

Environmental Assessment of Ogoniland Site Specific Fact Sheets

BUEMENE- KOROKORO



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	BUEMENE- KOROKORO
Site Number	qc_008-004
LGA	TAI
Main community	KOROKORO
Surrounding communities	KOROKORO
Investigated area (ha)	5.99
Category	SPDC Operating Site
Eastings (WGS 84, Zone 32N)	311781
Northings (WGS 84, Zone 32N)	523678



<p>Recommendations for risk reduction</p>	<ul style="list-style-type: none"> - Communities should be informed in community meetings about health and safety precautions. - The site should be remodelled to prevent run off from the contaminated area into the downstream swamps. - 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 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.
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II - Oilfield Infrastructure Type

Wells	KOROKORO-009 (producing)
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 1992_00174	Incident Date 19921028
Spill reported by community	Yes	

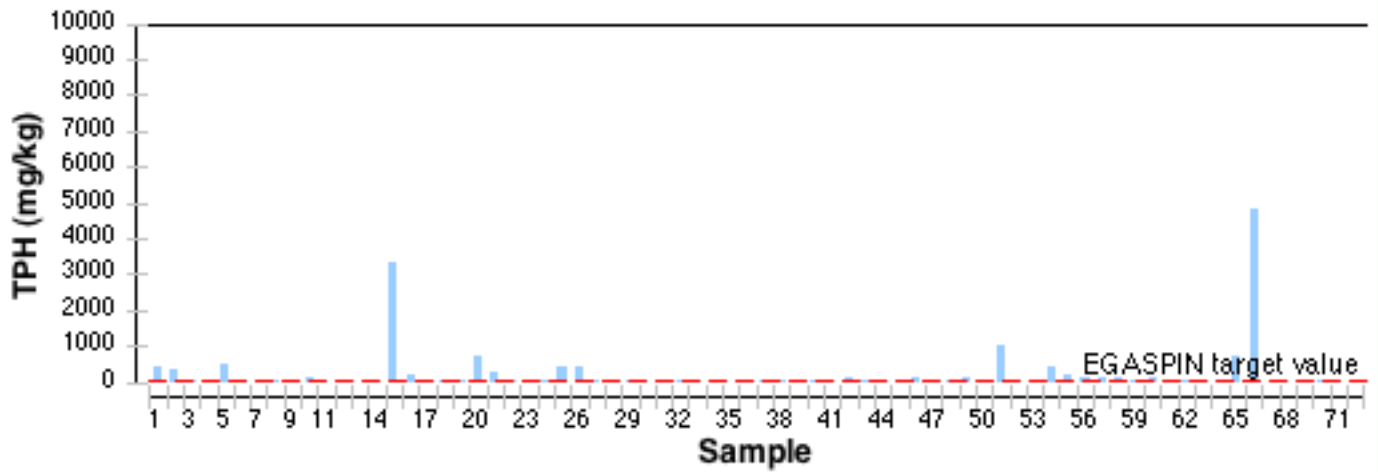
IV - Data Screening

Assessment criteria

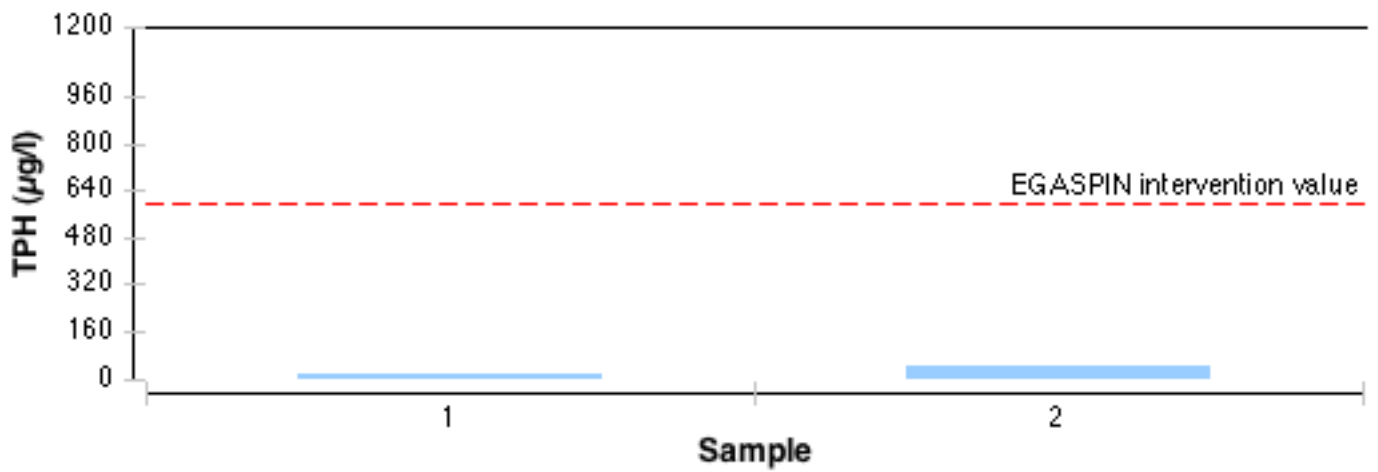
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	72
Deepest investigation (m)	5
Maximum soil TPH (mg/kg)	4,860.000
Number of soil measurements greater than EGASPIN intervention value	0
Deepest sample greater than EGASPIN (m)	0
Number of soil measurements below 1m	57
Number of soil measurements below 1m greater than EGASPIN intervention value	0
Number of ground water samples	2
Maximum groundwater TPH (µg/l)	47
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

