

Environmental Assessment of Ogoniland Site Specific Fact Sheets

KPITE / BIARA



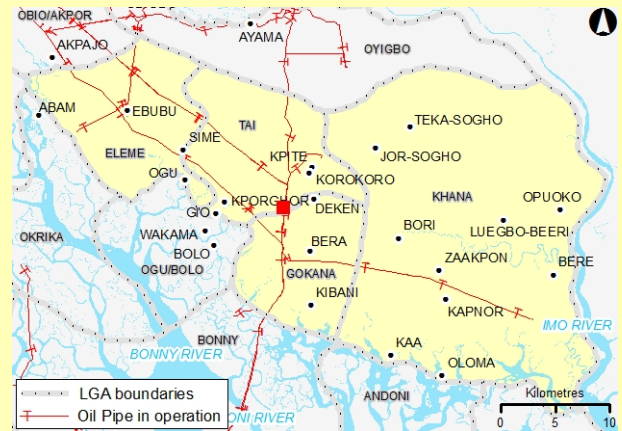
This fact sheet is part of a series prepared as part of the Environmental Assessment of Ogoniland by the United Nations Environment Programme (UNEP). It provides the observations and results from one of the individual sites studied in detail, plus the specific risk reduction measures for follow-up action.

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	KPITE / BIARA
Site Number	qc_009-010
LGA	TAI
Main community	BIARA
Surrounding communities	BIARA KPITE BIARA MUUBORGBARA BIARA
Investigated area (ha)	19.75
Category	SPDC Pipeline ROW
Eastings (WGS 84, Zone 32N)	308981
Northings (WGS 84, Zone 32N)	519708



<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	No
Flowstations	No
Manifolds	No
Flaresites	No
Oil pipeline in operation	24" NKPOKU TO BOMU TRUNKLINE 36" RUMUEKPE TO NKPOKU TRUNKLINE 12" EGBERU M/F TO BOMU TRUNK LINE
NNPC crude line	No
NNPC product line	No

III - Spill History

Spills reported by SPDC	Incident Number 2003_00100 527882	Incident Date 20030606
Spill reported by community	Yes	

