

Environmental Assessment of Ogoniland Site Specific Fact Sheets

NKELEOKEN- ALODE



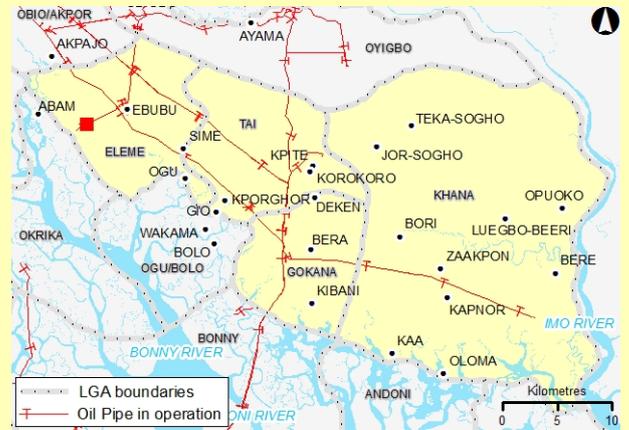
This fact sheet is part of a series prepared as part of the Environmental Assessment of Ogoniland by the United Nations Environment Programme (UNEP). It provides the observations and results from one of the individual sites studied in detail, plus the specific risk reduction measures for follow-up action.

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

July 2011

I - Site Description

Site Name	NKELEOKEN- ALODE
Site Number	qc_002-002
LGA	ELEME
Main community	NKELEOKEN ALODE
Surrounding communities	ALODE KPEAN NKELEOKEN NKELEOKEN ALODE
Investigated area (ha)	32.43
Category	SPDC Pipeline ROW
Eastings (WGS 84, Zone 32N)	291069
Northings (WGS 84, Zone 32N)	527211



<p>Recommendations for risk reduction</p>	<ul style="list-style-type: none"> - Communities should be informed in community meetings about health and safety precautions. - Impacted swamps and creeks should be demarcated and appropriate signage put in place to indicate that the area is impacted. - 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. - 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	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	NNPC TRUNKLINE

