

Environmental Assessment of Ogoniland Site Specific Fact Sheets

DEBON- BODO/MOGHO



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

Site Name	DEBON- BODO/MOGHO
Site Number	qc_019-010
LGA	GOKANA
Main community	GIOR DERE
Surrounding communities	GIOR DERE
Investigated area (ha)	4.38
Category	SPDC Operating Site
Eastings (WGS 84, Zone 32N)	308726
Northings (WGS 84, Zone 32N)	514525



<p>Recommendations for risk reduction</p>	<ul style="list-style-type: none"> - Communities should be informed in community meetings about health and safety precautions. - 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. - The impacted area should be demarcated and appropriate signage put in place to indicate that the site is impacted. - Highly contaminated core areas should be fenced and guarded until emergency cleanup measures have been carried out. - Floating oil on the surface, if any, should be collected and treated off site. - The site should be remodelled to prevent run off from the contaminated area into the downstream swamps. - Runoff from the area should be monitored and if necessary collected and treated while the cleanup plan is developed and implemented. - Additional soil sampling along with trial pits should be done at the contaminated site to delineate the site to be excavated for clean up. - A detailed plan should be prepared for clean up of the contaminated soil and risk reduction at site. - 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. - A detailed plan should be prepared for clean up of the contaminated water and risk reduction in the community. - 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.
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II - Oilfield Infrastructure Type

Wells	BOMU-052 (producing) BOMU-027 (closed in)
Flowstations	No
Manifolds	No
Flaresites	No
Oil pipeline in operation	No
NNPC crude line	No
NNPC product line	No

III - Spill History

Spills reported by SPDC	Incident Number	Incident Date
	1987_0090	19870107
	1992_00218	19921212
	455381	
Spill reported by community	Yes	

