

## ***Environmental Assessment of Ogoniland Site Specific Fact Sheets***

### **KOROKORO**



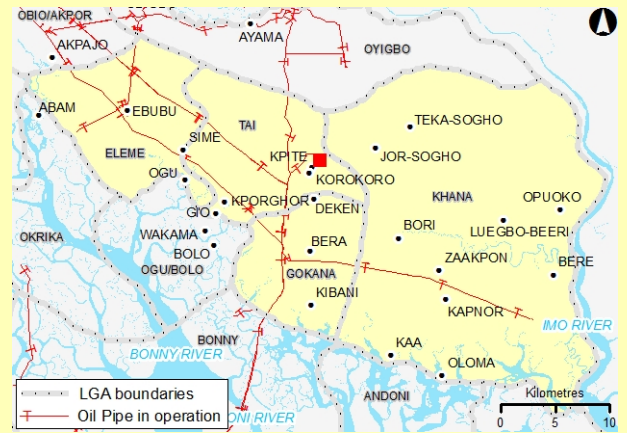
*This fact sheet is part of a series prepared as part of the Environmental Assessment of Ogoniland by the United Nations Environment Programme (UNEP). It provides the observations and results from one of the individual sites studied in detail, plus the specific risk reduction measures for follow-up action.*

*This fact sheet should be read in conjunction with the main assessment report available at: [www.unep.org/nigeria](http://www.unep.org/nigeria).*

July 2011

**I - Site Description**

Site Name	KOROKORO
Site Number	qc_008-009
LGA	TAI
Main community	KOROKORO
Surrounding communities	AABUE KOROKORO KOROKORO
Investigated area (ha)	1.89
Category	SPDC Operating Site
Eastings (WGS 84, Zone 32N)	312339
Northings (WGS 84, Zone 32N)	523976



<p>Recommendations for risk reduction</p>	<ul style="list-style-type: none"> <li>- Communities should be informed in community meetings about health and safety precautions.</li> <li>- The site should be remodelled to prevent run off from the contaminated area into the downstream swamps.</li> <li>- Additional soil sampling along with trial pits should be done at the contaminated site to delineate the site to be excavated for clean up.</li> <li>- 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.</li> <li>- A detailed plan should be prepared for clean up of the contaminated water and risk reduction in the community.</li> <li>- 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.</li> </ul>
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## II - Oilfield Infrastructure Type

Wells	KOROKORO-004 (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	No
Spill reported by community	Yes

