

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_008-010
LGA	TAI
Main community	KOROKORO
Surrounding communities	AABUE KOROKORO KOROKORO
Investigated area (ha)	1.58
Category	SPDC Operating Site
Eastings (WGS 84, Zone 32N)	312327
Northings (WGS 84, Zone 32N)	524214



<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. - 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-008 (closed in)
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	No
Spill reported by community	Yes

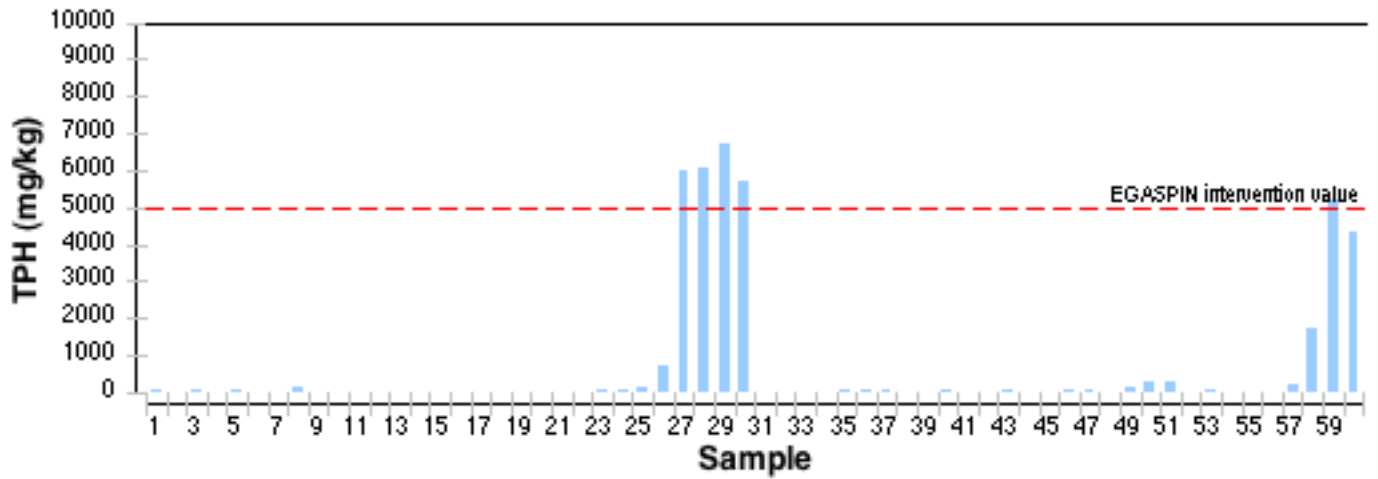
IV - Data Screening

Assessment criteria

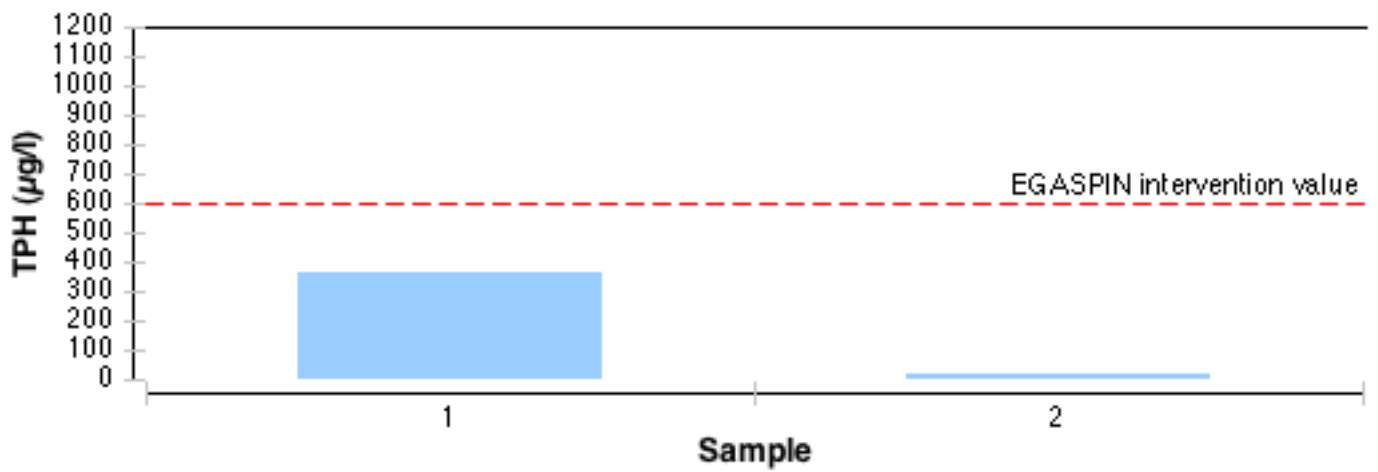
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	60
Deepest investigation (m)	5
Maximum soil TPH (mg/kg)	6,700.000
Number of soil measurements greater than EGASPIN intervention value	5
Deepest sample greater than EGASPIN (m)	5
Number of soil measurements below 1m	52
Number of soil measurements below 1m greater than EGASPIN intervention value	5
Number of ground water samples	3
Maximum groundwater TPH (µg/l)	360
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

