Environmental Assessment of Ogoniland
Site Specific Fact Sheets

OKENTA- ALODE

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.

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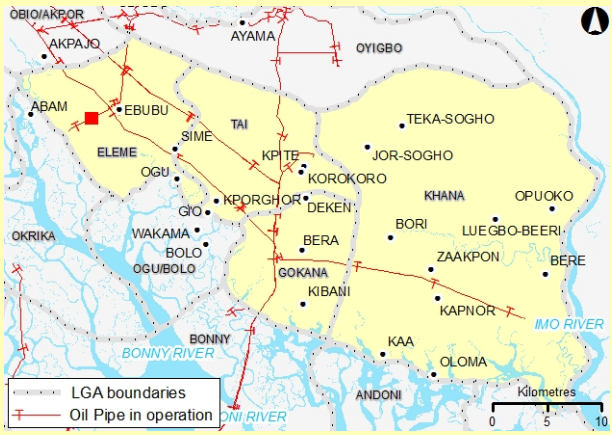
Site fact sheet

See Guide to content and terminology on last page.

I - Site Description

Site Name	OKENTA- ALODE
Site Number	qc_002-006
LGA	ELEME
Main community	ALODE OKPONA NANDOWA
Surrounding communities	ALODE OKPONA NANDOWA OKENTA ALODE
Investigated area (ha)	0.64
Category	SPDC Pipeline ROW
Eastings (WGS 84, Zone 32N)	292201
Northings (WGS 84, Zone 32N)	527740



Recommendations for risk reduction	- 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. - 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.

II - Oilfield Infrastructure Type

Wells	No
Flowstations	No
Manifolds	No
Flaresites	No
Oil pipeline in operation	10" EBUBU MF TO NGC REF(EBUBU TO ALESA) GAS LINE
NNPC crude line	No
NNPC product line	No

III - Spill History

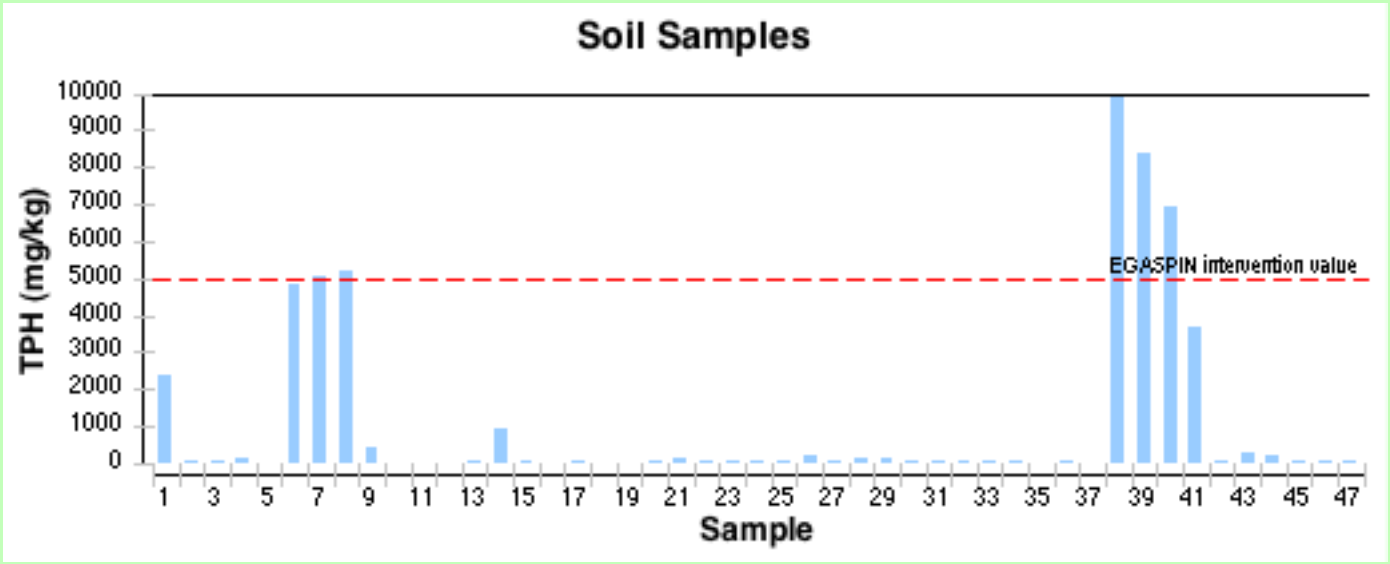
Spills reported by SPDC	No
Spill reported by community	Yes