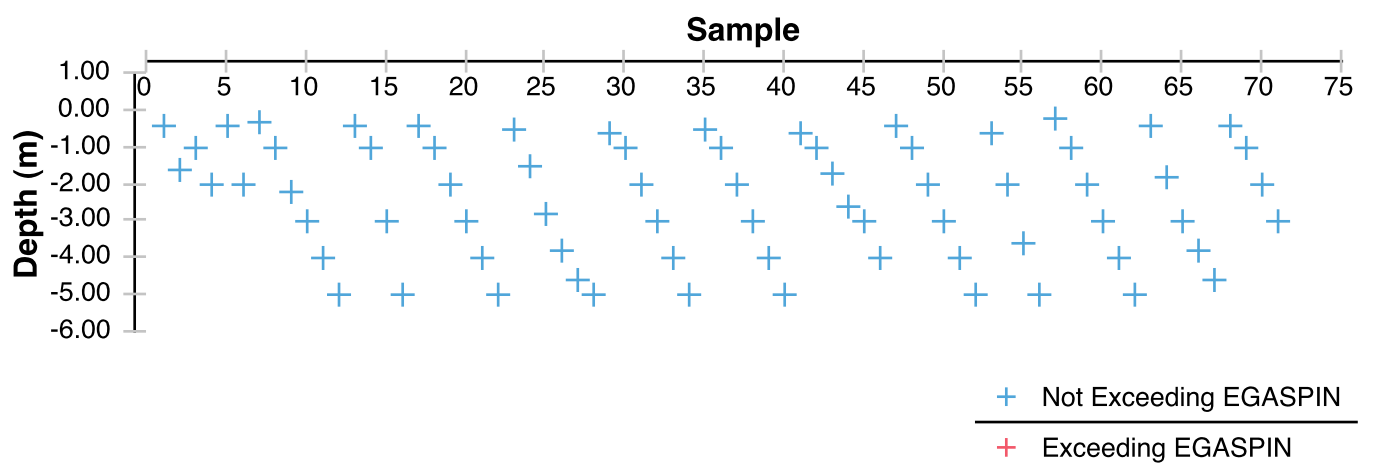
Soil Samples



Groundwater Samples



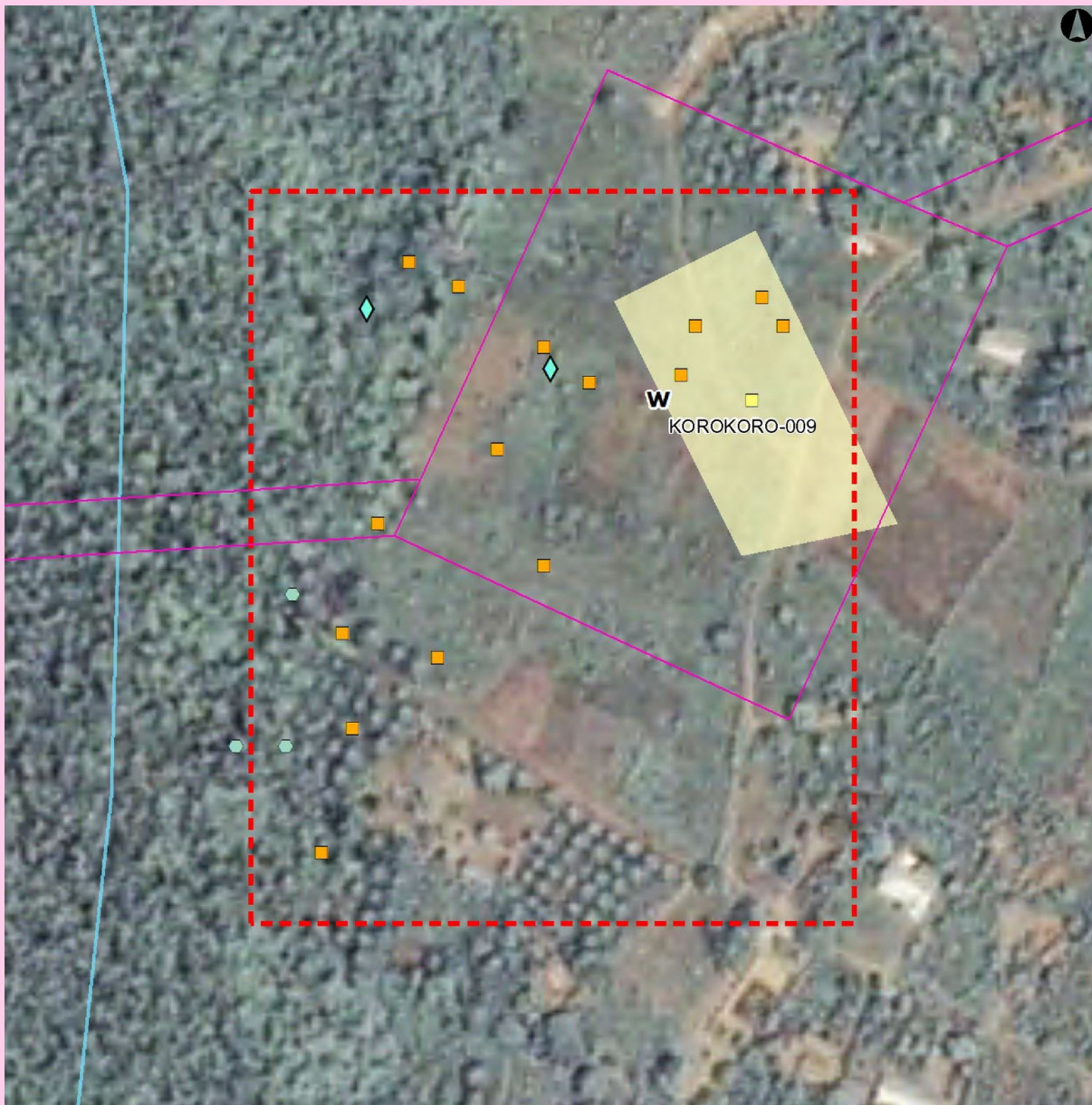
Soil Samples depth



Satellite image of the site



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