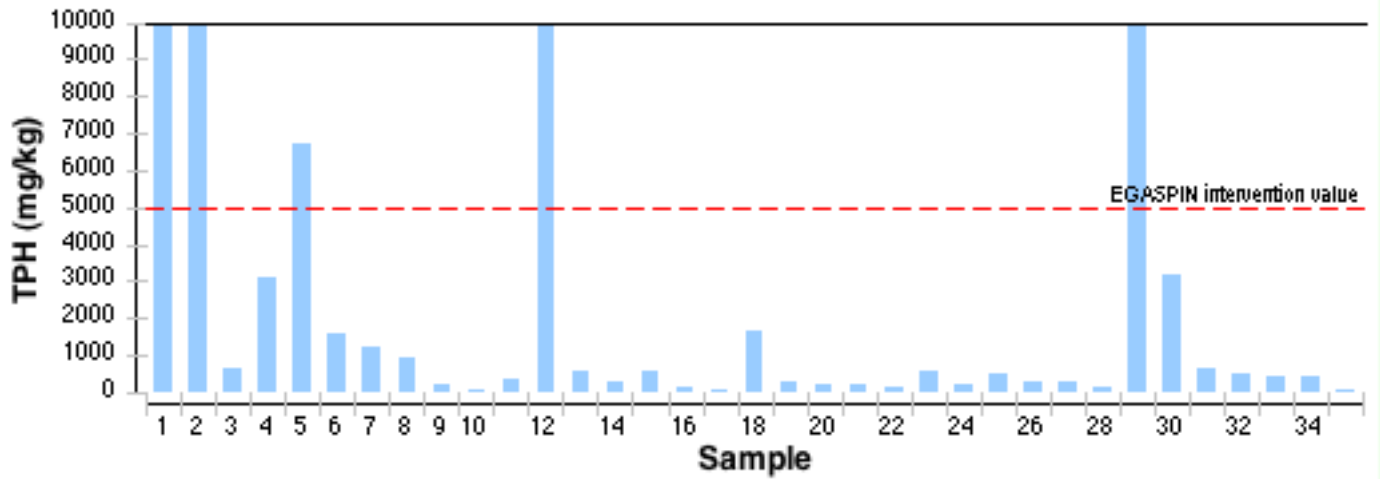
IV - Data Screening

Assessment criteria

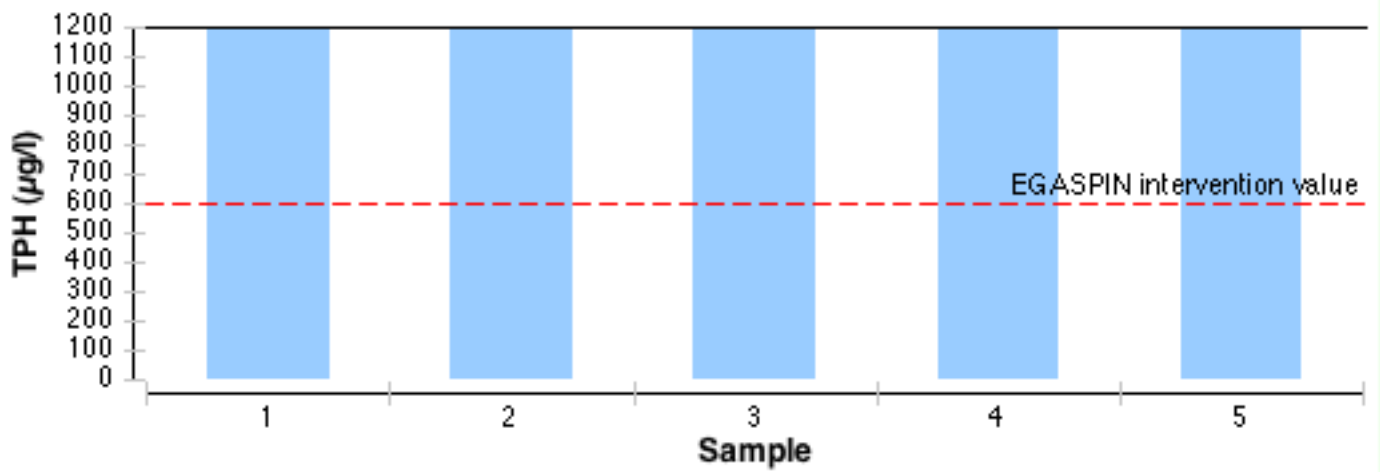
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Drinking water contamination	WHO guidelines (benzene: 10 µg/l) Nigerian drinking water standards (mineral oils: 3 µg/l)

Number of soil samples	35
Deepest investigation (m)	5.2
Maximum soil TPH (mg/kg)	139,000.000
Number of soil measurements greater than EGASPIN intervention value	5
Deepest sample greater than EGASPIN (m)	2
Number of soil measurements below 1m	26
Number of soil measurements below 1m greater than EGASPIN intervention value	1
Number of ground water samples	5
Maximum groundwater TPH (µg/l)	172,000
Number of groundwater measurements greater than EGASPIN intervention value	5
Number of community well samples	0
Presence of hydrocarbons in community wells	Not applicable
Number of CL sediment samples	0
Maximum CL sediment TPH (mg/kg)	Not applicable
Number of CL sediment measurements greater than EGASPIN intervention value	0
Presence of hydrocarbons in sediment above EGASPIN intervention value	Not applicable