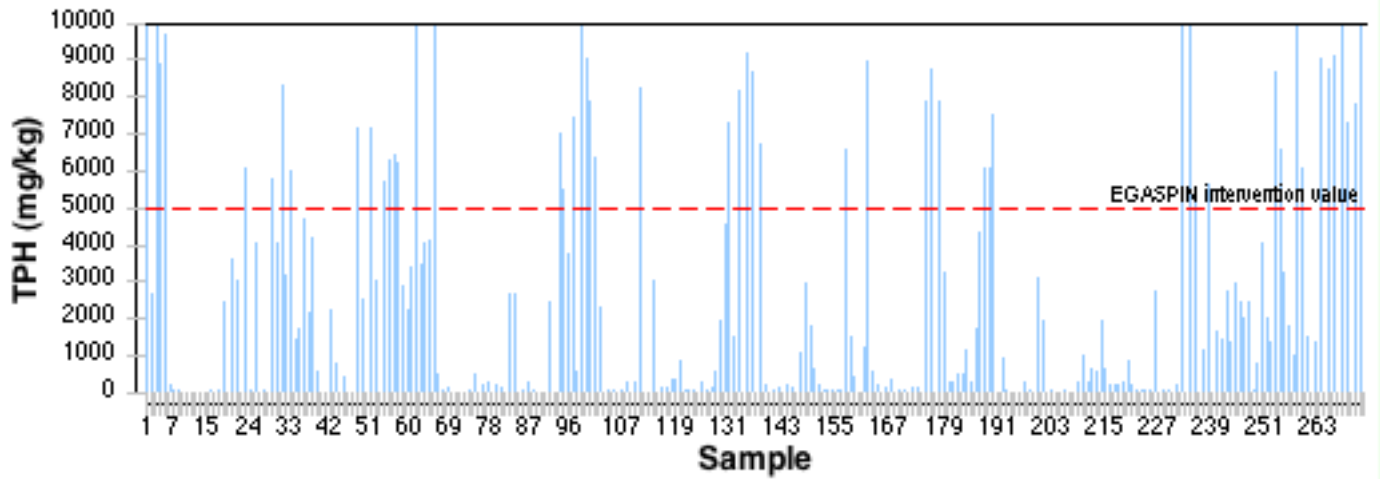
IV - Data Screening

Assessment criteria

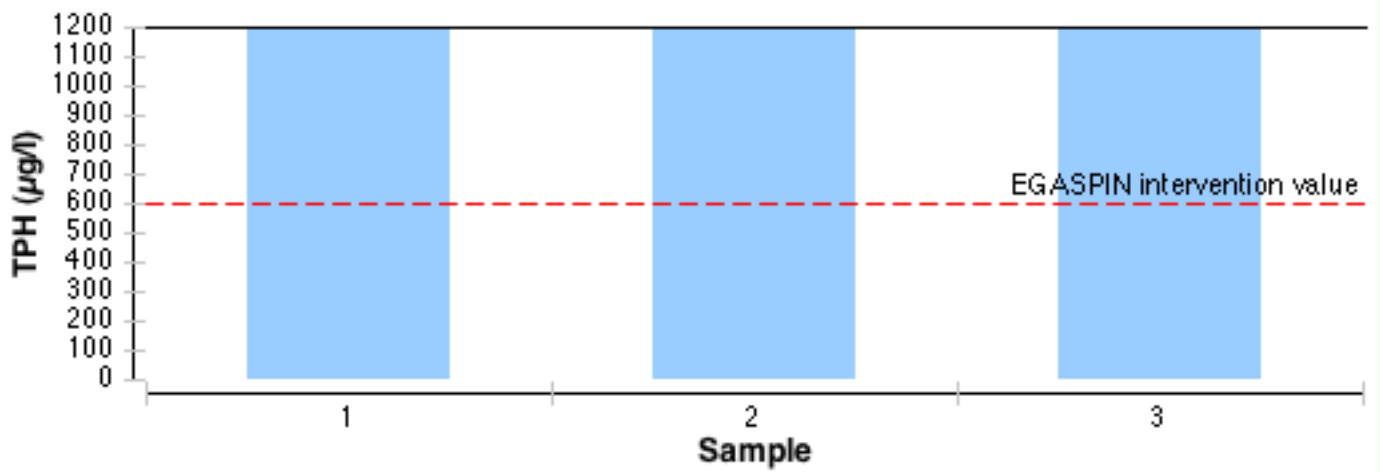
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	272
Deepest investigation (m)	5
Maximum soil TPH (mg/kg)	34,100.000
Number of soil measurements greater than EGASPIN intervention value	63
Deepest sample greater than EGASPIN (m)	5
Number of soil measurements below 1m	222
Number of soil measurements below 1m greater than EGASPIN intervention value	48
Number of ground water samples	4
Maximum groundwater TPH (µg/l)	1,140,000
Number of groundwater measurements greater than EGASPIN intervention value	3
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