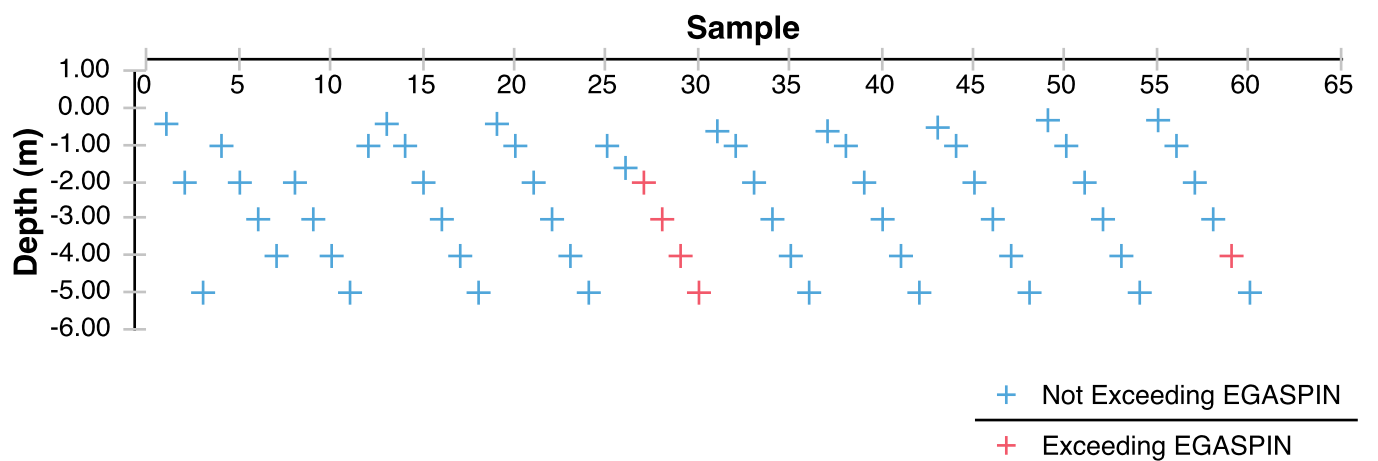
Soil Samples



Groundwater Samples




Soil Samples depth



Satellite image of the site

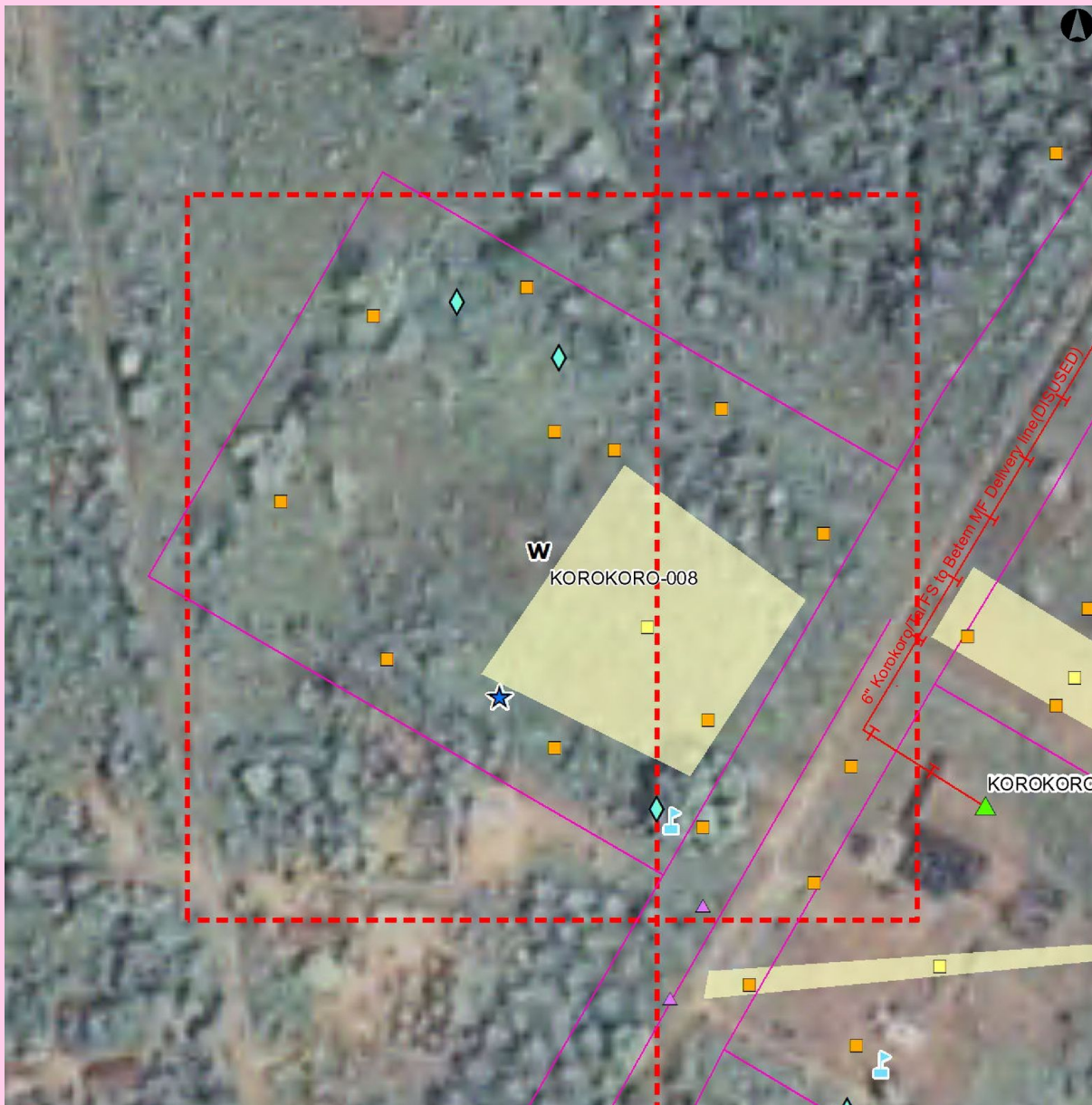


Metres
0 20
Projection: WGS 84
UTM Zone 32N

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

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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