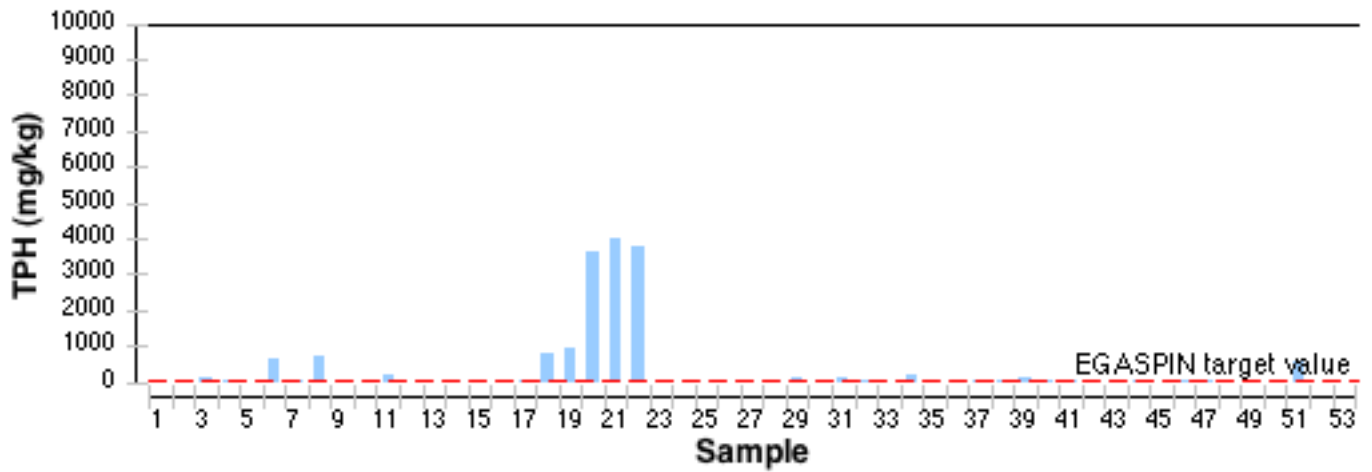
## IV - Data Screening

### **Assessment criteria**

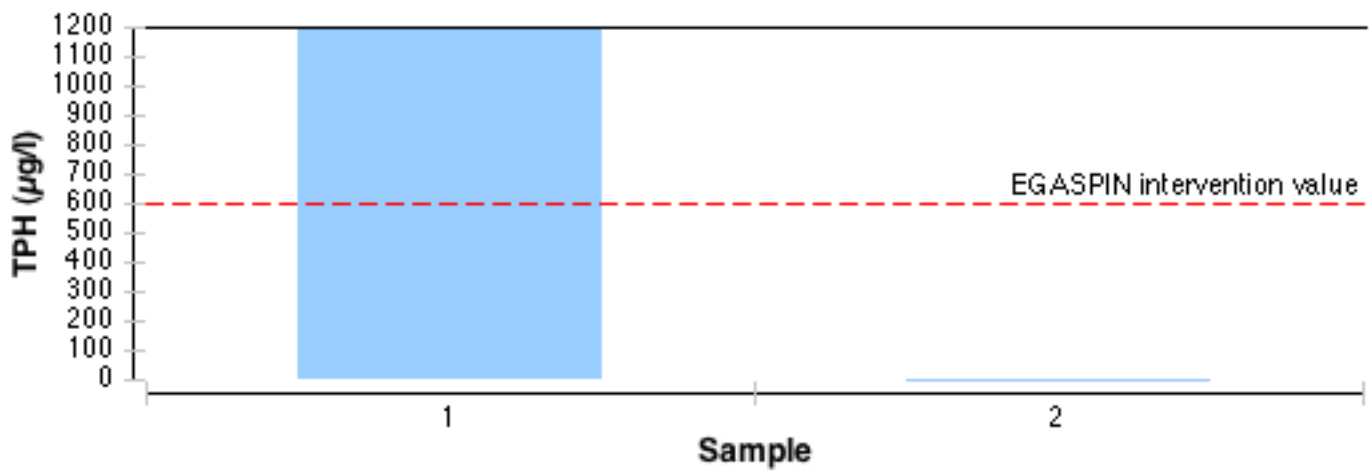
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	53
Deepest investigation (m)	5
Maximum soil TPH (mg/kg)	4,030.000
Number of soil measurements greater than EGASPIN intervention value	0
Deepest sample greater than EGASPIN (m)	0
Number of soil measurements below 1m	49
Number of soil measurements below 1m greater than EGASPIN intervention value	0
Number of ground water samples	2
Maximum groundwater TPH (µg/l)	1,180,000
Number of groundwater measurements greater than EGASPIN intervention value	1
Number of community well samples	5
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

