This fact sheet is part of a series prepared as part of the Environmental Assessment of Ogoniland by the United Nations Environment Programme (UNEP). It provides the observations and results from one of the individual sites studied in detail, plus the specific risk reduction measures for follow-up action.

This fact sheet should be read in conjunction with the main assessment report available at: www.unep.org/nigeria.

July 2011
## I - Site Description

<table>
<thead>
<tr>
<th>Recommendations for risk reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Communities should be informed in community meetings about health and safety precautions.</td>
</tr>
<tr>
<td>- A community based security and surveillance system should be put in place so that there is voluntary compliance with the restrictions which are needed to protect public health.</td>
</tr>
<tr>
<td>- The impacted area should be demarcated and appropriate signage put in place to indicate that the site is impacted.</td>
</tr>
<tr>
<td>- Highly contaminated core areas should be fenced and guarded until emergency cleanup measures have been carried out.</td>
</tr>
<tr>
<td>- Floating oil on the surface, if any, should be collected and treated off site.</td>
</tr>
<tr>
<td>- The site should be remodelled to prevent run off from the contaminated area into the downstream swamps.</td>
</tr>
<tr>
<td>- Runoff from the area should be monitored and if necessary collected and treated while the cleanup plan is developed and implemented.</td>
</tr>
<tr>
<td>- Additional soil sampling along with trial pits should be done at the contaminated site to delineate the site to be excavated for clean up.</td>
</tr>
<tr>
<td>- A detailed plan should be prepared for clean up of the contaminated soil and risk reduction at site.</td>
</tr>
<tr>
<td>- A system of ground water monitoring wells should be installed to act as early warning for communities which are not yet impacted by ground water contamination.</td>
</tr>
<tr>
<td>- While undertaking the clean up, management of excavation water should be handled properly to ensure that no pollutants are emitted into the environment without control.</td>
</tr>
</tbody>
</table>

### Site Name
OKENTA- ALODE

### Site Number
qc.002-007

### LGA
ELEME

### Main community
OKENTA ALODE

### Surrounding communities
OKENTA ALODE

### Investigated area (ha)
0.39

### Category
SPDC Pipeline ROW

### Eastings (WGS 84, Zone 32N)
292419

### Northings (WGS 84, Zone 32N)
527857
### II - Oilfield Infrastructure Type

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells</td>
<td>No</td>
</tr>
<tr>
<td>Flowstations</td>
<td>No</td>
</tr>
<tr>
<td>Manifolds</td>
<td>No</td>
</tr>
<tr>
<td>Flaresites</td>
<td>No</td>
</tr>
<tr>
<td>Oil pipeline in operation</td>
<td>10” EBUBU MF TO NGC REF( EBUBU TO ALESA) GAS LINE</td>
</tr>
<tr>
<td>NNPC crude line</td>
<td>No</td>
</tr>
<tr>
<td>NNPC product line</td>
<td>No</td>
</tr>
</tbody>
</table>

### III - Spill History

<table>
<thead>
<tr>
<th>Spill History</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spills reported by SPDC</td>
<td>No</td>
</tr>
<tr>
<td>Spill reported by community</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### IV - Data Screening

#### Assessment criteria

<table>
<thead>
<tr>
<th>Contamination Type</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil contamination</td>
<td>Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)</td>
</tr>
<tr>
<td>Groundwater contamination</td>
<td>Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)</td>
</tr>
<tr>
<td>Sediment contamination</td>
<td>Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)</td>
</tr>
<tr>
<td>Drinking water contamination</td>
<td>WHO guidelines (benzene: 10 µg/l)</td>
</tr>
<tr>
<td></td>
<td>Nigerian drinking water standards (mineral oils: 3 µg/l)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of soil samples</td>
<td>18</td>
</tr>
<tr>
<td>Deepest investigation (m)</td>
<td>3</td>
</tr>
<tr>
<td>Maximum soil TPH (mg/kg)</td>
<td>5,810.000</td>
</tr>
<tr>
<td>Number of soil measurements greater than EGASPIN intervention value</td>
<td>1</td>
</tr>
<tr>
<td>Deepest sample greater than EGASPIN (m)</td>
<td>0</td>
</tr>
<tr>
<td>Number of soil measurements below 1m</td>
<td>9</td>
</tr>
<tr>
<td>Number of soil measurements below 1m greater than EGASPIN intervention value</td>
<td>0</td>
</tr>
<tr>
<td>Number of groundwater samples</td>
<td>0</td>
</tr>
<tr>
<td>Maximum groundwater TPH (µg/l)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Number of groundwater measurements greater than EGASPIN intervention value</td>
<td>0</td>
</tr>
<tr>
<td>Number of community well samples</td>
<td>0</td>
</tr>
<tr>
<td>Presence of hydrocarbons in community wells</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Number of CL sediment samples</td>
<td>0</td>
</tr>
<tr>
<td>Maximum CL sediment TPH (mg/kg)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Number of CL sediment measurements greater than EGASPIN intervention value</td>
<td>0</td>
</tr>
<tr>
<td>Presence of hydrocarbons in sediment above EGASPIN intervention value</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Satellite image of the site

Approximate site investigation area (that area does not correspond to contamination extent).
Landcover 2007

Approximate site investigation area (that area does not correspond to contamination extent).