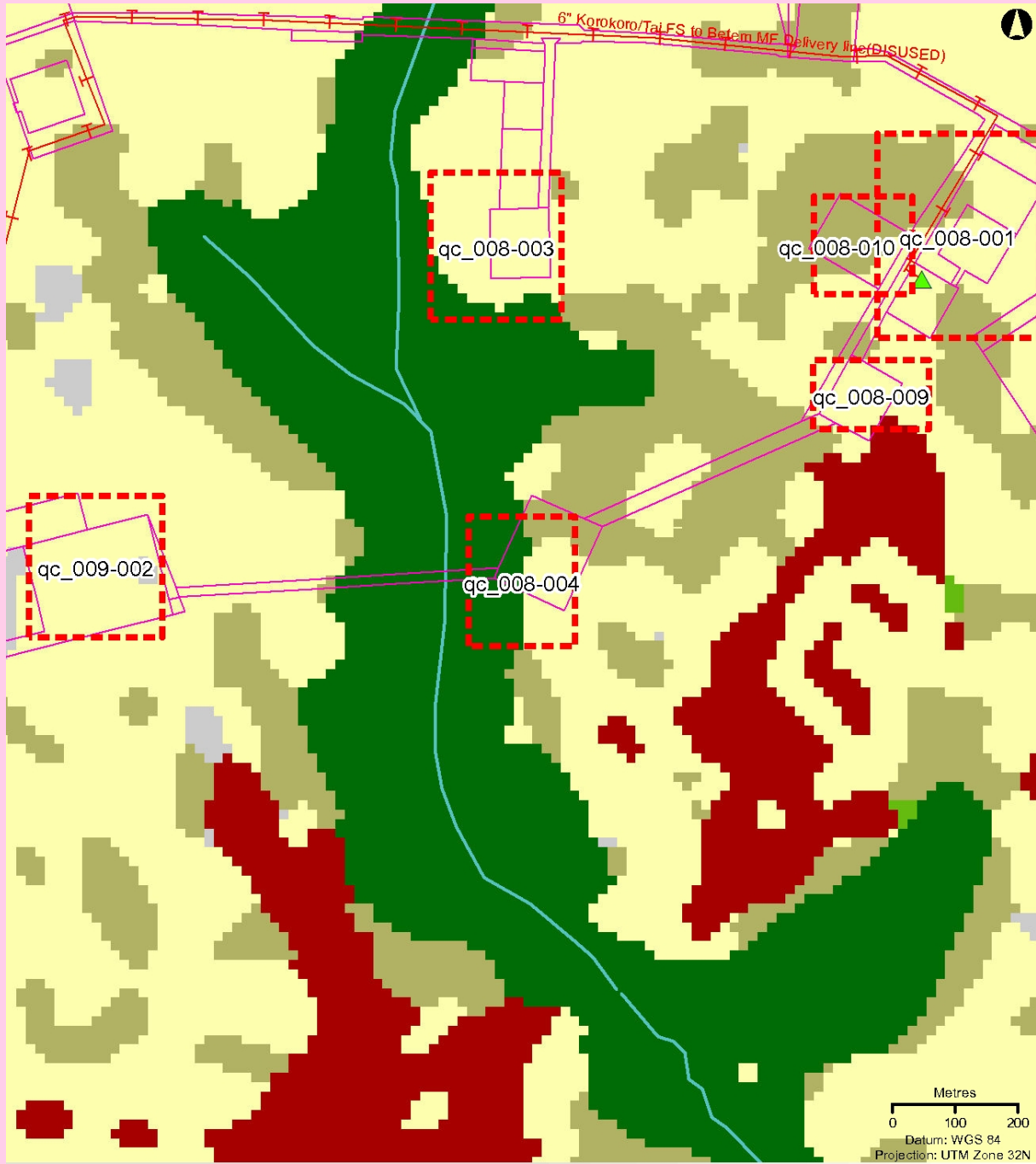
- Grassplot centroid
- Soil samples
- Soil Samples from GW monitoring well
- Grassplot sampling area
- Approximate site investigation area (that area does not correspond to contamination extent).
- Others**
- ▲ Air quality sampling
- Fish tissue sampling
- Sediment samples from Acquatic team
- Water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