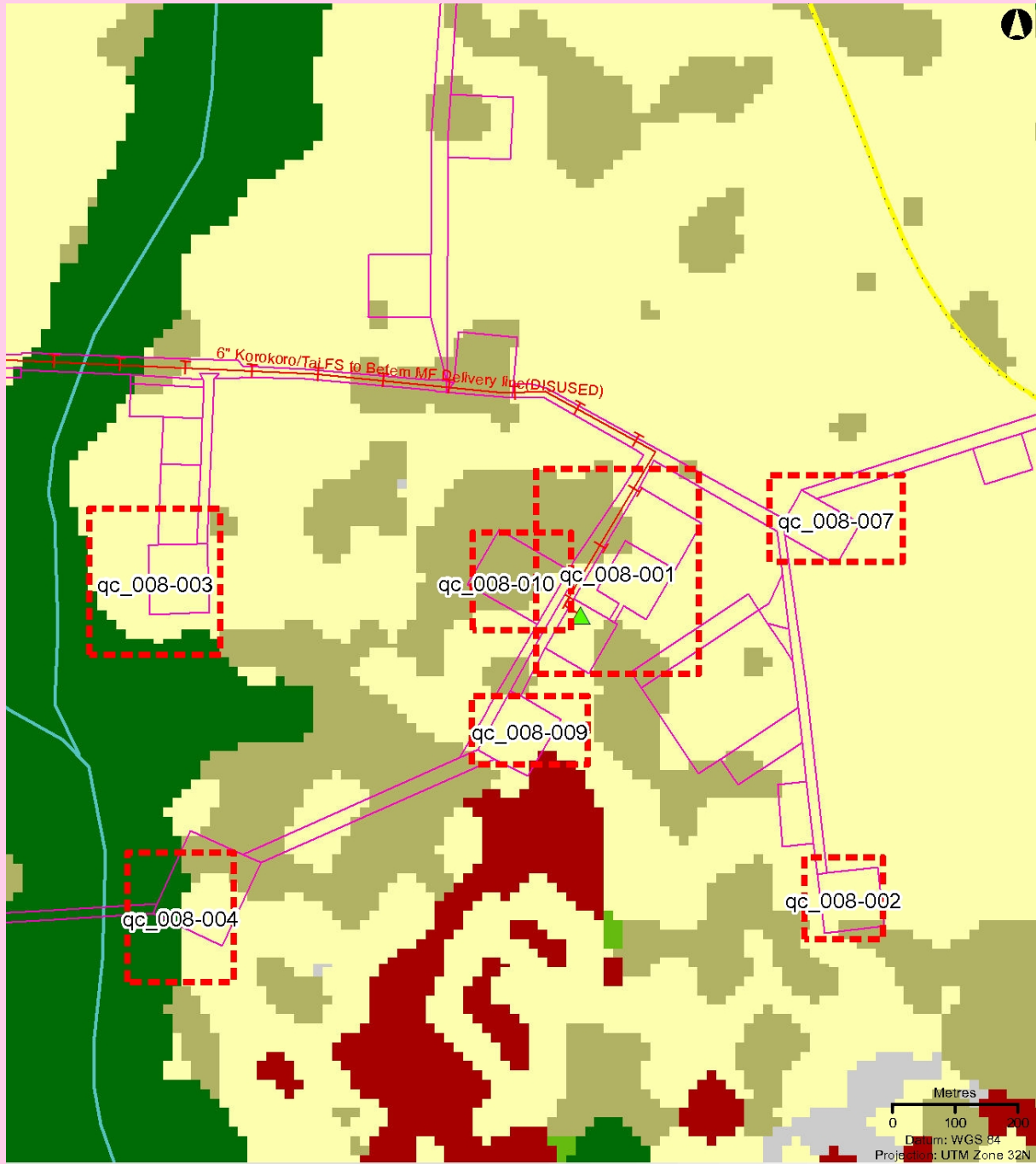
Water samples

- ▲ Rainwater samples (Community)
- ★ Bore-well (community)
- ★ Hand-dug well (community)
- Free-Phase samples
- ◆ Groundwater sample
