

Environmental Assessment of Ogoniland Site Specific Fact Sheets

BUEMENE- KOROKORO



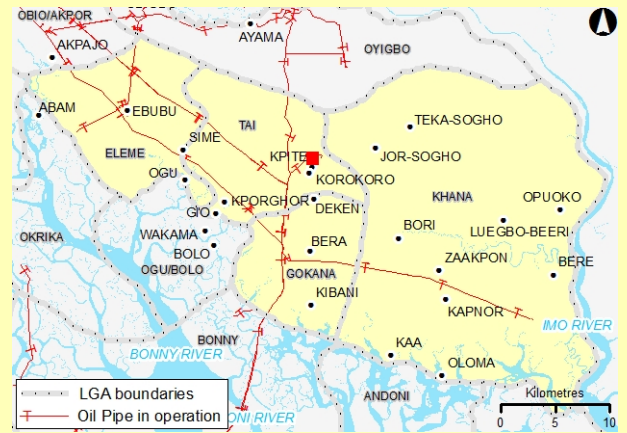
This fact sheet is part of a series prepared as part of the Environmental Assessment of Ogoniland by the United Nations Environment Programme (UNEP). It provides the observations and results from one of the individual sites studied in detail, plus the specific risk reduction measures for follow-up action.

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_008-003
LGA	TAI
Main community	KOROKORO
Surrounding communities	AABUE KOROKORO BUE MENE BUE MENE KOROKORO KOROKORO
Investigated area (ha)	11.08
Category	SPDC Operating Site
Eastings (WGS 84, Zone 32N)	311740
Northings (WGS 84, Zone 32N)	524213



<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	KOROKORO-005 (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_00132	Incident Date 19920824
Spill reported by community	Yes	

