (specify): NOT APPLICABLE

   e. Spill point coordinates:
      - Northing: (M) SP1: 514.55.96
      - Easting: (M) SP2: 514.60.06

   - After Joint Investigation of the Incident Spill, was found to be due to third party interference

Page 1 of 7
C. RISK/DAMAGE ASSESSMENT

7. Type of environment of spill site:
   - [ ] Land
   - [x] Swamp
   - [ ] water

Type of environment of which oil has spread:
   - [ ] Land
   - [x] Swamp
   - [ ] water

8. 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):

9. Containment measures put in place;
   - [x] Booms
   - [ ] Trench
   - [ ] Dyke
   - [ ] Others: __________________________

10. Any pictures or video coverage?
    [x] Y [ ] N

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

If yes give brief description:

[ ] NOT APPLICABLE

D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL

A. Structures / Properties

<table>
<thead>
<tr>
<th>S/N</th>
<th>Type of Structures</th>
<th>Description</th>
<th>Size</th>
<th>Number</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NONE WITHIN AREA OF IMPACT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. Crops/Economic Trees

<table>
<thead>
<tr>
<th>S/N</th>
<th>Types of crops</th>
<th>Young</th>
<th>Medium</th>
<th>Matured</th>
<th>Quantity</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NONE WITHIN AREA OF IMPACT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. Fish/Nets/Ponds

<table>
<thead>
<tr>
<th>S/N</th>
<th>Fish/Nets/Ponds</th>
<th>Description</th>
<th>Quantity/Size</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NONE WITHIN AREA OF IMPACT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>S/N</th>
<th>Others</th>
<th>Description</th>
<th>Quantity/Size</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NONE WITHIN AREA OF IMPACT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E. GRAPHIC DESCRIPTION OF LEAK POINT (Details should be contained in leak repair report)

[Diagram of pipeline and valves with labels indicating pressure indicators, flanges, and missing parts]
## F: Table Showing Some of Coordinates Taken During JIV for Area Calculation

**E. Coordinates (MINHA Mid-Belt)**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Northing (Meters)</th>
<th>Easting (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>51462.13</td>
<td>521215.26</td>
</tr>
<tr>
<td>P2</td>
<td>51529.69</td>
<td>521218.46</td>
</tr>
<tr>
<td>P3</td>
<td>51482.87</td>
<td>521236.82</td>
</tr>
<tr>
<td>P4</td>
<td>51536.64</td>
<td>521209.21</td>
</tr>
<tr>
<td>P5</td>
<td>51526.64</td>
<td>521209.21</td>
</tr>
<tr>
<td>P4</td>
<td>51532.78</td>
<td>521212.30</td>
</tr>
</tbody>
</table>
G. INCIDENT INFORMATION:

17 Impacted Area Details

a. Total calculated area of impact: 0.11 Ha
   - Impact within SPDC R.O.W: 0.11 Ha
   - Impact outside R.O.W: NIL

18 Volume of oil recovered before completion of JIV ($V_{rec}$):

| Recovered oil $V_{rec}$ | NIL | barrels |

19. Computation of the residual volume on site

   a. Computation of the volume of pooled free phase oil (on land or confined water body).
      i. Area ($m^2$) occupied by pool of free phase oil
      ii. Average Depth ($m$) of pool of free phase oil
      iii. Volume of pooled of free phase oil ($V_{pool}$) NIL barrels

   b. Computation of volume of infiltrated oil in the soil ($V_3$).
      i. Area ($m^2$) covered by the oil
      ii. Average Depth ($m$) below ground surface of infiltration of oil
      iii. Soil type
      iv. $\rho_e$ (effective porosity of the soil)

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

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Percentage coverage</th>
<th>Volume (m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barely Visible 0.00004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silvery 0.00008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slight Colour 0.00015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bright Colour 0.0003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dull 0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark 0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black oil 0.1</td>
<td>100</td>
<td>0.11 m$^3$</td>
</tr>
<tr>
<td>Emulsion (30% Oil) 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Percent Total 100% Total Volume 0.69 bbl

21. Calculation of evaporated volume:
   i. Oil type: Bonny Light
   ii. E-Factor: \( \frac{25}{\%} \)
   iii. Volume of evaporated oil: \( 0.23 \) barrels

<table>
<thead>
<tr>
<th>Oil Type</th>
<th>Bonny Light</th>
<th>Bonny Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E-Factor</td>
<td>E-Factor</td>
</tr>
<tr>
<td>Period Since Oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spill</td>
<td>&lt;1 day</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>1-7 days</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>&gt;7 days</td>
<td>40%</td>
</tr>
</tbody>
</table>

