

Environmental Assessment of Ogoniland Site Specific Fact Sheets

AJEOKPORI-AKPAJO



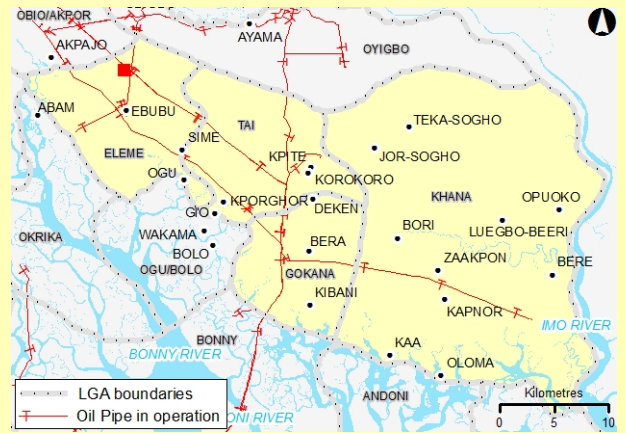
This fact sheet is part of a series prepared as part of the Environmental Assessment of Ogoniland by the United Nations Environment Programme (UNEP). It provides the observations and results from one of the individual sites studied in detail, plus the specific risk reduction measures for follow-up action.

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	AJEOKPORI-AKPAJO
Site Number	qc_004-001
LGA	ELEME
Main community	OGALE
Surrounding communities	AJEOKPORI AJEOKPORI OGALE NSISIOKEN OGALE OBAJE OKEN OGALE OBAJI OKEN OGALE OGALE
Investigated area (ha)	79.04
Category	SPDC Pipeline ROW
Eastings (WGS 84, Zone 32N)	294542
Northings (WGS 84, Zone 32N)	532224



Recommendations for risk reduction	<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. - Impacted swamps and creeks should be demarcated and appropriate signage put in place to indicate that the area is impacted. - 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.
------------------------------------	---

II - Oilfield Infrastructure Type

Wells	No
Flowstations	No
Manifolds	No
Flaresites	No
Oil pipeline in operation	24" NKPOKU TO BOMU TRUNKLINE 36" RUMUEKPE TO NKPOKU TRUNKLINE
NNPC crude line	No
NNPC product line	NNPC TRUNKLINE