Metres
0 7 14

Datum: WGS 84
Projection: UTM Zone 32N
UNEP 2011



Oil Facilities

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

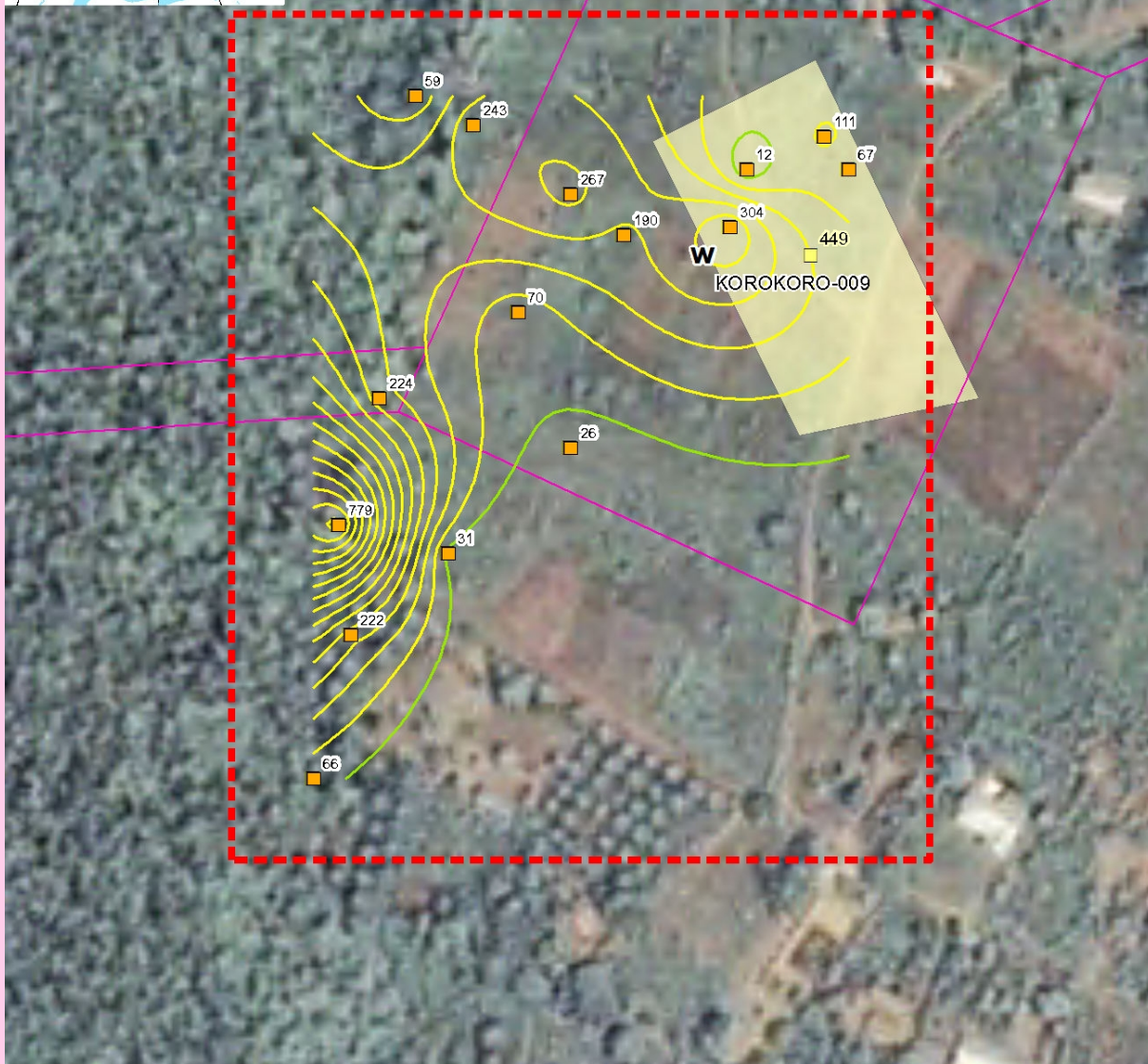
Approximate site investigation area
(that area does not correspond to
contamination extent).