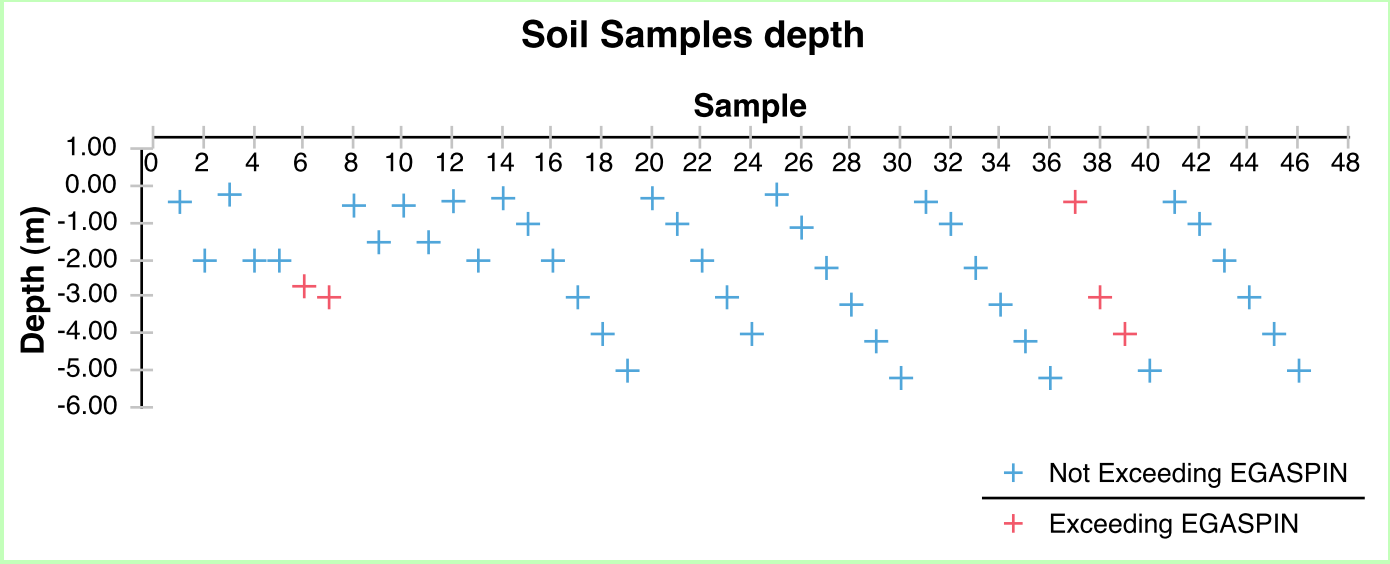
IV - Data Screening

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	47
Deepest investigation (m)	5.2
Maximum soil TPH (mg/kg)	11,100.000
Number of soil measurements greater than EGASPIN intervention value	5
Deepest sample greater than EGASPIN (m)	4
Number of soil measurements below 1m	35
Number of soil measurements below 1m greater than EGASPIN intervention value	4
Number of ground water samples	0
Maximum groundwater TPH (µg/l)	Not applicable
Number of groundwater measurements greater than EGASPIN intervention value	0
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
TPH (mg/kg)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
EGASPIN intervention value
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample


Soil Samples depth
Sample
Depth (m)
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48
Not Exceeding EGASPIN
Exceeding EGASPIN

V - Maps

Satellite image of the site

Sampling location map

Oil Facilities

- SPDC Right of way
- 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
- Surface water
- Water sample taken from an oil well
- Drilling well