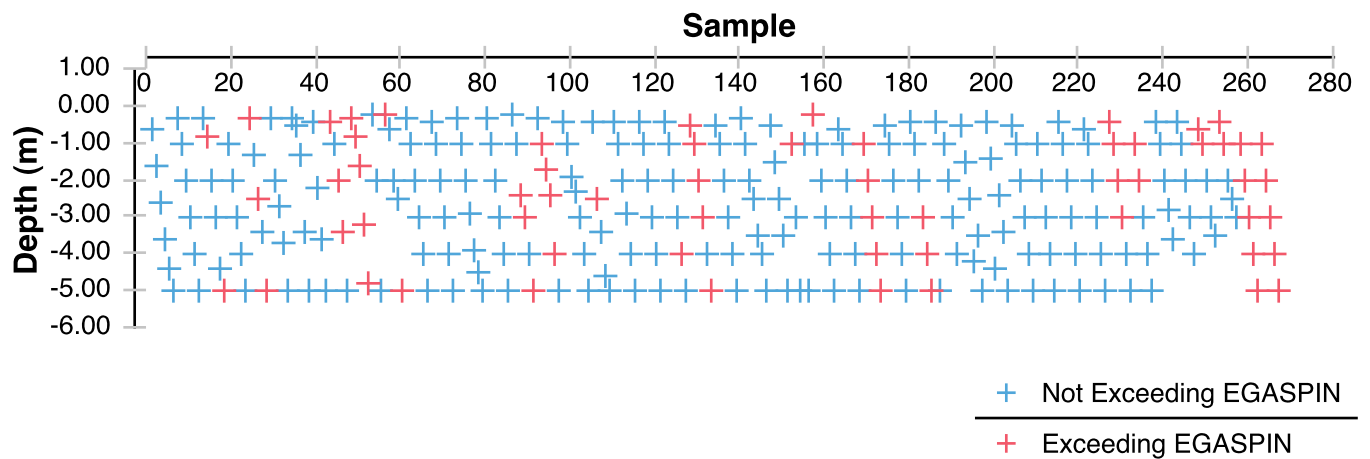
Soil Samples



Groundwater Samples



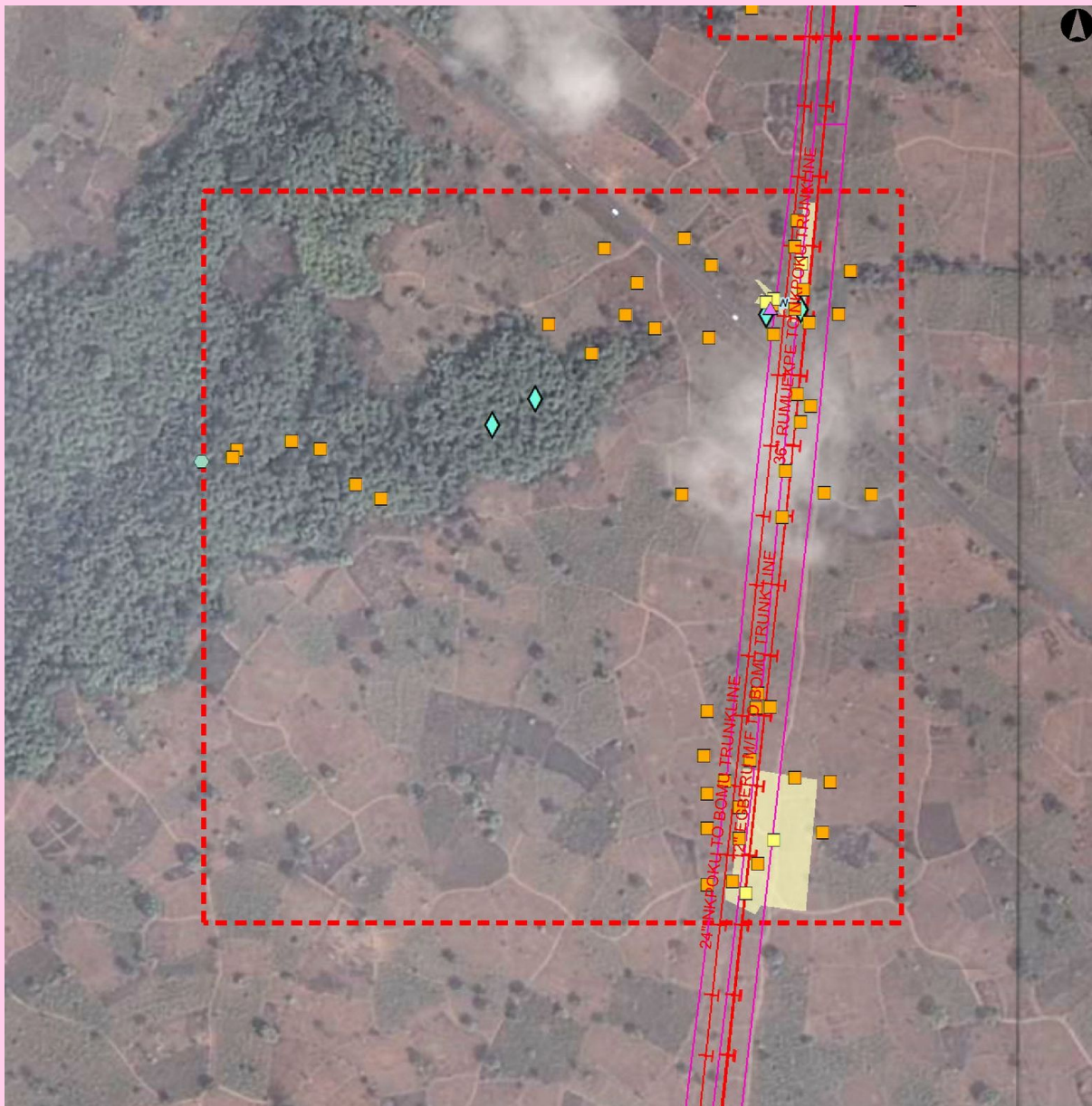
Soil Samples depth



Satellite image of the site



Sampling location map



Oil Facilities

- SPDC Right of way
- w** Wells
- Manifold
- Flow Station
- 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