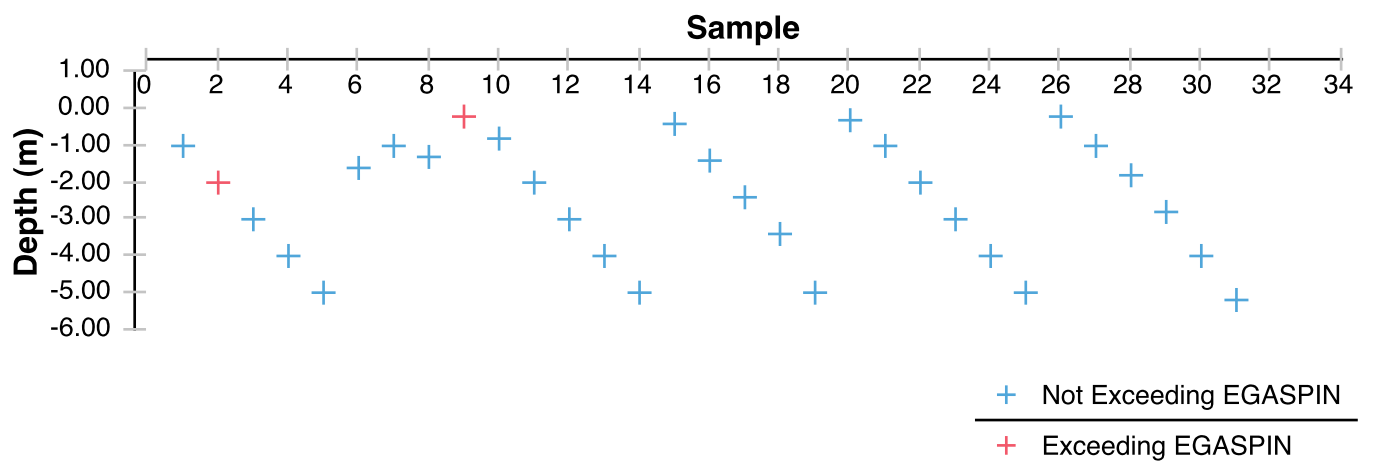
Soil Samples



Groundwater Samples



Soil Samples depth



Satellite image of the site



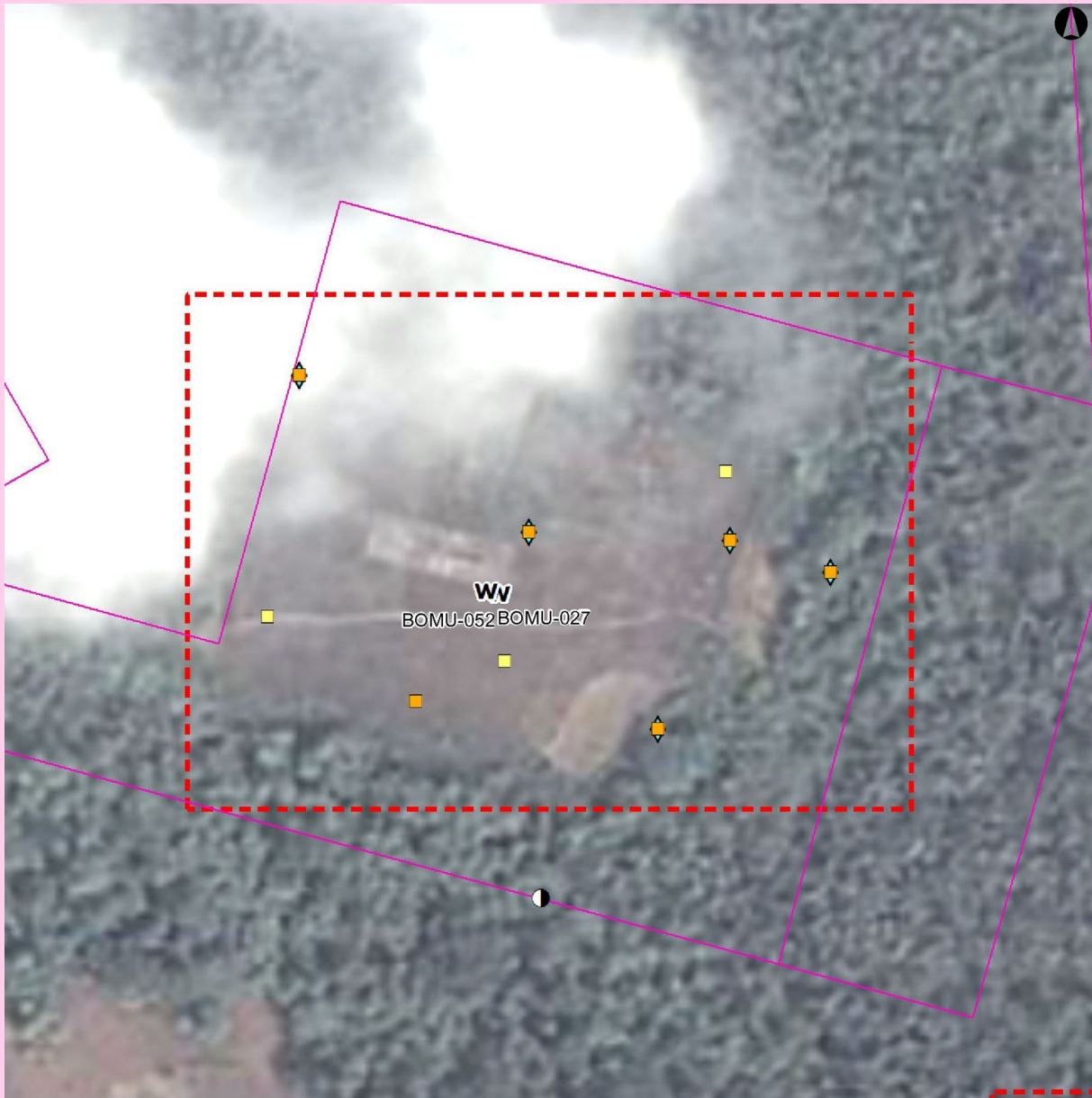
Metres
0 20
Projection: WGS 84
UTM Zone 32N