III - Spill History

Spills reported by SPDC	No
Spill reported by community	Yes

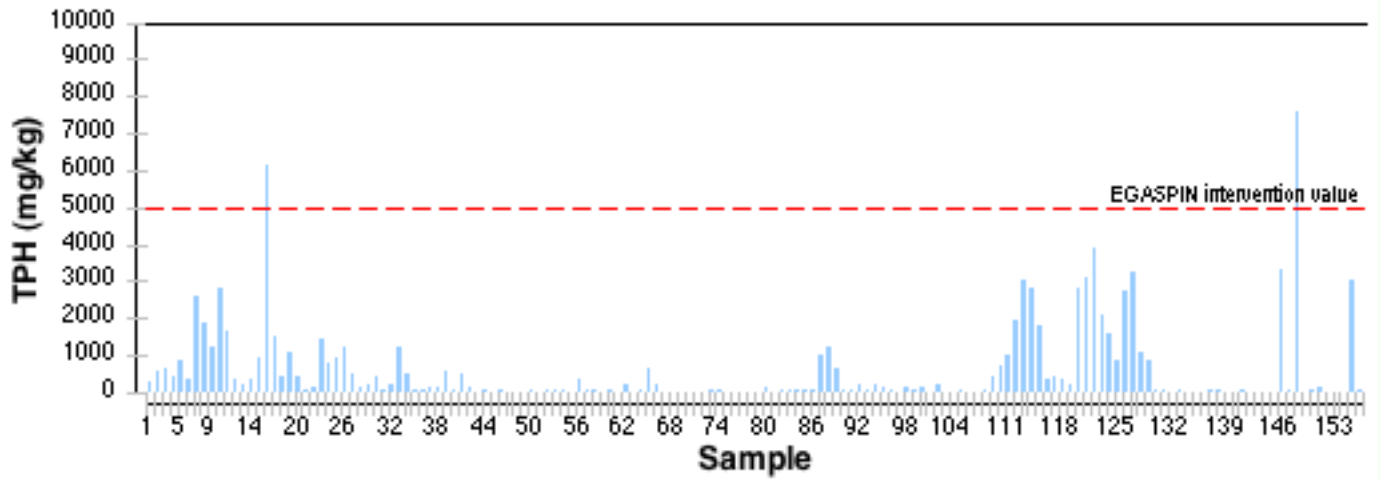
IV - Data Screening

Assessment criteria

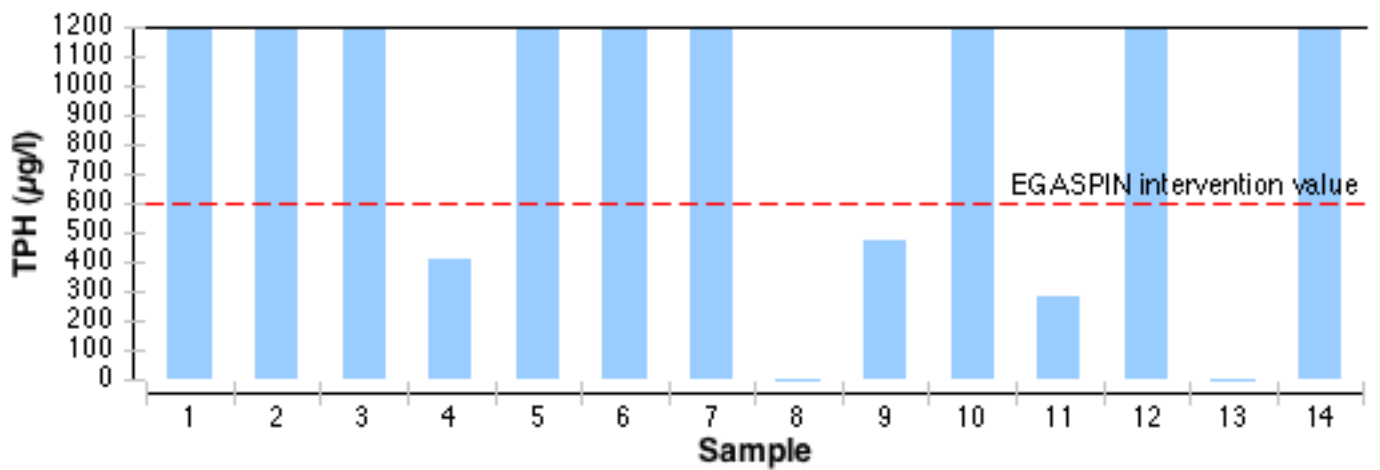
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	156
Deepest investigation (m)	5.2
Maximum soil TPH (mg/kg)	7,570.000
Number of soil measurements greater than EGASPIN intervention value	2
Deepest sample greater than EGASPIN (m)	2.6
Number of soil measurements below 1m	120
Number of soil measurements below 1m greater than EGASPIN intervention value	2
Number of ground water samples	16
Maximum groundwater TPH (µg/l)	1,720,000
Number of groundwater measurements greater than EGASPIN intervention value	9
Number of community well samples	0
Presence of hydrocarbons in community wells	Not applicable
Number of CL sediment samples	1
Maximum CL sediment TPH (mg/kg)	360.000
Number of CL sediment measurements greater than EGASPIN intervention value	0
Presence of hydrocarbons in sediment above EGASPIN intervention value	Not found