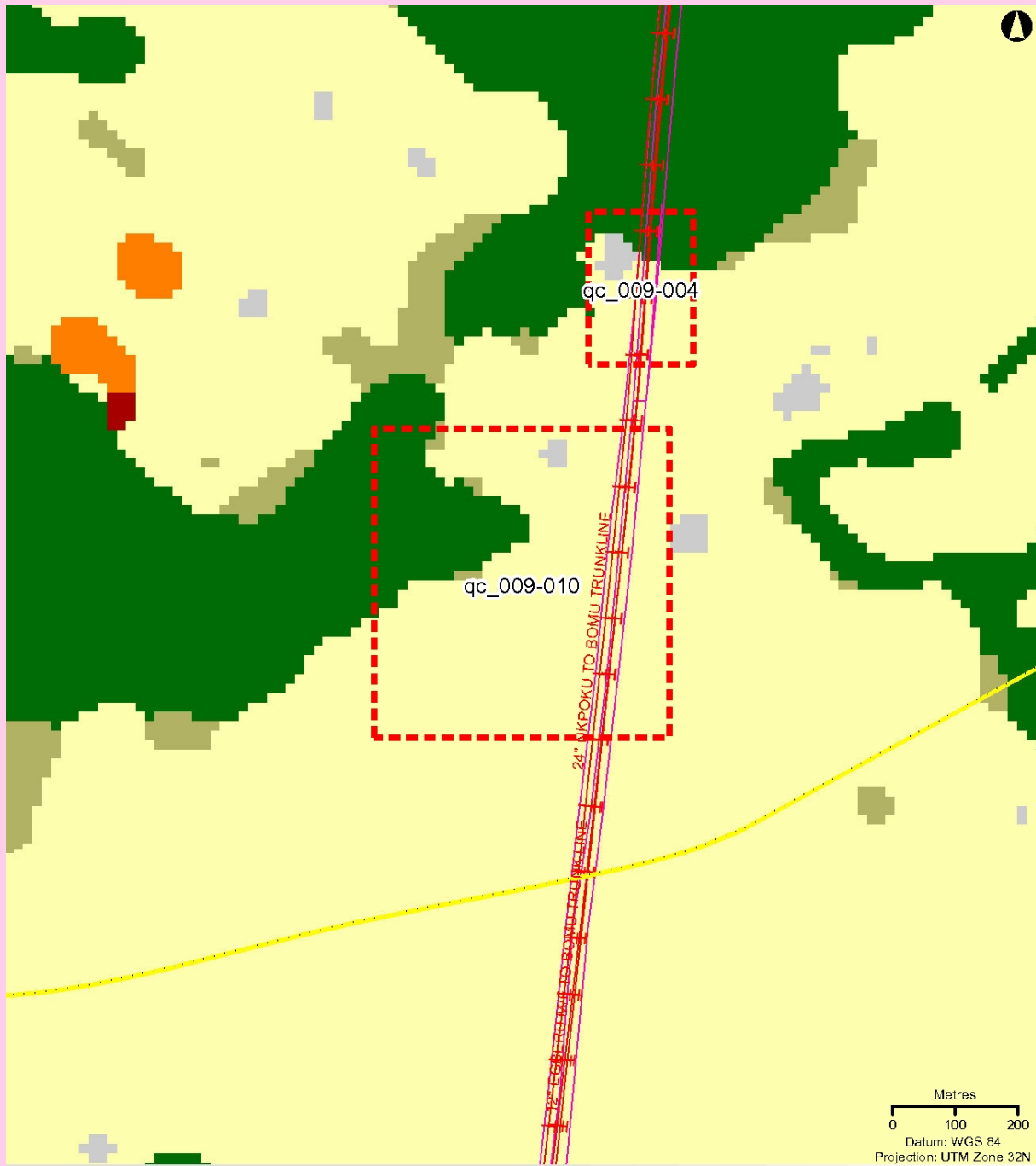
Water samples

- 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 10 20

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

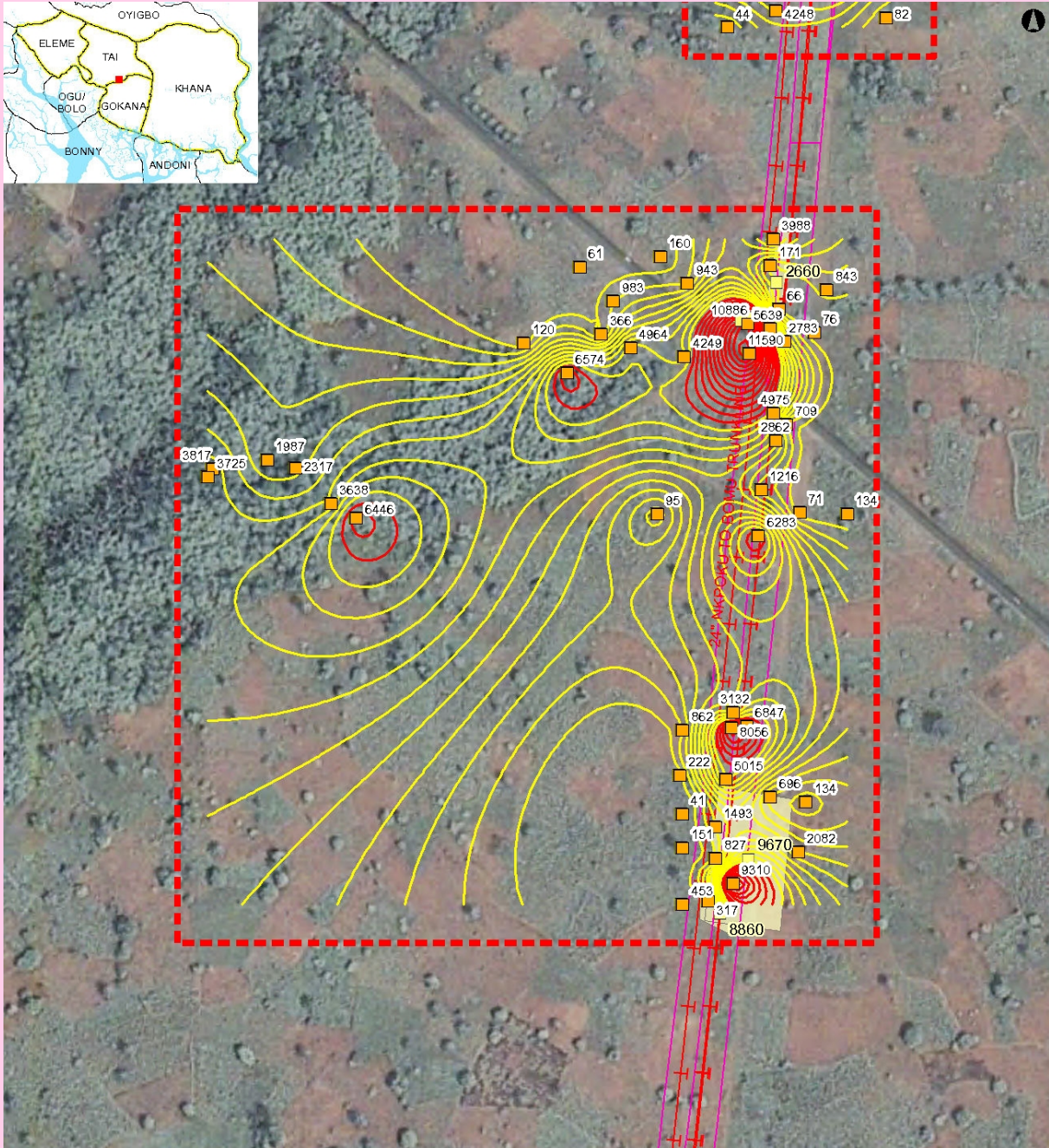
- - - Approximate site investigation area (that area does not correspond to contamination extent).

- 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)
- 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.