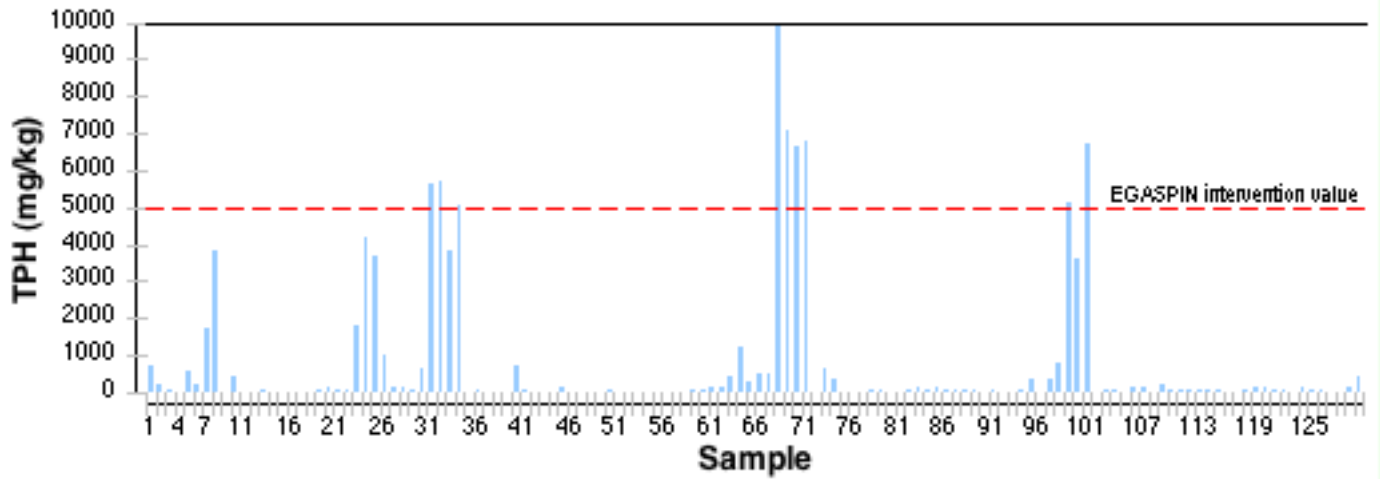
IV - Data Screening

Assessment criteria

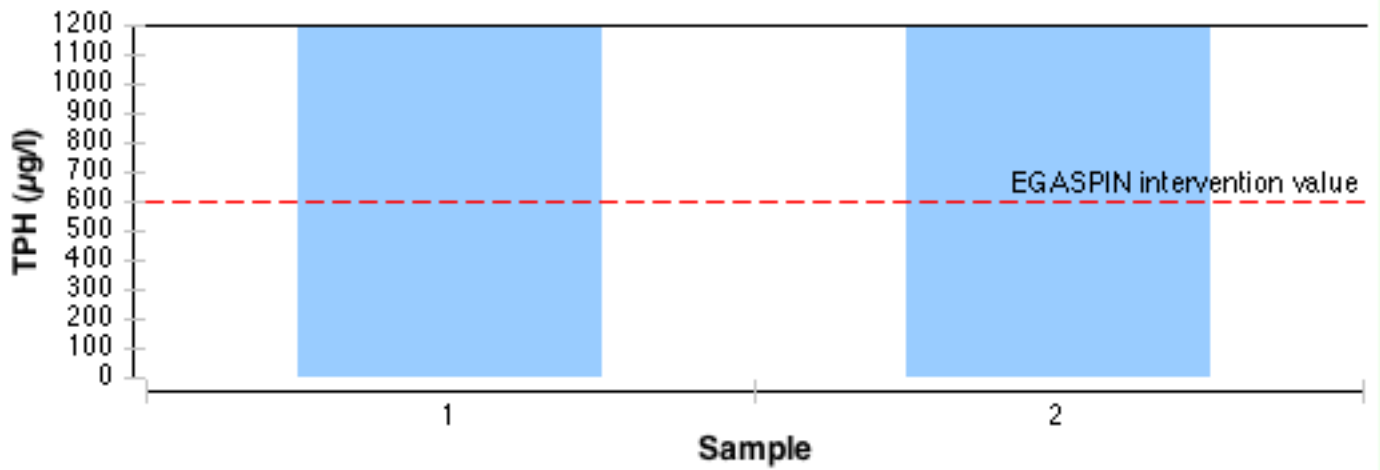
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	130
Deepest investigation (m)	5.2
Maximum soil TPH (mg/kg)	10,800.000
Number of soil measurements greater than EGASPIN intervention value	9
Deepest sample greater than EGASPIN (m)	5
Number of soil measurements below 1m	106
Number of soil measurements below 1m greater than EGASPIN intervention value	9
Number of ground water samples	2
Maximum groundwater TPH (µg/l)	22,600
Number of groundwater measurements greater than EGASPIN intervention value	2
Number of community well samples	1
Presence of hydrocarbons in community wells	Not found
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