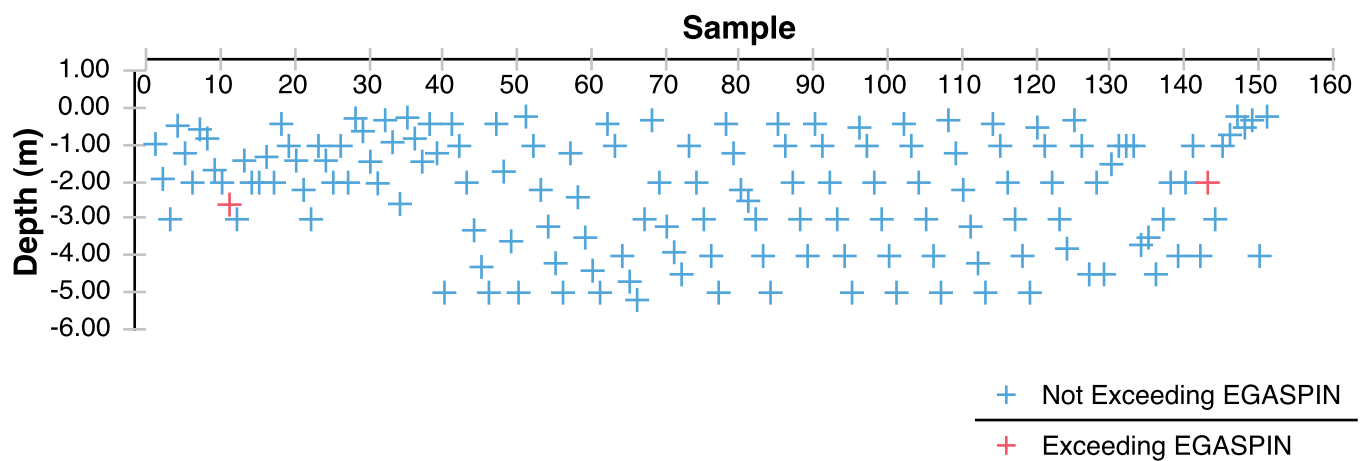
Soil Samples



Groundwater Samples



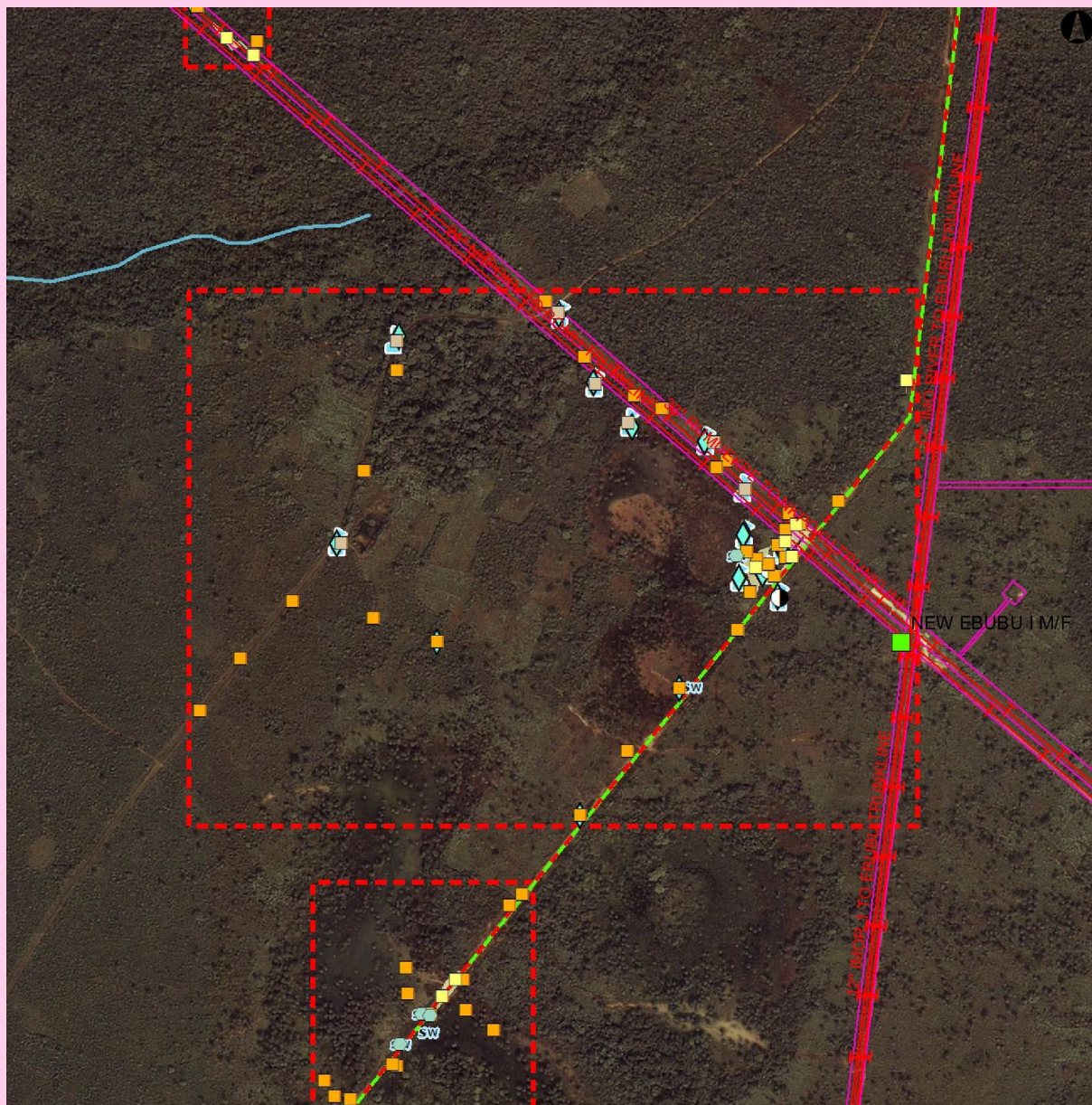
Soil Samples depth



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