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

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Sampling location map



Oil Facilities

- SPDC Right of way
- w** Wells
- Manifold
- ▲ FlowStation
- Pipeline**
- NNPC Crude
- NNPC Refined product
- SPDC Oil Pipe in operation

Soil samples

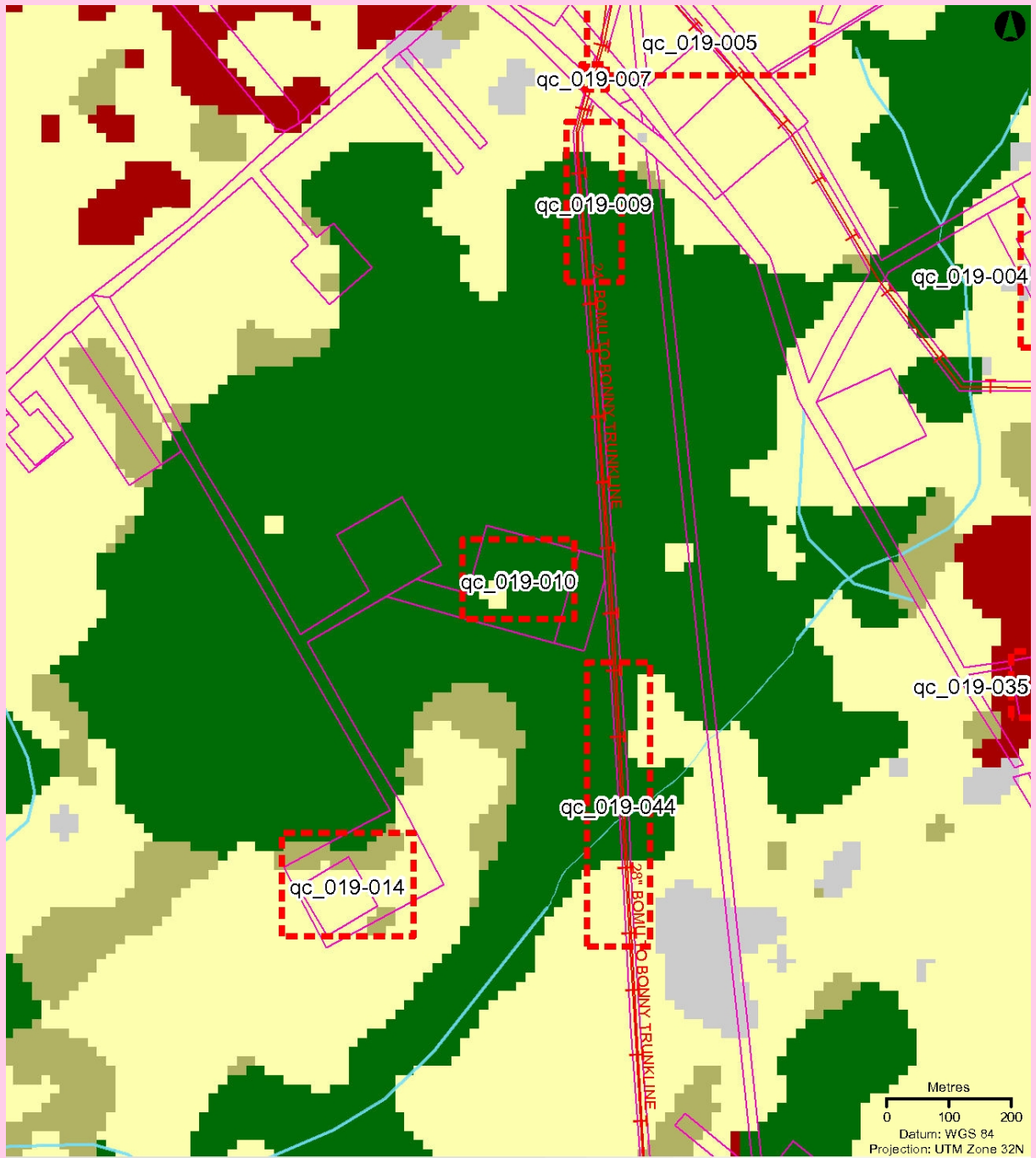
- Grassplot centroid
- Soil samples
- Soil Samples from GW monitoring well
- Grassplot sampling area
- Approximate site investigation area (that area does not correspond to contamination extent).
- Others**
- ▲ Air quality sampling
- Fish tissue sampling
- Sediment samples from Acquatic team
- Water Samples from Acquatic team