Aerial photograph



Ground photograph



VII - Sample List

Soil sample list

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2328104	not analyzed for TPH	3.60	309150	519888
2328381	32.100	3.00	309182	519901
2328445	10.600	3.60	309070	519923
2328711	793.000	5.00	309088	519905
2328780	6.470	0.40	309070	519923
2328893	15.600	1.30	309088	519905
2329203	3,440.000	0.60	309130	519858
2329261	13,100.000	0.20	309130	519858
2329303	244.000	1.00	309138	519766
2329446	254.000	5.00	309155	519810
2329473	35.200	4.00	309174	519872
2329502	82.400	1.00	309174	519872
2329524	8.700	5.00	309174	519872
2329542	17.000	3.00	309174	519872
2329644	49.500	0.40	309155	519810
2329752	2,550.000	1.00	309146	519818
2329774	3,010.000	5.00	309146	519818
2329850	27.300	0.50	309088	519905
2329910	4,150.000	2.50	309130	519858
2330084	2,910.000	0.20	309148	519799
2330115	2,270.000	2.00	309148	519799
2330163	324.000	1.00	309164	519751
2330197	14.300	4.00	309164	519751
2330205	51.900	0.30	309164	519751
2330221	3,390.000	5.00	309148	519799
2330237	39.400	4.00	309182	519901
2330268	4,020.000	2.00	309130	519858
2330301	11.700	2.00	309144	519917
2330489	10.100	5.00	309150	519888
2330504	22.500	0.30	309144	519917
2330519	94.800	3.00	309144	519917
2330547	497.000	2.00	309155	519810
2330560	91.500	1.00	309155	519810
2330676	20.300	5.00	309164	519751
2330753	320.000	0.30	309138	519766
2330803	96.700	2.60	309150	519888
2330837	7,030.000	0.30	309136	519735
2330861	5,710.000	0.80	309136	519735
2330881	6,410.000	3.20	309136	519735
2330913	300.000	2.90	309138	519766

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2330942	2,300.000	5.00	309138	519766
2330971	57.500	2.00	309164	519751
2330991	18.800	3.00	309164	519751
2331014	7,120.000	0.40	309146	519818
2331038	7,180.000	3.40	309146	519818
2331067	1,760.000	2.00	309154	519866
2331092	4,680.000	2.70	309154	519866
2331188	2,180.000	3.70	309154	519866
2331234	4,200.000	5.00	309154	519866
2331268	460.000	1.00	309144	519917
2331285	96.600	5.00	309144	519917
2331314	115.000	2.00	309138	519766
2331329	2,680.000	4.50	309138	519766
2331342	2,670.000	3.90	309138	519766
2331361	87.300	1.00	309182	519901
2331374	24.500	5.00	309182	519901
2331390	5,800.000	0.30	309144	519875
2331509	8,330.000	2.50	309144	519875
2331530	3,150.000	3.40	309144	519875
2331551	5,990.000	5.00	309144	519875
2331613	221.000	0.60	309150	519888
2331636	66.100	4.40	309150	519888
2331704	42.200	1.60	309150	519888
2331735	470.000	0.30	309174	519872
2331747	120.000	2.00	309174	519872
2331824	3,590.000	2.00	309146	519935
2331863	6,060.000	5.00	309146	519935
2331877	4,040.000	1.30	309144	519875
2332103	13,700.000	-	309130	519882
2332325	2,660.000	-	309149	519906
2332437	2,510.000	3.00	309155	519810
2332483	6,180.000	4.80	309136	519735
2332517	3,680.000	4.40	309146	519935
2332616	417.000	2.20	309070	519923
2332643	6,070.000	2.00	309146	519818
2332658	3,010.000	3.00	309146	519935
2332716	6,310.000	1.60	309136	519735
2332740	34,100.000	-	309125	519880
2332757	4,030.000	2.00	309182	519901
2332781	1,440.000	0.30	309154	519866