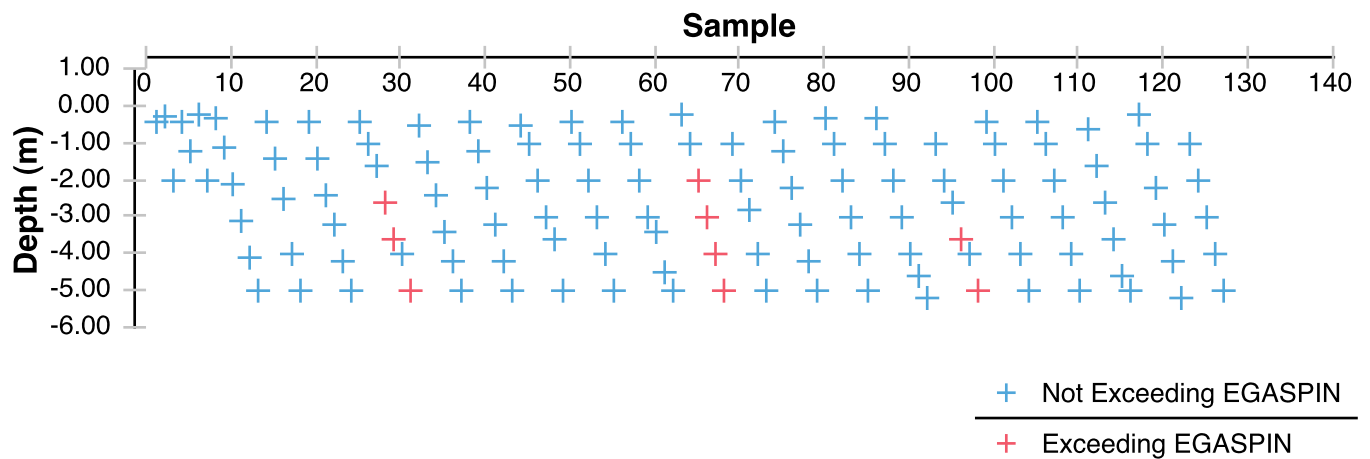
Soil Samples



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

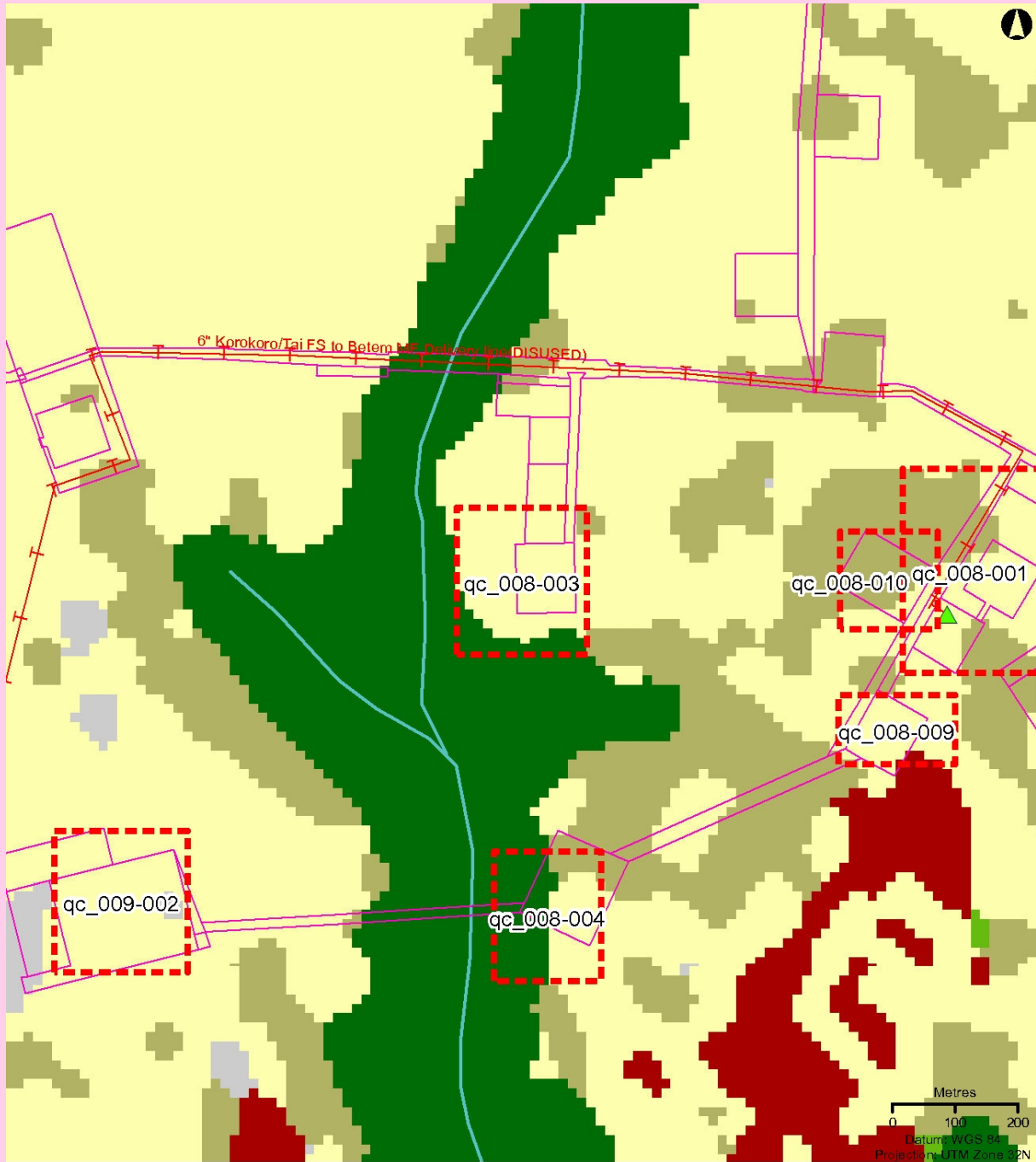
- Grassplot centroid
- Soil samples
- Soil Samples from GW monitoring well
- Grassplot sampling area
- Approximate site investigation area (that area does not correspond to contamination extent).
- Others**
- ▲ Air quality sampling
- Fish tissue sampling
- Sediment samples from Acquatic team
- Water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