Source:
land cover 2007 from Aster imagery

UNEPI 2011
Soil Contamination Map

The values shown next to soil sample points represent the average TPH value for all samples taken from the borehole at that location.
### Soil sample list

<table>
<thead>
<tr>
<th>Sample Identifier</th>
<th>Total petroleum hydrocarbon (mg/kg)</th>
<th>Depth (m)</th>
<th>Easting</th>
<th>Northing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1771896</td>
<td>30.600</td>
<td>0.90</td>
<td>292315</td>
<td>527808</td>
</tr>
<tr>
<td>1771987</td>
<td>31.800</td>
<td>3.00</td>
<td>292315</td>
<td>527808</td>
</tr>
<tr>
<td>1773566</td>
<td>757.000</td>
<td>3.00</td>
<td>292388</td>
<td>527818</td>
</tr>
<tr>
<td>1773615</td>
<td>211.000</td>
<td>0.40</td>
<td>292448</td>
<td>527852</td>
</tr>
<tr>
<td>1773825</td>
<td>984.000</td>
<td>2.20</td>
<td>292388</td>
<td>527818</td>
</tr>
<tr>
<td>1774014</td>
<td>46.700</td>
<td>2.00</td>
<td>292395</td>
<td>527861</td>
</tr>
<tr>
<td>1774167</td>
<td>262.000</td>
<td>1.00</td>
<td>292475</td>
<td>527899</td>
</tr>
<tr>
<td>1774214</td>
<td>31.000</td>
<td>0.80</td>
<td>292499</td>
<td>527911</td>
</tr>
<tr>
<td>1774230</td>
<td>4,250.000</td>
<td>0.20</td>
<td>292388</td>
<td>527818</td>
</tr>
<tr>
<td>1774415</td>
<td>224.000</td>
<td>0.20</td>
<td>292395</td>
<td>527861</td>
</tr>
<tr>
<td>1792208</td>
<td>56.600</td>
<td>2.00</td>
<td>292475</td>
<td>527899</td>
</tr>
<tr>
<td>1792210</td>
<td>53.100</td>
<td>0.40</td>
<td>292440</td>
<td>527878</td>
</tr>
<tr>
<td>1792211</td>
<td>248.000</td>
<td>2.00</td>
<td>292448</td>
<td>527852</td>
</tr>
<tr>
<td>1792212</td>
<td>25.100</td>
<td>1.83</td>
<td>292499</td>
<td>527911</td>
</tr>
<tr>
<td>1792214</td>
<td>3,630.000</td>
<td>0.45</td>
<td>292515</td>
<td>527885</td>
</tr>
<tr>
<td>1792216</td>
<td>159.000</td>
<td>2.00</td>
<td>292515</td>
<td>527885</td>
</tr>
<tr>
<td>1792218</td>
<td>38.900</td>
<td>-</td>
<td>292434</td>
<td>527868</td>
</tr>
<tr>
<td>1792219</td>
<td>5,810.000</td>
<td>-</td>
<td>292421</td>
<td>527837</td>
</tr>
</tbody>
</table>
The Site Fact Sheets present more detailed data from UNEP’s environmental assessment of Ogoniland on a site-by-site basis. Note that all data is based on the analysis of samples taken during the fieldwork period. The period of most intensive fieldwork ran from April to December 2010. The final sampling visit was completed in January 2011.

Here is a guide to the terms and abbreviations used. Please refer to the Environmental Assessment of Ogoniland report for details of EGASPIN target and intervention values.

**Terminology**

- **Site number**: Reference number allocated by UNEP to identify a study site
- **Area (ha)**: Estimated surface area (in hectares) of a given study site
- **Well**: Oil well, also referred to as a production well
- **Fugro well**: New well installed by Fugro at UNEP’s request to enable scientific sampling and monitoring
- **Community well**: Wells belonging to communities which are used to collect water for drinking and sanitation needs
- **Contamination contour**: Maps that display the geographical distribution of oil contamination concentrations in an analyzed receptor
- **Flare site**: Indicates whether the burning of unwanted gas through a pipe (or flare) takes place at a given site
- **Flow station**: Separation facilities (also called gathering centres) which separate natural gas and water from crude oil extracted from production wells
- **Incident number**: Numbers as supplied from the SPDC oil spills database
- **Manifold**: An arrangement of piping or valves designed to control, distribute and often monitor fluid flow

**Abbreviations**

- **BDL**: Below Detection Limit
- **CL**: Contaminated Land
- **EGASPIN**: Environmental Guidelines and Standards for Petroleum Industries in Nigeria
- **GW**: groundwater
- **LGA**: Local Government Area
- **mbgs**: metre/s below ground surface
- **NNPC**: Nigerian National Petroleum Corporation
- **SPDC**: Shell Petroleum Development Company of Nigeria
- **TPH**: total petroleum hydrocarbons
- **UNEP**: United Nations Environment Programme

**Explanatory Note**

1. The recommendations given are for initial risk reduction. Final clean up would need significant additional site specific engineering as well as consultation work.
2. Spill reported by SPDC has the date format YYYYMMDD
3. Assessment is done based on a screening of the measured value against a Nigerian or international standard
4. In the soil sample maps, the highest value has been cut-off to 2 times the intervention value. This was done to visually express the exceedences above intervention values. Actual values are given in the sample tables.
5. The values of soil contamination listed in the Soil Contamination Maps are average values of all samples taken at that sampling location.