Metres
0 6 12

Datum: WGS 84
Projection: UTM Zone 32N

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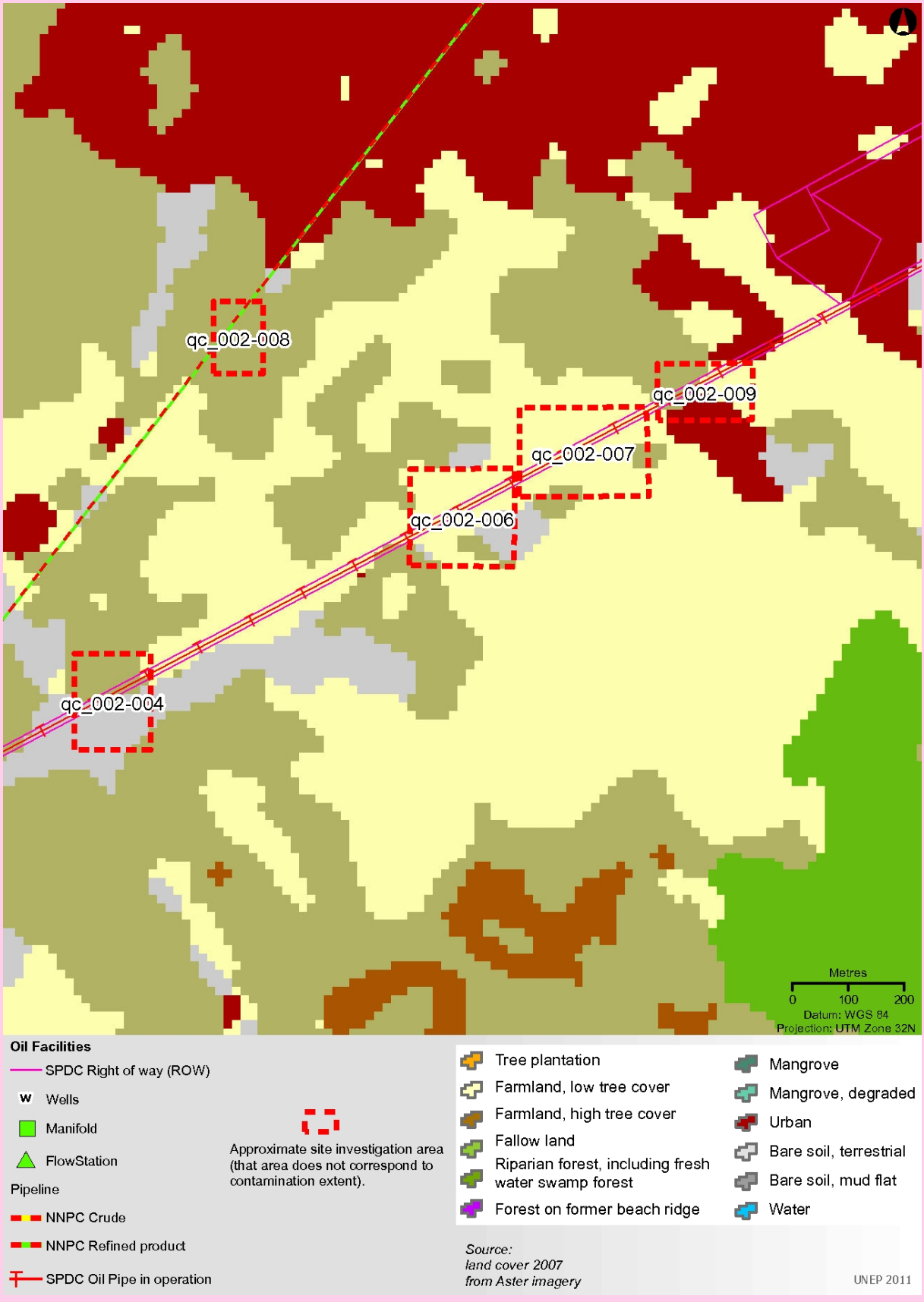
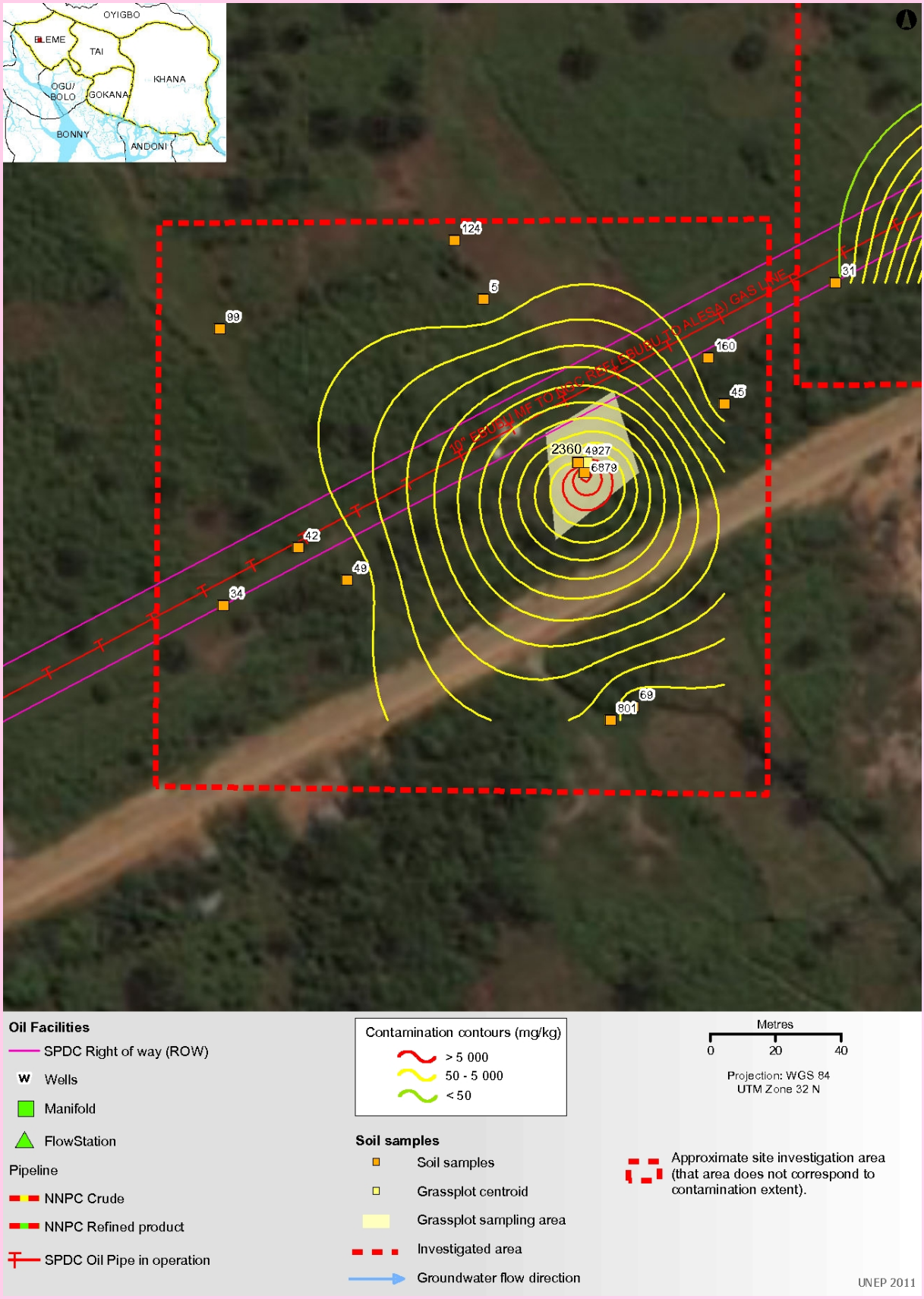
Landcover 2007