III - Spill History

Spills reported by SPDC	No
Spill reported by community	Yes

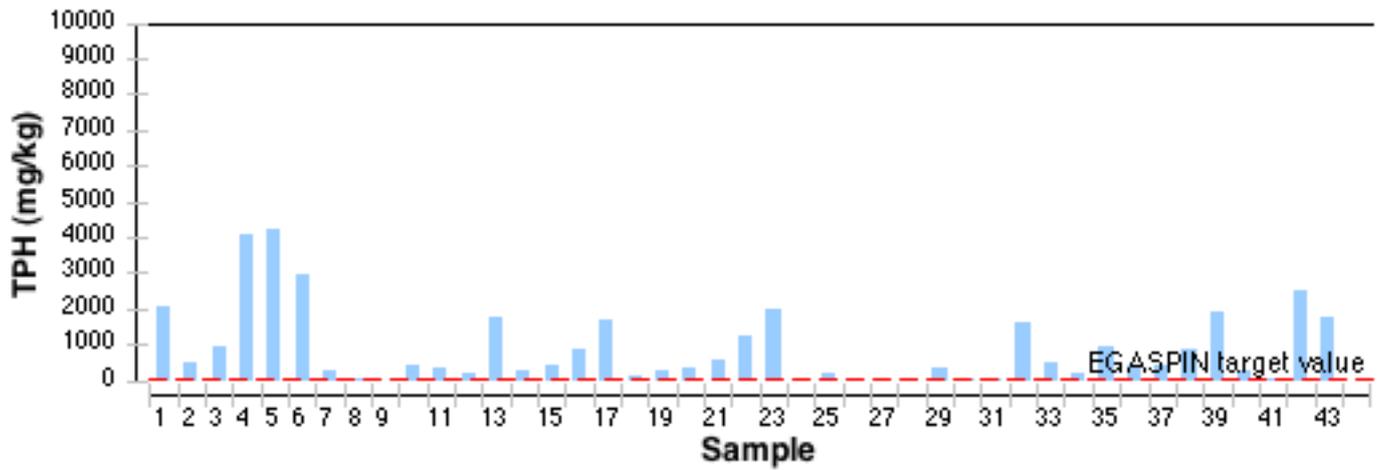
IV - Data Screening

Assessment criteria

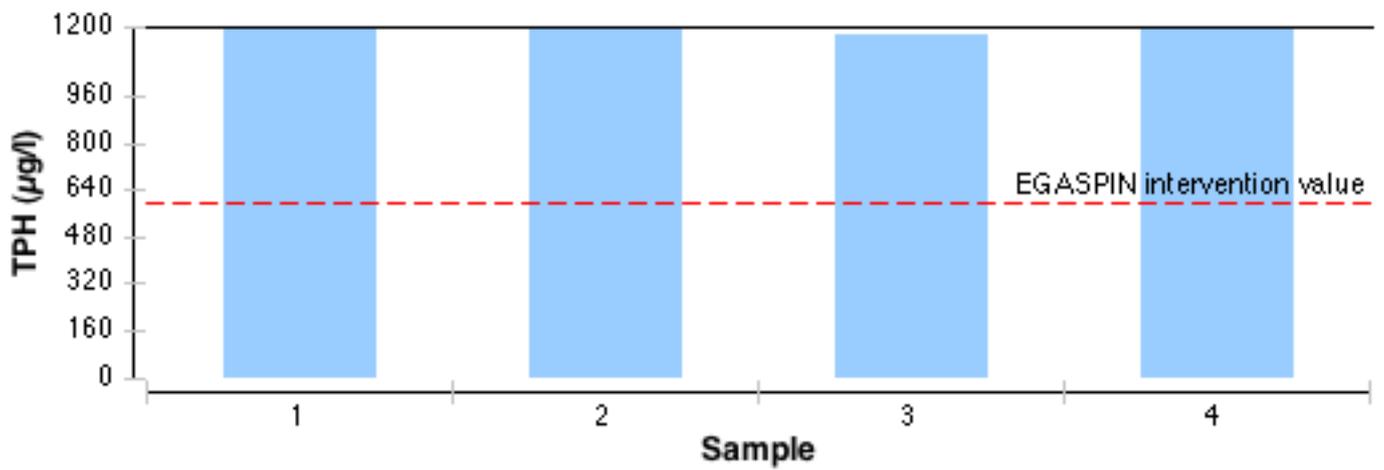
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	44
Deepest investigation (m)	3.8
Maximum soil TPH (mg/kg)	4,220.000
Number of soil measurements greater than EGASPIN intervention value	0
Deepest sample greater than EGASPIN (m)	0
Number of soil measurements below 1m	33
Number of soil measurements below 1m greater than EGASPIN intervention value	0
Number of ground water samples	4
Maximum groundwater TPH (µg/l)	16,500
Number of groundwater measurements greater than EGASPIN intervention value	4
Number of community well samples	0
Presence of hydrocarbons in community wells	Not applicable
Number of CL sediment samples	3
Maximum CL sediment TPH (mg/kg)	21,300.000
Number of CL sediment measurements greater than EGASPIN intervention value	2
Presence of hydrocarbons in sediment above EGASPIN intervention value	Yes