- 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

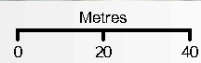
- SPDC Right of way (ROW)
- Wells
- Manifold
- FlowStation
- Pipeline**
- NNPC Crude
- NNPC Refined product
- SPDC Oil Pipe in operation

Contamination contours (mg/kg)

- > 5 000
- 50 - 5 000
- < 50

Soil samples

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



Projection: WGS 84
UTM Zone 32 N

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.

Ground photograph



VII - Sample List

Soil sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
1955782	26.200	1.00	311778	523737
1955824	449.000	-	311837	523722
1955842	23.200	1.60	311840	523751
1955940	373.000	0.40	311840	523751
1956305	42.700	0.40	311821	523743
1956345	4.640	2.00	311821	523743
1956557	508.000	2.00	311778	523737
2450434	92.600	0.40	311754	523754
2450485	16.600	2.00	311715	523594
2450486	23.000	0.40	311715	523594
2450510	69.700	1.00	311715	523594
2450521	28.500	1.00	311724	523629
2450537	20.100	0.40	311724	523629
2450550	18.700	5.00	311724	523629
2450569	7.730	5.00	311817	523729
2450584	3,310.000	1.00	311817	523729
2450597	3.370	0.40	311817	523729
2450615	60.600	3.00	311778	523675
2450627	8.900	5.00	311778	523675
2450639	1.960	4.00	311778	523675
2450740	99.800	3.00	311740	523761
2450921	117.000	3.60	311791	523727
2450932	14.700	5.00	311846	523743
2450940	37.600	0.30	311846	523743
2450951	42.500	1.00	311846	523743
2450962	31.500	5.00	311765	523708
2450972	147.000	2.00	311765	523708
2450981	7.410	5.00	311748	523649
2450994	446.000	0.60	311791	523727
2451008	145.000	1.00	311754	523754
2451037	40.900	2.00	311778	523675
2451045	14.800	1.00	311778	523675
2451058	17.200	0.60	311778	523675
2451073	7.110	4.60	311721	523656
2451112	35.200	0.40	311721	523656
2451119	11.700	3.80	311721	523656
2451130	4,860.000	3.00	311721	523656
2451146	754.000	1.80	311721	523656
2451238	437.000	1.50	311731	523687
2451252	62.100	3.80	311731	523687

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2451264	39.500	4.60	311731	523687
2451271	414.000	2.80	311731	523687
2451280	23.000	5.00	311731	523687
2452391	6.850	4.00	311846	523743
2452408	115.000	2.20	311846	523743
2452426	11.000	3.00	311846	523743
2452456	39.600	0.50	311748	523649
2452474	30.000	1.00	311748	523649
2452493	62.200	4.00	311748	523649
2452510	32.700	2.00	311748	523649
2452969	19.700	5.00	311754	523754
2453008	22.400	2.00	311754	523754
2453027	9.080	4.00	311754	523754
2453060	1,040.000	3.00	311754	523754
2453371	219.000	2.00	311791	523727
2453392	135.000	5.00	311791	523727
2453452	138.000	0.60	311740	523761
2453488	40.800	4.00	311740	523761
2453515	25.400	1.00	311740	523761
2453541	35.500	2.60	311740	523761
2453556	41.700	1.70	311740	523761
2453584	41.900	1.00	311765	523708
2453605	41.400	4.00	311765	523708
2453634	78.200	3.00	311765	523708
2453666	99.200	0.20	311765	523708
2454072	19.300	3.00	311748	523649
2454294	740.000	2.00	311724	523629
2454313	301.000	3.00	311724	523629
2454585	25.700	4.00	311724	523629
2454759	82.000	0.50	311731	523687
2454847	239.000	3.00	311817	523729
2454859	69.700	3.00	311715	523594

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon ($\mu\text{g/l}$)	Easting	Northing
2701771	47	311728	523748
2701776	16	311780	523731

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