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

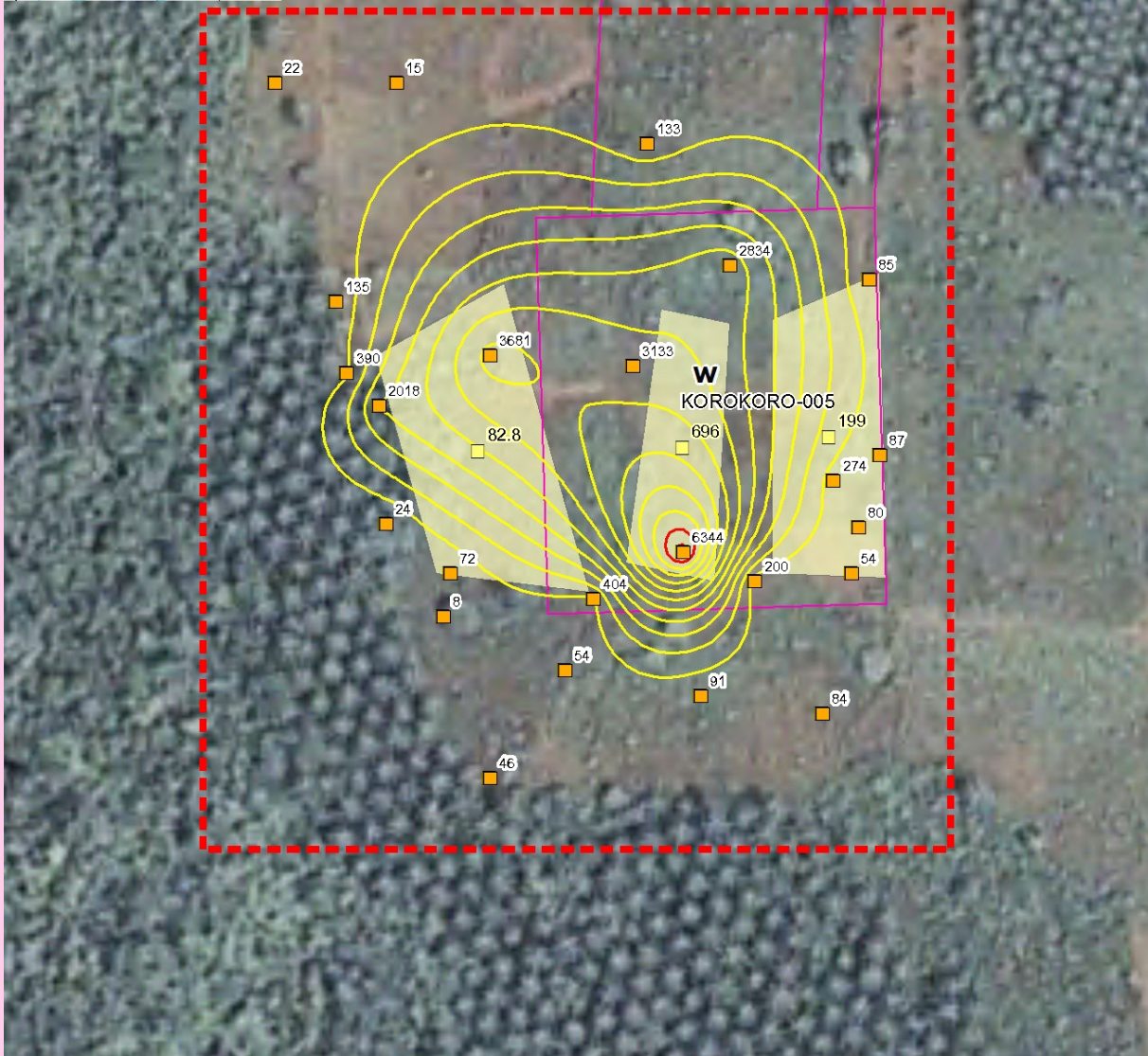
Approximate site investigation area (that area does not correspond to contamination extent).