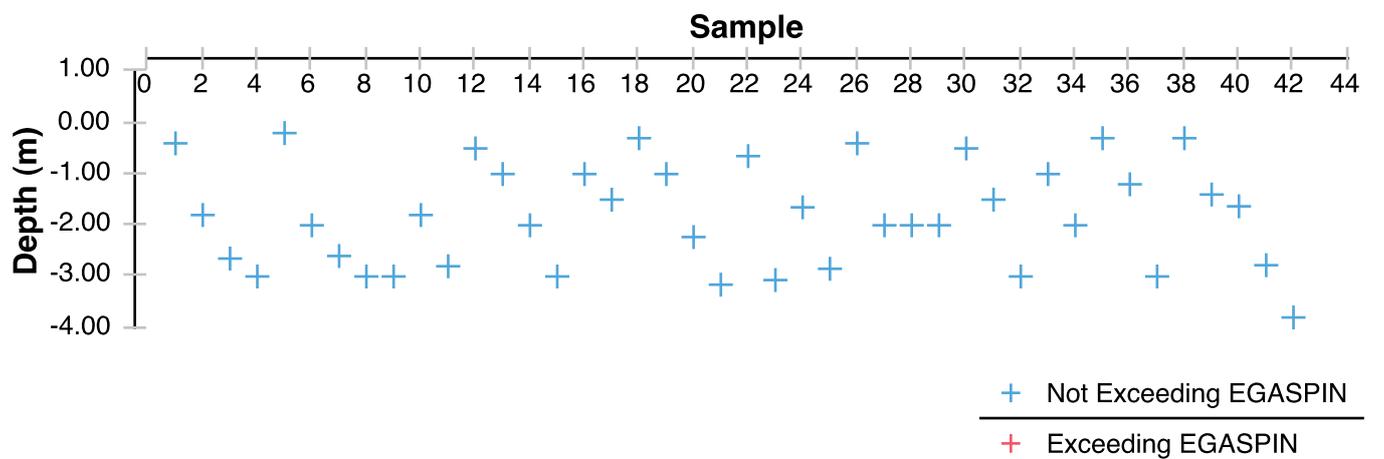
Soil Samples



Groundwater Samples

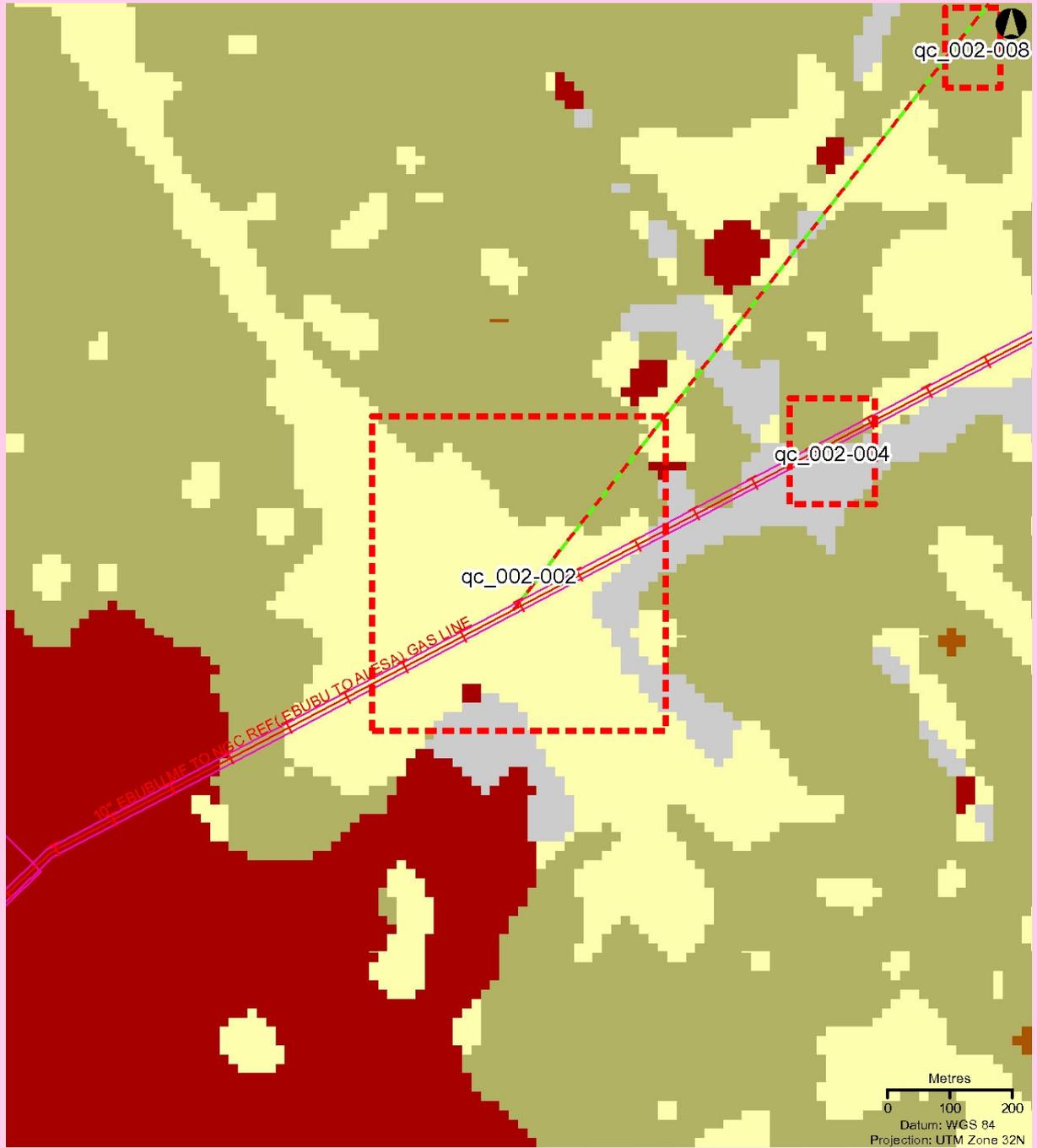


Soil Samples depth



Satellite image of the site





Oil Facilities