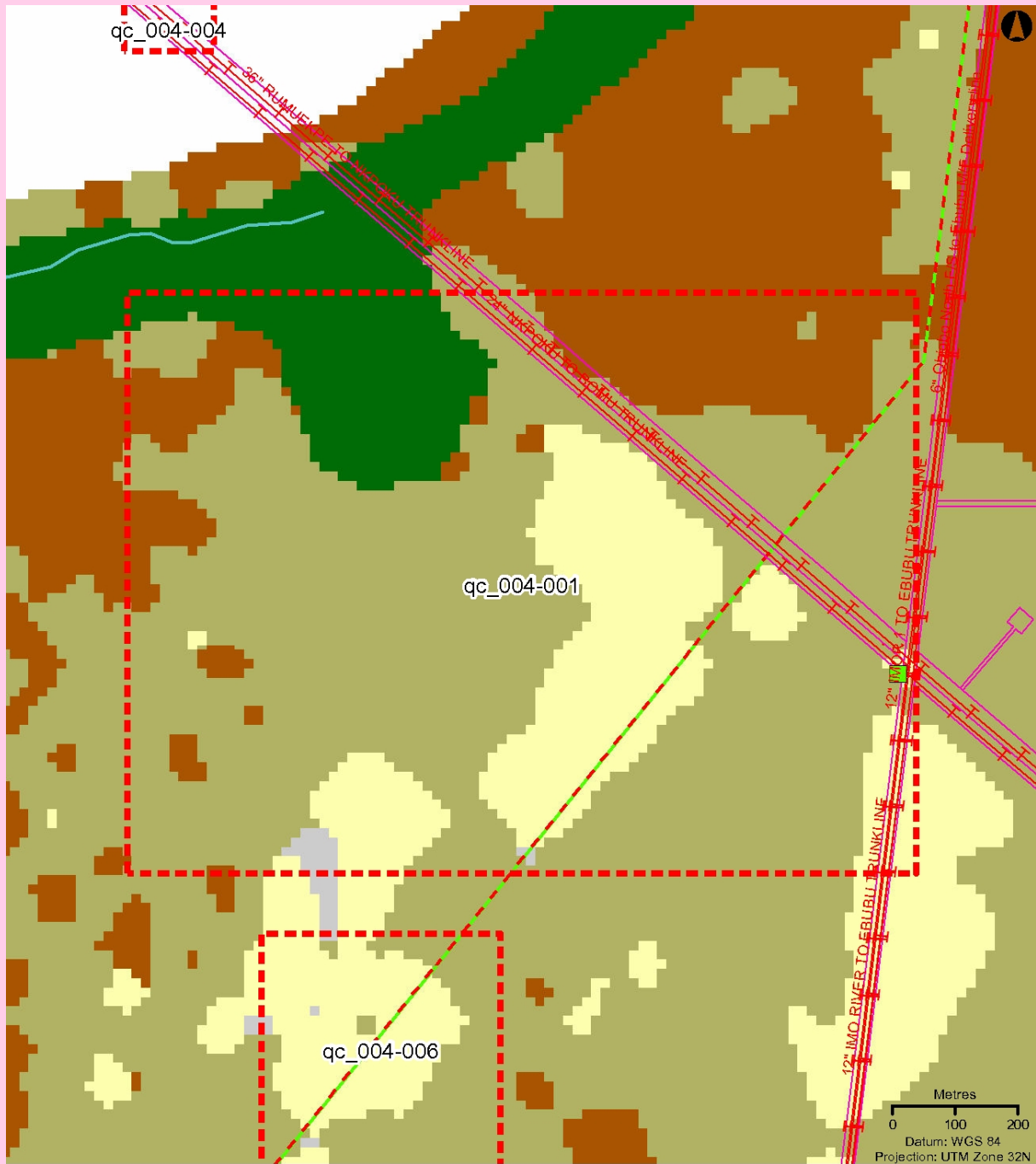
Water samples

- ▲ 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

Metres
0 40 80