9. Gross Total Estimated Spilled Volume: \( V_{est}(bbls) = V_{vap}(bbls) + V_{wat}(bbls) + V_{mf}(bbls) + V_{pool}(bbls) + V_{misc}(bbls) \)

\[
V_{est}(bbls) = 0.23 + 0.69 + 0.6 + 0.0 = 0.92 \text{ bbls}
\]

10. Net Total Estimated Spilled Volume: \( V_{net}(bbls) = V_{vap}(bbls) + 0.6*V_{wat}(bbls) + V_{mf}(bbls) + V_{pool}(bbls) + V_{misc}(bbls) \)

\[
V_{net}(bbls) = 0.23 + (0.69 \times 0.6) + 0.6 + 0.0 = 0.64 \text{ bbls}
\]

*Calculation of the respective estimated volume is to done using the new spill estimation software on site
*Conversion of m³ to barrel is Total volume VT (m³) x 6.29
*Emulsification factor for spill on water to consider is 60% of volume of oil.

This report was filled and signed on the _03/10/2011_ at incident site by joint investigation representative 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
A. GENERAL INFORMATION:

1. Spill incident Number: 641066

2. Name of Location: Alakiri - Egun Pipeline

3. Name of nearest community: Kائيными

4. State: Ogun LGA: Egun

5. Type of Production facility/Installation: Pipeline Asset owner /District: UIGIPIN ESP

B. INCIDENT INFORMATION:

6. Details of incident:
   a. Date of incident: 29th March, 2011
   b. Date/Period of investigation: (6th to 8th) April 2011
   c. Description of spill point environment:
      - [Y] Firm soil
      - [N] Loose soil
      - [Y] Previously excavated area
      - [Y] Under water
      - [N] Swampy
      - [Y] Exposed pipe surface
   d. Description of leak point (tick as applicable):
      - [Y] Drilled hole
      - [Y] Hack saw cut
      - [Y] Explosive tear
      - [Y] Complete Rupture
      - [Y] Inward dent
      - [Y] Well head tampering
      - [Y] Failed Weld-on illegal hot tap valve
      - [Y] Missing pipeline (flowline)
      - [Y] Crude oil theft (illegal bunkering) point
      - [Y] Third party tampering with Clamp Bolt/Nut
      - [Y] Third party tampering with valve setting
      - [N] Third party tampering with flange Nuts/bolts
      - [N] Corrosion

5. Type: Not Applicable

8. Spill point coordinates
   - Northing: (MINNA M ID - B E I )
   - Easting: 520727.61m

Page 1 of 7
C. RISK/DAMAGE ASSESSMENT

7. Type of environment of spill site:
   - [ ] Land
   - [ ] Swamp
   - [ ] Water

   Type of environment of which oil has spread:
   - [ ] Land
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   - [ ] Water

8. Distance from the nearest sensitive habitat
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   - [ ] Drinking water source
   - [ ] Built up area
   - [ ] Farmlands
   - [ ] Fish Farm/Pond
   - [ ] Fishing net
   - [ ] Others (specify): ____________

   [ ] NOT APPLICABLE

9. Containment measures put in place;
   - [ ] Booms
   - [ ] Trench
   - [ ] Dyke
   - [ ] Others: __________________

10. Any pictures or video coverage? [ ] Yes [ ] No

11. Was there any disruption to the investigation? [ ] Yes [ ] No

If yes give brief description:

"The Kalibiana Community as represented by the Leadership of the CDC Community Development Committee claim the cause of spill on 24th Alakiri-Gboko trunkline to be corrosion. While Joint Investigation team observed the cause to be due to drilled hole and assessment of impacted area and recovery work was disrupted by the Kalibiana Community."

D. TYPE/NUMBERS OF PROPERTIES, IF ANY, FOUND WITHIN THE AREA OF SPREAD OF OIL

A. Structures / Properties

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<tr>
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B. Crops/Economic Trees

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<th>Description</th>
<th>Quantity/Size</th>
<th>Comments</th>
<th>P&lt;br&gt;&lt;br&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>NONE WITHIN AREA OF IMPACT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E. GRAPHIC DESCRIPTION OF LEAK POINT (Details should be contained in leak repair report)

- **Side View of Spill Point:**
  - Around Spill Point
  - Thickness of surrounding reduced by drill effect.
  - 1.5 cm drilled hole to form a rectangular shape of 150 mm x 300 mm at 9'clock position.

- **24" Ø:**
  - Alkalai - Bonny
  - Direction of oil flow.