Water samples

- ▲ Rainwater samples (Community)
- ★ Bore-well (community)
- ★ Hand-dug well (community)
- Free-Phase samples
- ◆ Groundwater sample
- s w Surface water
- w Water sample taken from an oil well
- ⚓ Drilling well

Metres
0 6 12

Datum: WGS 84
Projection: UTM Zone 32N
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Oil Facilities

- SPDC Right of way (ROW)
- w** Wells
- Manifold
- ▲ FlowStation
- Pipeline
- NNPC Crude
- NNPC Refined product
- + SPDC Oil Pipe in operation

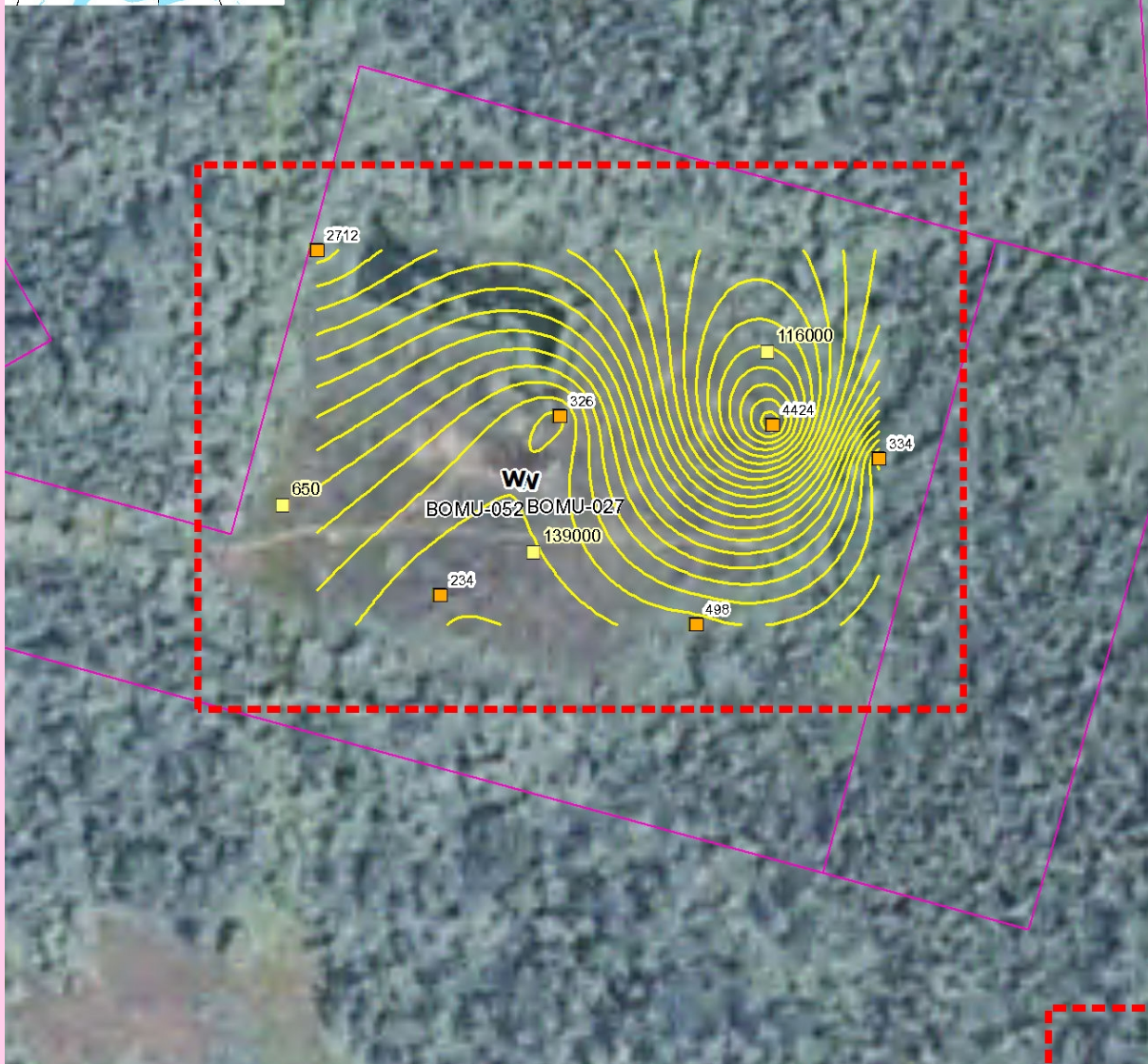
Approximate site investigation area (that area does not correspond to contamination extent).