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

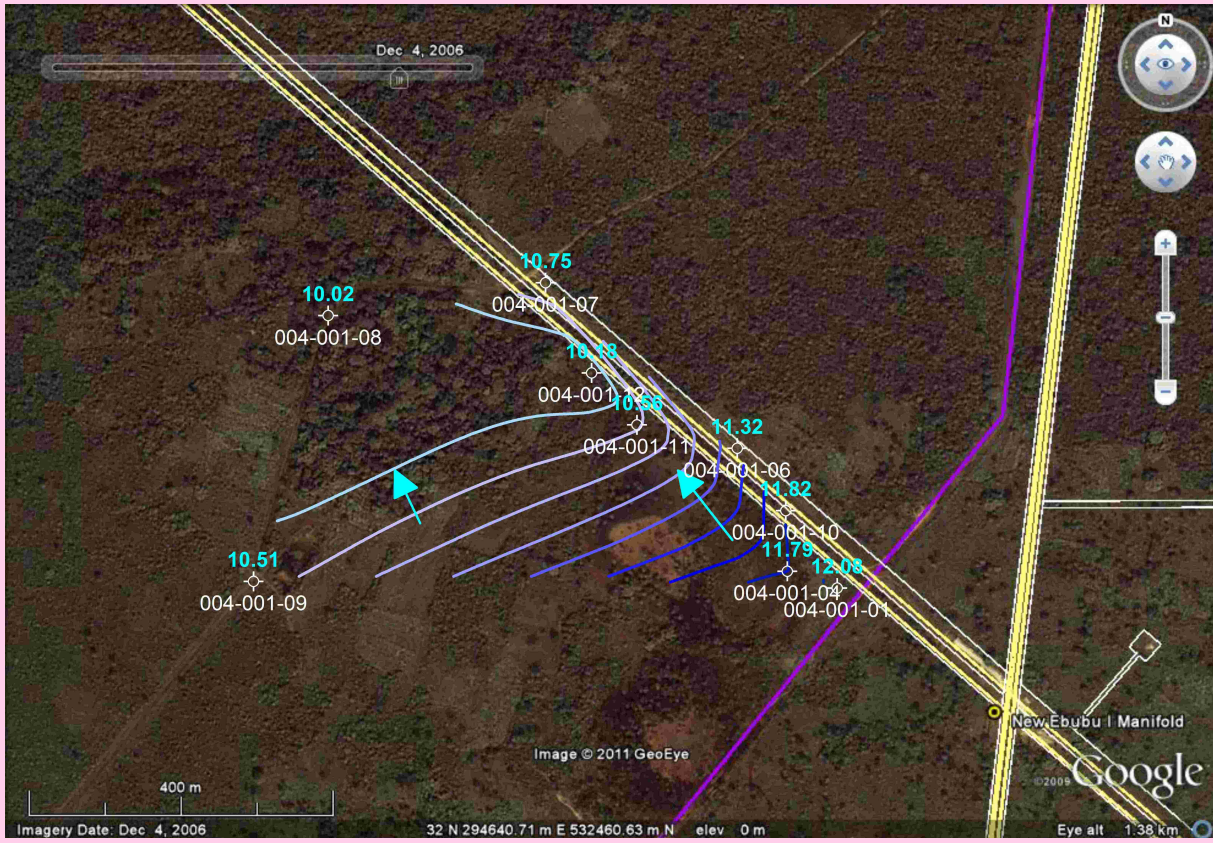
Approximate site investigation area (that area does not correspond to contamination extent).