- 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

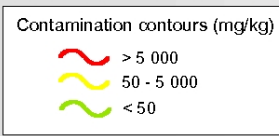
Source:
land cover 2007
from Aster imagery

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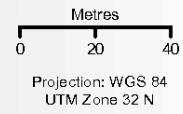
Soil Contamination Map



- 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.

Ground photograph



VII - Sample List

Soil sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
1956008	5.990	0.20	311675	524229
1956055	433.000	2.00	311675	524229
1956073	1,700.000	0.40	311755	524231
1956093	232.000	2.00	311811	524199
1956123	3,850.000	1.20	311755	524231
1956154	567.000	0.25	311811	524199
1956176	199.000	-	311810	524211
1956194	696.000	-	311769	524208
1956216	8.180	0.40	311702	524161
2361389	82.800	-	311712	524207
2361432	5.110	3.20	311715	524116
2361463	9.480	1.20	311715	524116
2361495	3,700.000	3.20	311684	524220
2361542	not analyzed for TPH	0.40	311704	524173
2361579	36.300	0.40	311684	524220
2361634	17.700	2.40	311672	524249
2361721	121.000	5.00	311684	524220
2361747	17.900	5.00	311655	524310
2361801	682.000	1.60	311715	524234
2361942	707.000	5.00	311672	524249
2361993	147.000	0.40	311715	524234
2362035	34.000	0.50	311672	524249
2362065	not analyzed for TPH	3.60	311655	524310
2362104	17.000	5.00	311715	524116
2362145	28.800	2.20	311715	524116
2362190	23.200	3.40	311672	524249
2362233	18.700	4.20	311672	524249
2362272	37.900	1.50	311672	524249
2362307	78.200	1.00	311715	524234
2362320	5,710.000	3.60	311715	524234
2362348	3,800.000	4.00	311715	524234
2362365	5,630.000	2.60	311715	524234
2362643	5,030.000	5.00	311715	524234
2362690	3.240	3.00	311689	524310
2362763	35.800	0.40	311689	524310
2362789	18.400	5.00	311689	524310
2362817	17.300	4.00	311689	524310
2362837	14.800	2.00	311689	524310
2362904	BDL	2.00	311655	524310
2362933	14.500	1.00	311689	524310