- **24" Ø:**
  - Bonny

- **24" Ø:**
  - Olema Flow Station
### Table Showing Some of Coordinates Taken During JIV for Area Calculation

**MINNA MID-BELT**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Northing (Meters)</th>
<th>Easting (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pt1</td>
<td>53839.514</td>
<td>520840.472</td>
</tr>
<tr>
<td>Pt2</td>
<td>54239.65</td>
<td>520764.112</td>
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<tr>
<td>PtA</td>
<td>54454.954</td>
<td>520721.351</td>
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<tr>
<td>Pt5</td>
<td>54531.852</td>
<td>520666.002</td>
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<tr>
<td>Pt6</td>
<td>54568.655</td>
<td>520696.899</td>
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<td>Pt7</td>
<td>54491.724</td>
<td>520770.745</td>
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<tr>
<td>Pt8</td>
<td>54461.264</td>
<td>520830.449</td>
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<td>Pt9</td>
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<td>Pt10</td>
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<td>Pt11</td>
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<td>53703.439</td>
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<td>53556.500</td>
<td>521049.948</td>
</tr>
<tr>
<td>B12</td>
<td>53715.065</td>
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</tr>
<tr>
<td>C1</td>
<td>54969.196</td>
<td>520938.128</td>
</tr>
<tr>
<td>C2</td>
<td>54977.192</td>
<td>520977.493</td>
</tr>
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<td>C3</td>
<td>54935.171</td>
<td>521086.610</td>
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<td>C4</td>
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<tr>
<td>C5</td>
<td>54923.423</td>
<td>521083.940</td>
</tr>
<tr>
<td>C7</td>
<td>54964.008</td>
<td>520995.293</td>
</tr>
</tbody>
</table>
G. INCIDENT INFORMATION:

17 Impacted Area Details
   a. Total calculated area of impact 386 Ha.
   - Impact within SPDC R.O.W 1.74 Ha.
   - Impact outside R.O.W 2.12 Ha.

18 Volume of oil recovered before completion of JIV (V_{rec}):
   Recovered oil V_{rec}:
   
19. Computation of the residual volume on site
   a. Computation of the volume of pooled free phase oil (on land or confined water body).
      i. Area (m²) occupied by pool of free phase oil 5340 m²
      ii. Average Depth (m) of pool of free phase oil 0.061 m
      iii. Volume of pooled of free phase oil V_{pool} 33.59 barrels

   b. Computation of volume of infiltrated oil in the soil (V-3).
      i. Area (m²) covered by the oil: 2316.6 m²
      ii. Average Depth (m) below ground surface of infiltration of oil: 0.012 m
      iii. Soil type: CLAY
      iv. ϕ (effective porosity of the soil): 8.0%

   v. 13.98 barrels

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

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Percentage coverage</th>
<th>Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barely Visible</td>
<td>0.00004</td>
<td></td>
</tr>
<tr>
<td>Silvery</td>
<td>0.00008</td>
<td></td>
</tr>
<tr>
<td>Slight Colour</td>
<td>0.00015</td>
<td></td>
</tr>
<tr>
<td>Bright Colour</td>
<td>0.0003</td>
<td></td>
</tr>
<tr>
<td>Dull</td>
<td>0.001</td>
<td>80% 0.021 m³</td>
</tr>
<tr>
<td>Dark</td>
<td>0.002</td>
<td>20% 0.01 m³</td>
</tr>
<tr>
<td>Black oil</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Emulsion (30% Oil)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Percent Total 100% Total Volume 0.2645 bbl

Note: Area of impact on open water is approximately 26700 m².

21. Calculation of evaporated volume:

i. Oil type: Bonny Light

ii. E-Factor: 25 %

iii.

<table>
<thead>
<tr>
<th>Volume of evaporated oil: ( V_{evap} )</th>
<th>15.93 barrels</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Oil Type</th>
<th>Bonny Light</th>
<th>Bonny Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Factor</td>
<td>E-Factor</td>
<td></td>
</tr>
<tr>
<td>Period Since Oil Spill</td>
<td>&lt;1 day</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>1-7 days</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>&gt;7 days</td>
<td>40%</td>
</tr>
</tbody>
</table>

9. Gross Total Estimated Spilled Volume \( V_{est}(bbls) = V_{vap}(bbls) + V_{vap}(bbls) + V_{int}(bbls) + V_{pool}(bbls) + V_{vap}(bbls) \)

\[
V_{est}(bbls) = 15.93 + 0.2 + 13.98 + 33.59 = 63.69 \text{ Barrels}
\]

10. Net Total Estimated Spilled Volume \( V_{est}(bbls) = V_{vap}(bbls) + 0.6\times V_{vap}(bbls) + V_{int}(bbls) + V_{pool}(bbls) \)

\[
V_{est}(bbls) = 15.93 + (0.2 \times 6.06) + 13.98 + 33.59 = 63.72 \text{ Barrels}
\]

*Calculation of the respective estimated volume is to be done using the new spill estimation software on site

*Conversion of m3 to barrel is Total Volume VT (m3) x 6.29

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

This report was filled and signed on the 16/04/2011 at incident site by joint investigation representative 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