- 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

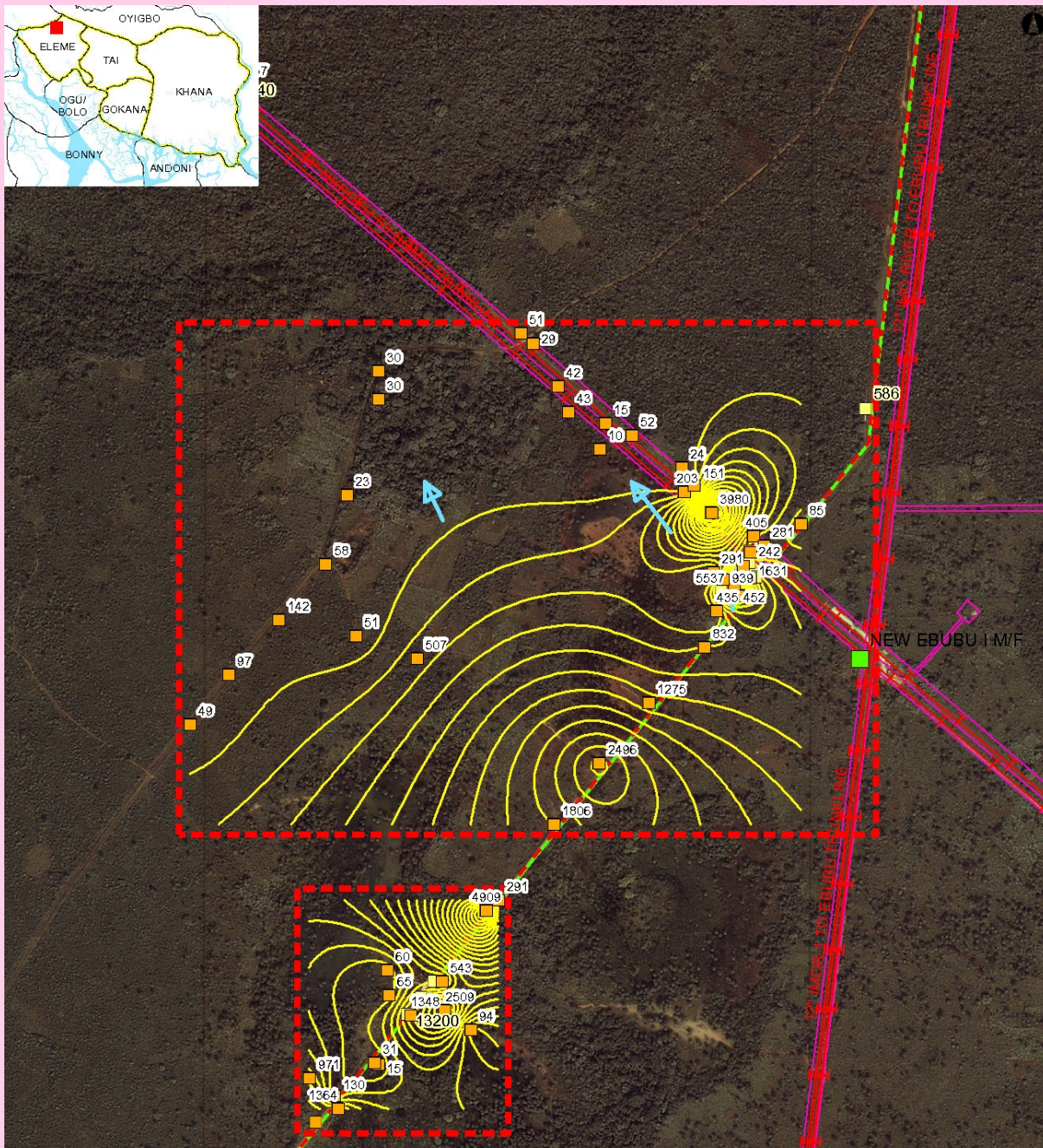
Source:
land cover 2007
from Aster imagery