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2332801	542.000	0.30	309088	519905
2332989	2,230.000	3.40	309088	519905
2333336	2,420.000	0.30	309146	519935
2333361	209.000	4.00	309155	519810
2333391	323.000	4.00	309144	519917
2333423	5,720.000	0.80	309146	519935
2333455	BDL	5.00	309070	519923
2333485	18,500.000	5.00	309130	519858
2350687	55.300	1.00	308978	519865
2350701	39.600	2.30	308978	519865
2350717	53.000	3.00	308978	519865
2350766	60.300	2.00	309068	519750
2350785	76.400	1.00	309068	519750
2350828	52.900	5.00	309068	519750
2350872	45.800	0.40	309068	519750
2350914	1,050.000	2.00	309038	519893
2350971	57.600	1.00	309038	519893
2351006	196.000	5.00	309038	519893
2351116	8,190.000	0.50	309128	519607
2351132	8,180.000	1.00	309128	519607
2351150	8,690.000	3.00	309128	519607
2351182	1,470.000	4.00	309128	519607
2351245	9,180.000	2.00	309128	519607
2351297	2,460.000	0.20	309050	519862
2351340	7,020.000	2.40	309050	519862
2351361	5,520.000	3.00	309050	519862
2351385	7,430.000	5.00	309050	519862
2351419	133.000	0.40	309119	519616
2351458	546.000	1.00	309119	519616
2351476	1,940.000	2.00	309119	519616
2351507	4,540.000	3.00	309119	519616
2351541	7,280.000	4.00	309119	519616
2351564	1,520.000	5.00	309119	519616
2351603	6,710.000	5.00	309128	519607
2351631	237.000	0.50	309196	519750
2351659	67.500	1.00	309196	519750
2351680	135.000	3.00	309196	519750
2351737	89.400	4.00	309196	519750
2351793	229.000	5.00	309196	519750
2351833	297.000	0.40	309086	519856

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2351867	8,230.000	2.50	309086	519856
2352045	2,920.000	3.40	309086	519856
2352110	8,990.000	1.70	309007	519845
2352134	6,380.000	4.00	309007	519845
2352153	2,950.000	2.50	309038	519893
2352172	670.000	4.00	309038	519893
2352221	126.000	1.00	309030	519871
2352239	122.000	2.00	309030	519871
2352257	345.000	2.90	309030	519871
2352278	313.000	4.00	308978	519865
2352317	84.500	5.00	308978	519865
2352367	72.500	0.50	309016	519916
2352395	54.100	3.50	309016	519916
2352657	58.600	1.50	309016	519916
2352726	3,760.000	4.00	309050	519862
2352776	170.000	0.30	309038	519893
2352988	51.300	1.90	308978	519865
2353025	547.000	0.30	309007	519845
2353053	2,280.000	5.00	309007	519845
2353114	899.000	5.00	309030	519871
2353159	39.900	0.40	309030	519871
2353187	372.000	4.00	309030	519871
2353216	102.000	2.50	309016	519916
2353250	37.300	5.00	309016	519916
2353293	7,890.000	2.40	309007	519845
2353322	12,000.000	1.00	309007	519845
2353404	3,040.000	5.00	309086	519856
2353433	66.000	2.00	309196	519750
2353491	300.000	4.00	309068	519750
2353510	1,770.000	3.50	309038	519893
2353576	175.000	0.40	308978	519865
2353791	not analyzed for TPH	1.00	309050	519862
2353814	not analyzed for TPH	4.60	309086	519856
2353894	not analyzed for TPH	3.00	309068	519750
2389798	6,550.000	1.00	309163	519522
2389799	1,520.000	3.00	309163	519522
2389801	410.000	5.00	309163	519522
2389808	373.000	5.00	309144	519559
2389809	8,980.000	0.20	309144	519559
2389810	613.000	1.00	309144	519559

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2389811	449.000	3.00	309144	519559
2389812	242.000	2.00	309144	519559
2389813	129.000	4.00	309144	519559
2389814	127.000	3.00	309168	519556
2389815	66.500	2.00	309168	519556
2389816	174.000	4.00	309168	519556
2389817	116.000	5.00	309168	519556
2389818	62.800	1.00	309168	519556
2389819	269.000	0.60	309168	519556
2389820	7,860.000	2.00	309118	519606
2389821	7,230.000	4.00	309118	519606
2389822	8,610.000	1.00	309118	519606
2389823	8,740.000	3.00	309118	519606
2389824	7,840.000	5.00	309118	519606
2389825	529.000	3.00	309085	519604
2389826	317.000	2.00	309085	519604
2389827	539.000	4.00	309085	519604
2389828	1,150.000	5.00	309085	519604
2389829	281.000	1.00	309085	519604
2389830	6,040.000	3.00	309114	519571
2389831	7,490.000	5.00	309114	519571
2389832	1,720.000	1.00	309114	519571
2389833	6,050.000	4.00	309114	519571
2389834	260.000	0.40	309114	519571
2389835	4,360.000	2.00	309114	519571
2389836	28.300	0.40	309083	519574
2389837	37.200	1.00	309083	519574
2389838	917.000	5.00	309083	519574
2389839	19.700	2.00	309083	519574
2389840	26.700	3.00	309083	519574
2389841	114.000	4.00	309083	519574
2389842	377.000	2.50	309107	519539
2389843	263.000	0.50	309107	519539
2389844	3,070.000	4.20	309107	519539
2389846	64.600	1.50	309107	519539
2389847	3,490.000	5.00	309107	519539
2389848	1,950.000	3.50	309107	519539
2389849	44.400	4.40	309085	519548
2389850	18.700	5.00	309085	519548
2389851	19.100	3.40	309085	519548