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

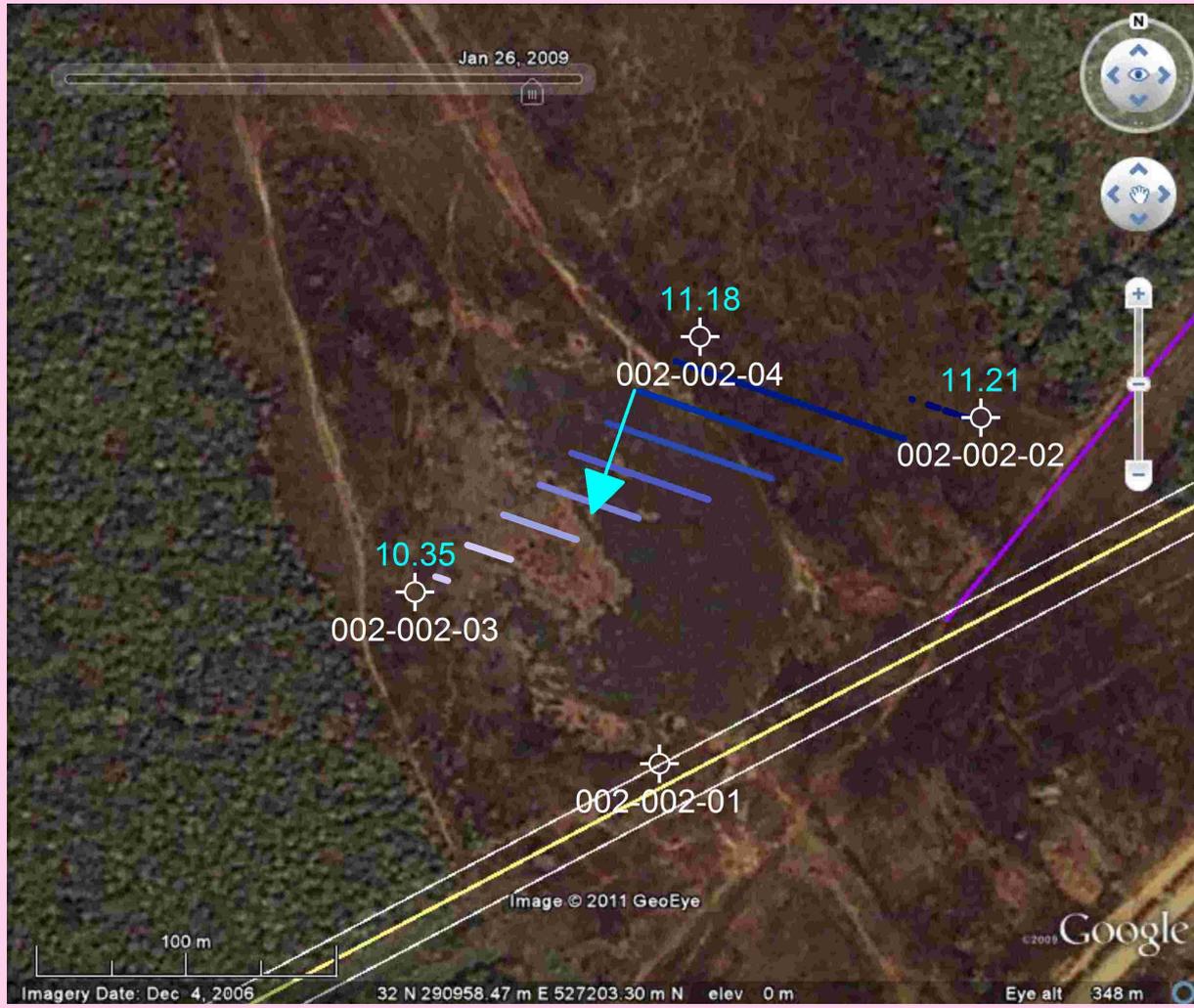
Approximate site investigation area (that area does not correspond to contamination extent).