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2362975	22.100	3.10	311686	524187
2362988	9.890	1.10	311686	524187
2363007	20.900	5.00	311686	524187
2363030	24.900	4.10	311686	524187
2363042	36.900	2.10	311686	524187
2363051	36.000	0.30	311686	524187
2363068	56.100	3.00	311655	524310
2363085	24.900	1.00	311655	524310
2363105	31.600	0.50	311655	524310
2363151	64.500	2.50	311704	524173
2363447	130.000	4.00	311704	524173
2363476	94.300	5.00	311704	524173
2363519	160.000	4.20	311715	524116
2363549	43.200	0.40	311715	524116
2363597	1,010.000	4.20	311684	524220
2363622	4,210.000	2.40	311684	524220
2363643	1,800.000	1.40	311684	524220
2363689	not analyzed for TPH	1.40	311704	524173
2493922	137.000	3.00	311744	524166
2493923	308.000	5.00	311744	524166
2493924	467.000	3.40	311744	524166
2493967	7,070.000	3.00	311769	524179
2494454	87.700	0.30	311821	524255
2494671	22.400	1.00	311821	524255
2495402	64.500	1.00	311774	524139
2495446	148.000	4.00	311774	524139
2495464	163.000	5.00	311774	524139
2495487	76.200	2.00	311821	524255
2495558	85.000	1.00	311759	524293
2495580	413.000	5.00	311759	524293
2495609	480.000	1.00	311769	524179
2495621	6,610.000	4.00	311769	524179
2495682	658.000	2.00	311789	524171
2496348	1,200.000	4.50	311744	524166
2496367	169.000	2.00	311744	524166
2496392	63.900	0.40	311744	524166
2496477	48.900	1.00	311744	524166
2496572	6,760.000	5.00	311769	524179
2496626	478.000	0.20	311769	524179
2496664	10,800.000	2.00	311769	524179

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2496779	29.800	1.00	311789	524171
2496805	392.000	2.80	311789	524171
2496843	80.600	2.20	311816	524173
2496882	24.400	4.20	311816	524173
2496904	97.500	1.20	311816	524173
2496927	58.100	5.00	311816	524173
2496966	14.300	0.40	311816	524173
2496993	34.800	3.20	311816	524173
2497044	50.000	3.00	311824	524206
2497089	109.000	0.30	311824	524206
2497126	72.300	5.00	311824	524206
2497162	132.000	2.00	311824	524206
2497188	86.100	4.00	311824	524206
2497218	86.600	1.00	311824	524206
2497419	5,130.000	3.60	311782	524259
2497465	not analyzed for TPH	1.00	311782	524259
2497488	798.000	2.60	311782	524259
2497523	6,750.000	5.00	311782	524259
2497563	376.000	2.00	311782	524259
2497602	3,590.000	4.00	311782	524259
2497930	60.000	3.00	311808	524134
2497964	75.900	2.00	311808	524134
2498003	24.600	0.40	311808	524134
2498050	195.000	1.00	311808	524134
2498069	104.000	4.00	311808	524134
2498108	53.800	5.00	311808	524134
2498182	7.190	2.60	311736	524146
2498254	61.600	4.60	311736	524146
2498285	154.000	5.00	311736	524146
2498297	75.700	1.60	311736	524146
2498312	52.600	0.60	311736	524146
2498325	30.900	3.60	311736	524146
2498364	18.500	3.20	311818	524186
2498390	70.400	5.20	311818	524186
2498414	123.000	4.20	311818	524186
2498429	85.100	1.00	311818	524186
2498453	95.500	2.20	311818	524186
2498468	117.000	0.20	311818	524186
2498483	129.000	4.00	311759	524293
2498720	20.600	2.00	311759	524293

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2498740	16.200	3.00	311759	524293
2499099	25.000	0.40	311774	524139
2499122	90.900	2.00	311774	524139
2542009	6.380	3.00	311774	524139
2542057	374.000	5.20	311821	524255
2542059	87.600	4.60	311821	524255
2542060	24.300	3.00	311821	524255
2542062	24.300	4.00	311821	524255
2542098	not analyzed for TPH	5.00	311789	524171
2542099	not analyzed for TPH	4.00	311789	524171

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
1853495	22,600	311683	524207
1854033	4,250	311704	524164

Community well sample list

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
2364017	not analyzed for TPH	311680	524212

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