UNEP 2011

Ground Water Elevation Map



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

Metres

0 20 40

Projection: WGS 84
UTM Zone 32 N

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

UNEP 2011

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
1688224	162.000	1.43	294968	532284
1688226	308.000	-	294956	532227
1688227	859.000	-	294963	532282
1688234	494.000	0.60	294876	532236
1688275	499.000	0.80	294968	532284
1688297	586.000	-	295153	532532
1688351	448.000	-	294892	532208
1688392	2,820.000	1.20	294924	532194
1688414	1,650.000	2.00	294924	532194
1688426	453.000	2.00	294943	532274
1688580	1,220.000	2.20	294894	532223
1688621	203.000	1.40	294943	532273
1688644	1,460.000	0.40	294894	532223
1688740	1,230.000	0.25	294876	532236
1688752	2,600.000	1.90	294943	532225
1688772	151.000	2.00	295036	532323
1688801	1,550.000	3.00	294915	532214
1688818	637.000	-	294944	532253
1688831	384.000	0.55	294883	532165
1688837	131.000	1.00	294943	532272
1688853	49.400	1.30	295036	532323
1688861	66.200	0.23	294968	532284
1688874	75.800	2.02	294876	532236
1688884	76.100	1.43	294876	532236
1688891	961.000	1.40	294894	532223
1688910	1,900.000	3.00	294943	532225
1688931	452.000	2.00	294915	532214
1688952	115.000	0.30	294949	532301
1688964	351.000	0.95	294943	532225
1688976	414.000	1.40	294930	532248
1688988	1,070.000	2.00	294930	532248
1689003	6,150.000	2.60	294915	532214
1689196	1,250.000	0.45	294924	532194
1689217	554.000	2.58	294949	532301
1689230	967.000	2.00	294883	532165
1689261	133.000	0.90	294949	532301
1689275	192.000	0.80	294883	532165
1689298	519.000	3.00	294894	532223
1689323	228.000	2.00	294842	532393
1689665	328.000	1.66	294883	532165

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
1689680	74.600	1.00	294842	532393
1689731	760.000	1.00	294894	532223
2286641	41.500	0.30	294270	532600
2287293	19.300	4.50	294270	532600
2287316	46.600	2.00	294270	532600
2287358	28.500	4.50	294820	532425
2287396	30.400	1.00	294270	532600
2287462	68.600	1.00	294175	532250
2287488	48.400	1.00	294820	532425
2287552	24.200	3.50	294270	532600
2287589	47.800	4.30	294270	532549
2287623	83.400	0.40	294528	532668
2287652	57.900	4.20	294729	532483
2287669	27.300	2.00	294270	532549
2287690	51.400	1.20	294214	532376
2287720	51.500	1.70	294528	532668
2287744	64.500	1.00	294729	532483
2287893	383.000	0.20	294729	532483
2287904	48.700	2.20	294729	532483
2287917	18.900	5.00	294528	532668
2287925	66.900	3.60	294528	532668
2287932	36.800	0.40	294270	532549
2287952	24.700	5.00	294270	532549
2287972	26.800	3.30	294270	532549
2288005	17.800	5.00	294214	532376
2288044	12.700	3.20	294729	532483
2288088	19.800	0.40	294214	532376
2288115	14.900	1.00	294270	532549
2288144	6.420	5.00	294729	532483
2288179	54.400	4.50	294175	532250
2288214	4.450	3.00	294820	532425
2288237	13.700	2.00	294820	532425
2293091	51.900	0.30	294595	532572
2293112	BDL	4.00	294671	532458
2293124	BDL	2.00	294614	532525
2293242	BDL	3.90	294595	532572
2293275	3,350.000	1.00	294873	532343
2293305	70.100	4.00	294614	532525
2293329	18.000	4.00	294681	532505
2293351	BDL	5.20	294681	532505