- 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

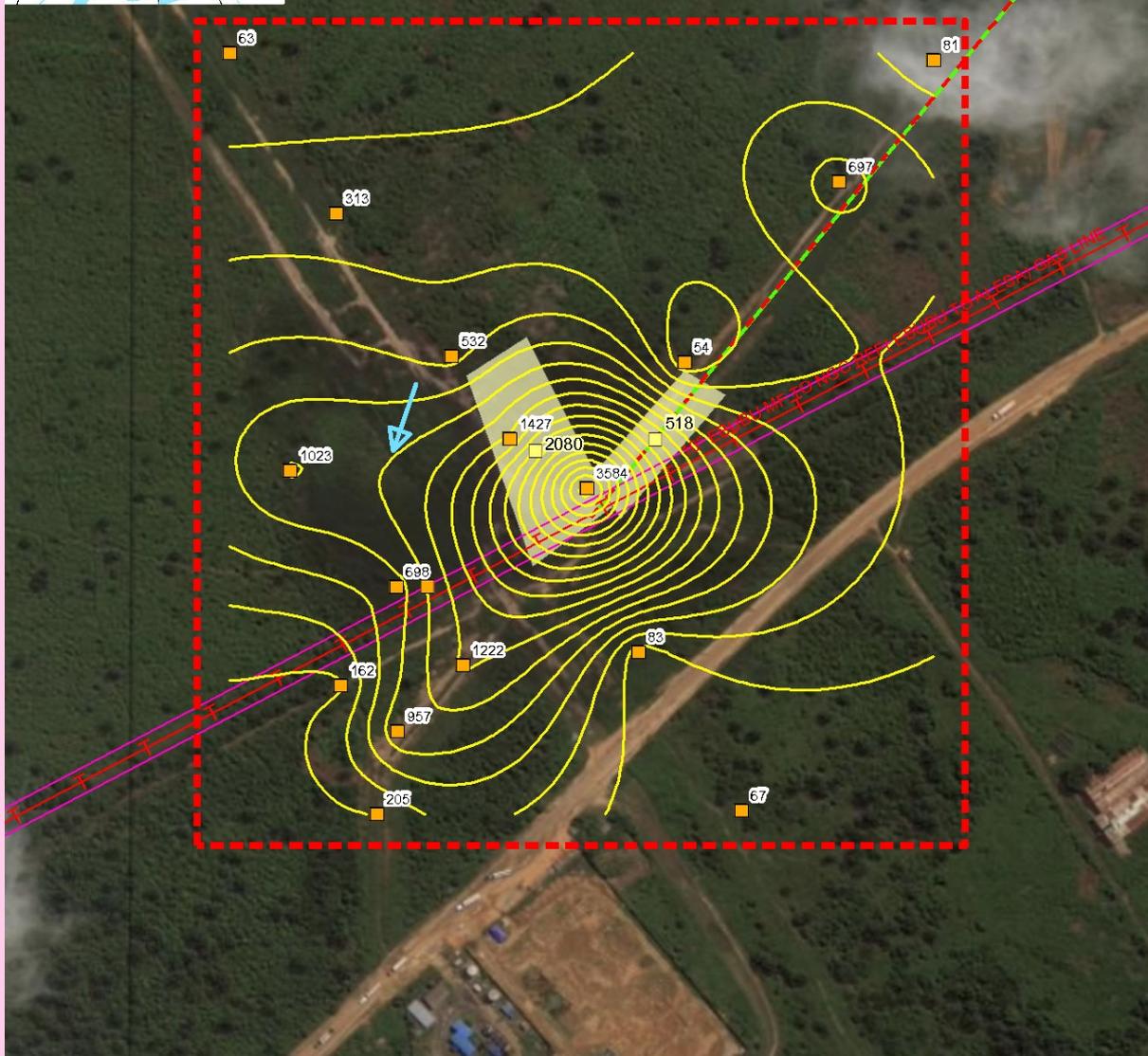
Source:
land cover 2007
from Aster imagery