- Tree plantation
- Farmland, low tree cover
- Farmland, high tree cover
- Fallow land
- Riparian forest, including fresh water swamp forest
- Forest on former beach ridge
- Mangrove
- Mangrove, degraded
- Urban
- Bare soil, terrestrial
- Bare soil, mud flat
- Water

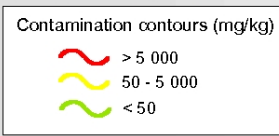
Source:
land cover 2007
from Aster imagery

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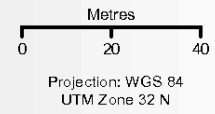
Soil Contamination Map



- Oil Facilities**
- SPDC Right of way (ROW)
 - w** Wells
 - Manifold
 - ▲ FlowStation
 - Pipeline**
 - NNPC Crude
 - NNPC Refined product
 - ⊥ SPDC Oil Pipe in operation



- Soil samples**
- Soil samples
 - Grassplot centroid
 - Grassplot sampling area
 - - - Investigated area
 - Groundwater flow direction



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

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

Aerial photograph



Ground photograph



VII - Sample List

Soil sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2536825	650.000	-	308656	514509
2536827	139,000.000	-	308715	514498
2536828	116,000.000	-	308770	514545
2536829	203.000	1.60	308693	514488
2536830	105.000	1.00	308693	514488
2536831	372.000	1.30	308693	514488
2536856	103,000.000	0.20	308771	514528
2536858	591.000	0.80	308771	514528
2536860	301.000	2.00	308771	514528
2536861	556.000	3.00	308771	514528
2536863	178.000	4.00	308771	514528
2536865	71.700	5.00	308771	514528
2536866	3,210.000	0.20	308753	514481
2536867	659.000	1.00	308753	514481
2536868	492.000	1.80	308753	514481
2536869	406.000	2.80	308753	514481
2536870	410.000	4.00	308753	514481
2536871	107.000	5.20	308753	514481
2536873	3,070.000	1.00	308664	514569
2536875	6,700.000	2.00	308664	514569
2536876	1,610.000	3.00	308664	514569
2536877	1,240.000	4.00	308664	514569
2536878	939.000	5.00	308664	514569
2536879	1,690.000	0.40	308796	514520
2536880	277.000	1.40	308796	514520
2536881	243.000	2.40	308796	514520
2536883	196.000	3.40	308796	514520
2536885	173.000	5.00	308796	514520
2536888	588.000	0.30	308721	514530
2536890	246.000	1.00	308721	514530
2536891	500.000	2.00	308721	514530
2536892	298.000	3.00	308721	514530
2536893	318.000	4.00	308721	514530
2536895	164.000	5.00	308721	514530
2536897	80,300.000	-	308721	514530

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
2537560	69,600	308771	514528
2537562	137,000	308664	514569
2537563	172,000	308796	514520
2538243	4,300	308721	514530
2538461	58,100	308753	514481

Guide to content

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