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2293377	BDL	2.40	294824	532381
2293414	9.800	0.40	294681	532505
2293433	BDL	1.00	294681	532505
2293460	21.900	3.00	294681	532505
2293588	7,570.000	2.00	294873	532343
2293615	6.790	3.00	294614	532525
2293630	94.500	1.00	294614	532525
2293657	178.000	0.70	294671	532458
2293690	12.300	0.20	294671	532458
2293715	6.190	0.50	294671	532458
2293730	11.400	0.30	294873	532343
2293749	3,000.000	4.00	294873	532343
2293772	105.000	3.50	294824	532381
2293785	181.000	1.20	294824	532381
2293798	182.000	5.00	294824	532381
2293808	634.000	4.40	294824	532381
2293827	16.500	4.70	294681	532505
2294047	75.900	2.00	294595	532572
2294078	24.700	3.20	294595	532572
2294149	24.100	4.50	294595	532572
2579647	28.500	1.00	294230	532120
2579648	22.000	2.00	294230	532120
2579649	42.100	5.00	294230	532120
2579650	25.400	4.00	294230	532120
2579651	136.000	3.00	294230	532120
2579652	30.400	2.00	293930	531960
2579653	189.000	1.00	293930	531960
2579654	14.900	5.00	293930	531960
2579655	8.340	0.50	293930	531960
2579657	11.000	3.00	293930	531960
2579658	91.400	4.00	293930	531960
2579659	880.000	0.50	294588	531780
2579660	868.000	3.80	294588	531780
2579661	3,250.000	2.00	294588	531780
2579662	1,110.000	3.00	294588	531780
2579663	2,740.000	1.00	294588	531780
2579664	not analyzed for TPH	0.40	294860	532100
2579666	1,930.000	5.00	294860	532100
2579668	744.000	3.00	294860	532100
2579669	989.000	4.00	294860	532100

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2579670	435.000	2.00	294860	532100
2579671	99.400	1.00	294860	532100
2579672	44.100	0.40	294090	532150
2579673	62.800	3.00	294090	532150
2579675	52.800	1.00	294090	532150
2579676	203.000	2.00	294090	532150
2579677	251.000	4.00	294090	532150
2579684	3,090.000	2.00	294670	531890
2579685	3,890.000	3.00	294670	531890
2579686	2,110.000	4.00	294670	531890
2579687	210.000	0.40	294670	531890
2579689	1,600.000	5.00	294670	531890
2579692	2,840.000	1.00	294670	531890
2579693	178.000	0.40	294000	532050
2579694	not analyzed for TPH	2.00	294000	532050
2579695	154.000	5.00	294000	532050
2579696	171.000	3.00	294000	532050
2579697	51.900	4.00	294000	532050
2579698	62.400	1.00	294000	532050
2579700	643.000	5.00	294340	532080
2579702	69.300	2.20	294340	532080
2579703	92.300	1.20	294340	532080
2579704	38.800	0.40	294340	532080
2579705	1,010.000	3.00	294340	532080
2579707	1,200.000	4.00	294340	532080
2579708	92.300	2.50	294340	532080
2579709	394.000	3.20	294760	532000
2579710	1,830.000	2.20	294760	532000
2579711	2,810.000	1.20	294760	532000
2579712	3,050.000	0.30	294760	532000
2579714	413.000	4.20	294760	532000
2579715	369.000	5.00	294760	532000
2579724	not analyzed for TPH	-	294175	532250

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
1867511	410	294872	532268
1867542	107,000	294938	532240
1867776	11,300	294904	532198
1868023	3,640	294863	532191
1899639	322,000	294931	532158
2578862	2,680	294275	532609
2578904	2,300	294678	532452
2579717	1,720,000	294934	532155
2579718	BDL	294612	532528
2579719	131,000	294760	532000
2579722	BDL	294804	532427
2579724	281	294167	532250
2579725	468	294552	532647
2579729	not analyzed for TPH	294938	532244
2579731	not analyzed for TPH	294915	532204
2580864	988,000	294588	531780

Sediment sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Easting	Northing
1688201	360.000	294859	532228

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