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.

VI - Photos

Ground photograph

VII - Sample List

Soil sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
1771835	6.290	1.50	292207	527803
1771846	6.650	1.50	292276	527785
1771860	2.810	0.50	292207	527803
1771873	78.300	0.38	292246	527674
1771934	5,030.000	2.70	292236	527753
1772019	971.000	2.00	292246	527674
1772039	5,200.000	3.00	292236	527753
1772064	4,850.000	2.00	292236	527753
1772194	2,360.000	-	292239	527753
1772232	466.000	0.50	292276	527785
1773582	24.500	2.00	292127	527709
1773978	118.000	0.20	292127	527709
1792206	49.600	0.40	292150	527727
1792207	40.400	2.00	292150	527727
2536277	8,360.000	3.00	292238	527750
2536305	3,690.000	5.00	292238	527750
2536328	6,900.000	4.00	292238	527750
2536550	105.000	5.00	292198	527821
2536559	49.000	3.00	292198	527821
2536573	50.300	0.40	292198	527821
2536729	321.000	1.00	292198	527821
2536751	203.000	2.00	292198	527821
2536857	107.000	1.00	292165	527717
2536909	54.600	4.20	292165	527717
2536936	44.800	0.40	292165	527717
2536985	40.700	2.20	292165	527717
2537017	34.200	5.20	292165	527717
2537040	34.100	3.20	292165	527717
2537071	83.400	3.00	292253	527678
2537091	44.400	2.00	292253	527678
2537113	117.000	0.30	292253	527678
2537153	48.200	1.00	292253	527678
2537172	81.000	4.00	292253	527678
2537828	55.900	1.10	292126	527794
2537844	236.000	0.20	292126	527794
2537863	132.000	3.20	292126	527794
2537877	123.000	2.20	292126	527794
2537892	54.300	5.20	292126	527794
2537906	94.600	4.20	292126	527794
2538009	78.900	2.00	292281	527771

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2538030	31.800	3.00	292281	527771
2538041	51.200	5.00	292281	527771
2538058	30.600	4.00	292281	527771
2538067	52.900	0.30	292281	527771
2538080	26.600	1.00	292281	527771
2538094	51.900	4.00	292198	527821
2538138	11,100.000	0.40	292238	527750

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 excedences 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