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Ground Water Elevation Map



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

Contamination contours (mg/kg)

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

Soil samples

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

Metres
0 20 40
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
1664666	not analyzed for TPH	3.80	290975	527116
1738206	83.000	2.00	291104	527076
1738244	1,600.000	0.50	290989	527259
1738289	499.000	1.50	290989	527259
1738294	197.000	3.00	290989	527259
1738309	422.000	2.00	290955	527116
1738316	973.000	1.00	290955	527116
1738325	62.900	2.00	290853	527446
1738360	1,890.000	3.00	291025	527208
1738386	518.000	-	291115	527207
1738395	88.300	1.40	290890	527188
1738424	841.000	1.20	291025	527208
1738446	1,800.000	2.78	290890	527188
1738449	2,080.000	-	291041	527200
1738486	2,550.000	1.63	290890	527188
1738500	300.000	0.30	290890	527188
1738514	361.000	2.00	290918	527347
1738562	72.000	0.40	290918	527347
1738575	409.000	0.30	291025	527208
1738588	67.800	2.85	291167	526978
1738594	4,220.000	2.65	291072	527177
1738597	59.600	1.65	291167	526978
1738613	970.000	0.40	291072	527177
1738615	4,100.000	1.80	291072	527177
1738617	2,960.000	3.00	291072	527177
1738619	58.700	2.00	291285	527442
1738642	282.000	0.20	291285	527442
1738658	105.000	1.00	290921	527055
1738695	1,670.000	3.00	290956	527027
1738707	277.000	1.50	290921	527055
1738720	465.000	1.00	290956	527027
1738731	244.000	0.50	290956	527027
1738737	847.000	2.00	290956	527027
1739645	408.000	3.00	291132	527255
1739674	BDL	2.60	291132	527255
1739712	180.000	1.80	291227	527367
1739760	337.000	3.00	291227	527367
1739794	1,770.000	2.80	291227	527367
1755931	1,240.000	2.23	290996	527068
1756126	322.000	0.30	290996	527068

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
1756149	237.000	3.07	290943	526976
1756163	568.000	1.00	290996	527068
1756175	1,980.000	3.16	290996	527068
1756190	85.700	0.65	290943	526976

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
1883824	16,500	291086	527225
1883842	1,310	290982	527261
1883861	1,400	290976	527117
1883891	1,170	290867	527433

Sediment sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Easting	Northing
1738341	2,390.000	290977	527169
1738416	6,080.000	291042	527121
1738480	21,300.000	291069	527158

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