- 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

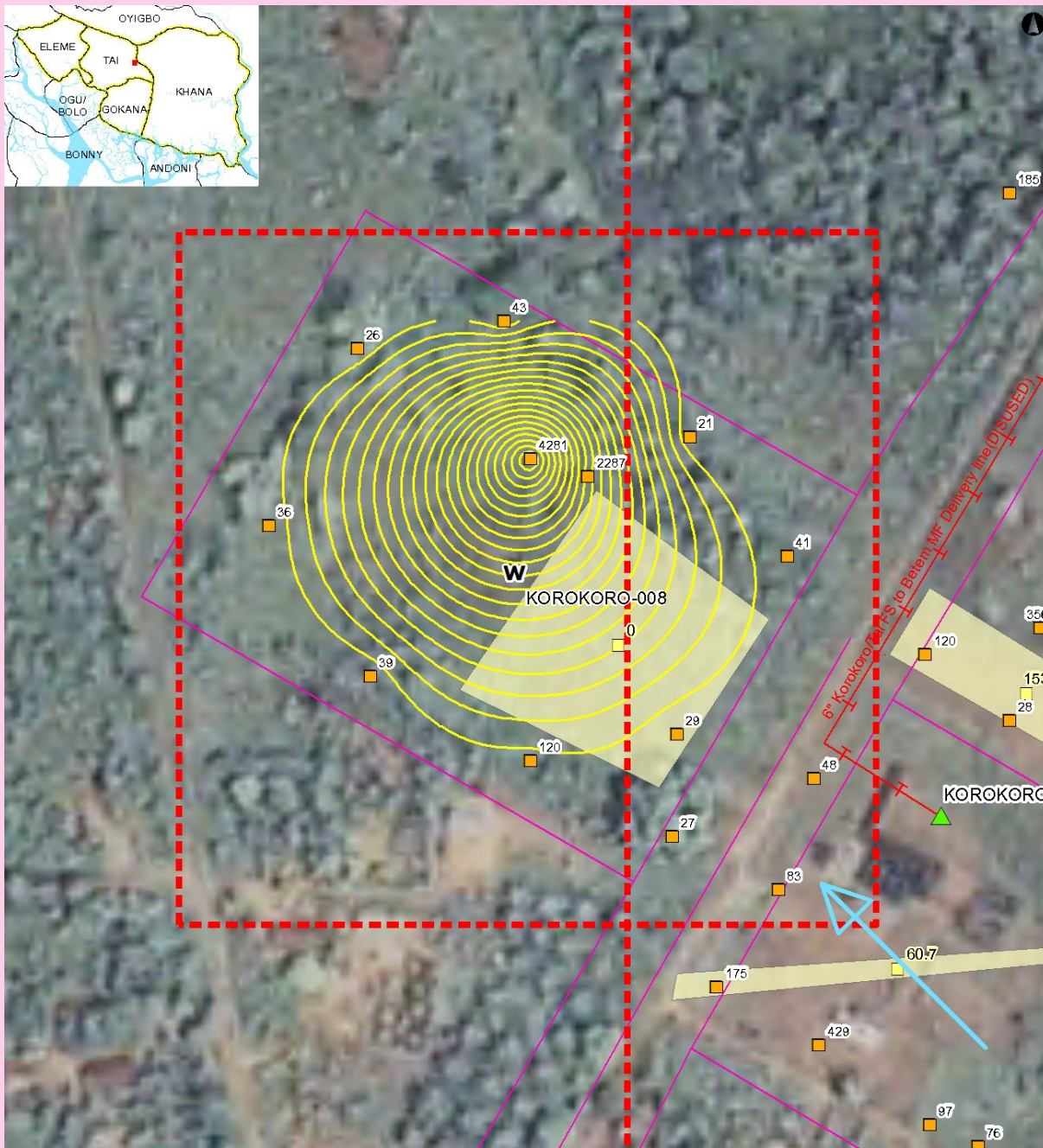
Approximate site investigation area (that area does not correspond to contamination extent).