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2389852	71.000	2.40	309085	519548
2389853	23.400	1.40	309085	519548
2389854	91.300	0.40	309085	519548
2389855	8,860.000	-	309111	519481
2389856	9,670.000	-	309130	519517
2389862	3,270.000	0.50	309085	519604
2390275	8.640	1.00	309097	519557
2390278	1,250.000	5.00	309097	519557
2392072	8,650.000	0.60	308768	519780
2392087	6,560.000	1.00	308768	519780
2392104	3,240.000	2.00	308768	519780
2392118	1,810.000	3.00	308768	519780
2392135	991.000	3.50	308768	519780
2392151	104.000	0.40	308805	519786
2392164	828.000	1.00	308805	519786
2392181	4,010.000	2.00	308805	519786
2392192	2,010.000	3.00	308805	519786
2392209	1,390.000	4.00	308805	519786
2392230	11,700.000	0.40	308865	519747
2392238	13,500.000	1.00	308865	519747
2392254	10,700.000	2.00	308865	519747
2392269	5,230.000	3.00	308865	519747
2392286	2,360.000	4.00	308865	519747
2392297	1,160.000	5.00	308865	519747
2392323	2,720.000	0.60	309085	519487
2392342	70.100	1.00	309085	519487
2392353	59.000	2.00	309085	519487
2392386	56.100	3.00	309085	519487
2392419	296.000	4.00	309085	519487
2392457	193.000	5.00	309085	519487
2392480	661.000	1.00	309102	519489
2392500	190.000	2.00	309102	519489
2392515	227.000	3.00	309102	519489
2392529	200.000	4.00	309102	519489
2392538	306.000	5.00	309102	519489
2392818	854.000	0.40	309085	519525
2392833	221.000	1.00	309085	519525
2392865	90.600	2.00	309085	519525
2392881	54.100	3.00	309085	519525
2392899	61.500	4.00	309085	519525

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2392914	75.800	5.00	309085	519525
2392952	296.000	0.50	309107	519518
2392967	1,010.000	1.00	309107	519518
2392980	304.000	2.00	309107	519518
2392991	674.000	3.00	309107	519518
2393005	582.000	4.00	309107	519518
2393015	1,920.000	5.00	309107	519518
2393039	10,800.000	0.40	308765	519775
2393060	6,090.000	1.00	308765	519775
2393082	1,510.000	2.00	308765	519775
2393094	2,040.000	2.50	308765	519775
2393105	1,340.000	3.00	308765	519775
2393195	5,630.000	1.00	308848	519757
2393224	6,780.000	2.00	308848	519757
2393292	1,640.000	3.00	308848	519757
2393311	1,430.000	4.00	308848	519757
2393323	2,710.000	5.00	308848	519757
2393345	1,350.000	0.40	308824	519781
2393357	2,950.000	1.00	308824	519781
2393364	2,480.000	2.00	308824	519781
2393379	2,000.000	2.80	308824	519781
2393422	2,440.000	3.60	308824	519781
2622207	21,500.000	1.00	309129	519878
2622209	7,320.000	2.00	309129	519878
2622210	7,290.000	3.00	309129	519878
2622211	7,820.000	4.00	309129	519878
2622213	10,500.000	5.00	309129	519878
2622228	9,010.000	1.00	309119	519501
2622229	9,960.000	2.00	309119	519501
2622230	8,770.000	3.00	309119	519501
2622231	9,100.000	4.00	309119	519501
2622233	9,710.000	5.00	309119	519501

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon ($\mu\text{g/l}$)	Easting	Northing
2715958	1,140,000	308940	519797
2715962	566,000	308969	519815
2715971	not analyzed for TPH	309125	519872
2715974	74,600	309148	519875

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