- 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

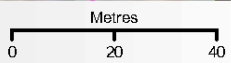
- SPDC Right of way (ROW)
- w** Wells
- Manifold
- ▲ FlowStation
- Pipeline
 - NNPC Crude
 - NNPC Refined product
 - SPDC Oil Pipe in operation

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
1957315	16.400	2.00	312359	524156
1957359	70.700	0.40	312359	524156
2421113	34.900	0.40	312363	524246
2421116	23.100	3.00	312363	524246
2421119	24.300	2.00	312363	524246
2421124	13.600	4.00	312363	524246
2421129	22.900	1.00	312363	524246
2421134	15.400	5.00	312363	524246
2421194	29.000	2.00	312288	524266
2421196	17.700	4.00	312288	524266
2421198	21.400	5.00	312288	524266
2421201	36.600	3.00	312288	524266
2421205	12.100	1.00	312288	524266
2421542	37.300	0.60	312288	524266
2421655	27.800	5.00	312385	524219
2421665	128.000	2.00	312385	524219
2421671	14.900	1.00	312385	524219
2421676	16.100	3.00	312385	524219
2421682	20.400	4.00	312385	524219
2421715	19.200	3.00	312360	524179
2421739	30.300	1.00	312360	524179
2421750	37.300	2.00	312360	524179
2421766	18.900	4.00	312360	524179
2421778	38.500	5.00	312360	524179
2421845	32.500	5.00	312327	524173
2421851	272.000	1.00	312327	524173
2421857	51.000	4.00	312327	524173
2421875	122.000	0.30	312327	524173
2421890	260.000	2.00	312327	524173
2421911	28.800	3.00	312327	524173
2422004	20.700	2.00	312268	524226
2422009	20.500	3.00	312268	524226
2422016	18.700	1.00	312268	524226
2422024	45.600	5.00	312268	524226
2422033	26.300	0.60	312268	524226
2422047	69.000	4.00	312268	524226
2422141	688.000	1.60	312327	524241
2422152	6,040.000	3.00	312327	524241
2422163	5,730.000	5.00	312327	524241
2422177	6,000.000	2.00	312327	524241

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2422190	6,700.000	4.00	312327	524241
2422195	121.000	1.00	312327	524241
2422269	107.000	5.00	312321	524272
2422272	23.000	1.00	312321	524272
2422277	21.600	0.40	312321	524272
2422280	24.600	3.00	312321	524272
2422286	19.400	2.00	312321	524272
2422291	42.800	4.00	312321	524272
2422611	19.800	1.00	312340	524237
2422613	1,700.000	3.00	312340	524237
2422615	33.500	0.30	312340	524237
2422619	203.000	2.00	312340	524237
2422621	4,320.000	5.00	312340	524237
2422624	5,190.000	4.00	312340	524237
2422641	47.300	3.00	312291	524192
2422643	32.100	2.00	312291	524192
2422648	27.900	5.00	312291	524192
2422652	42.800	0.50	312291	524192
2422656	33.400	1.00	312291	524192
2422855	49.700	4.00	312291	524192

Groundwater sample list

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
1853699	360	312349	524160
2701765	not analyzed for TPH	312328	524257
2701767	16	312306	524269

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