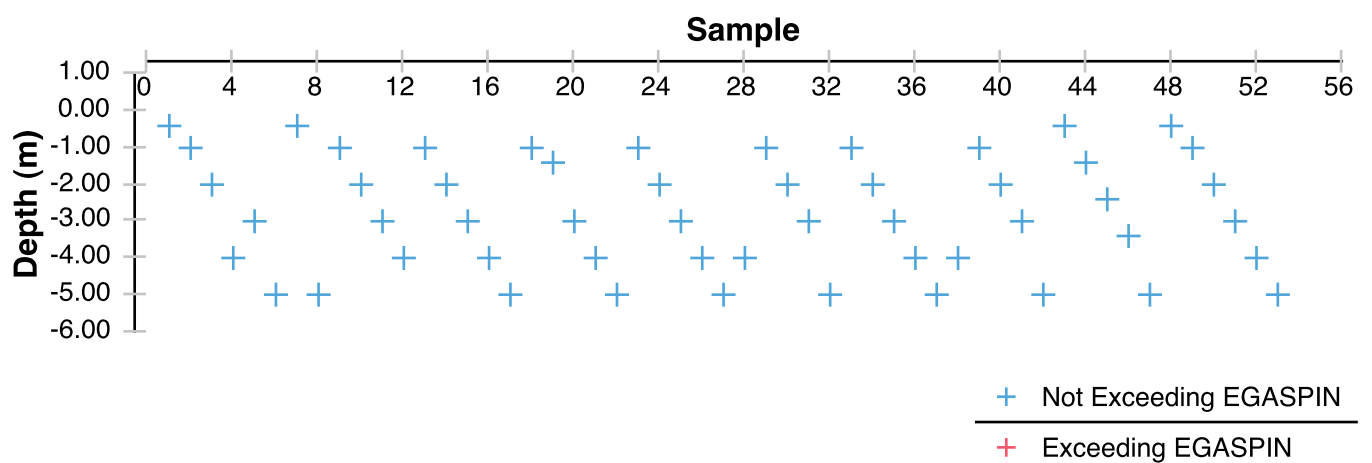
### Soil Samples



### 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

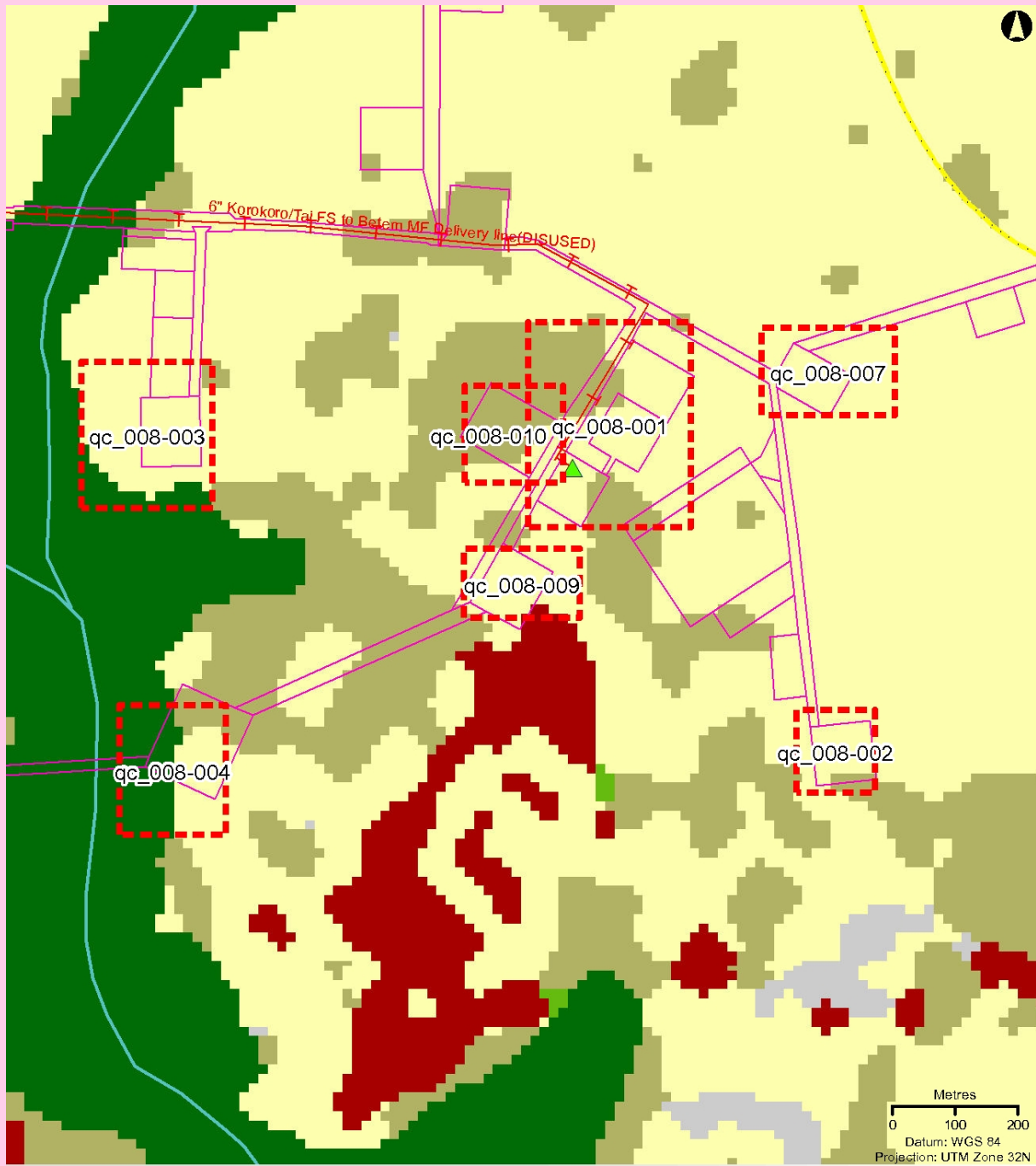
**Water samples**

- ▲ 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  
 UNEP 2011





**Oil Facilities**

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

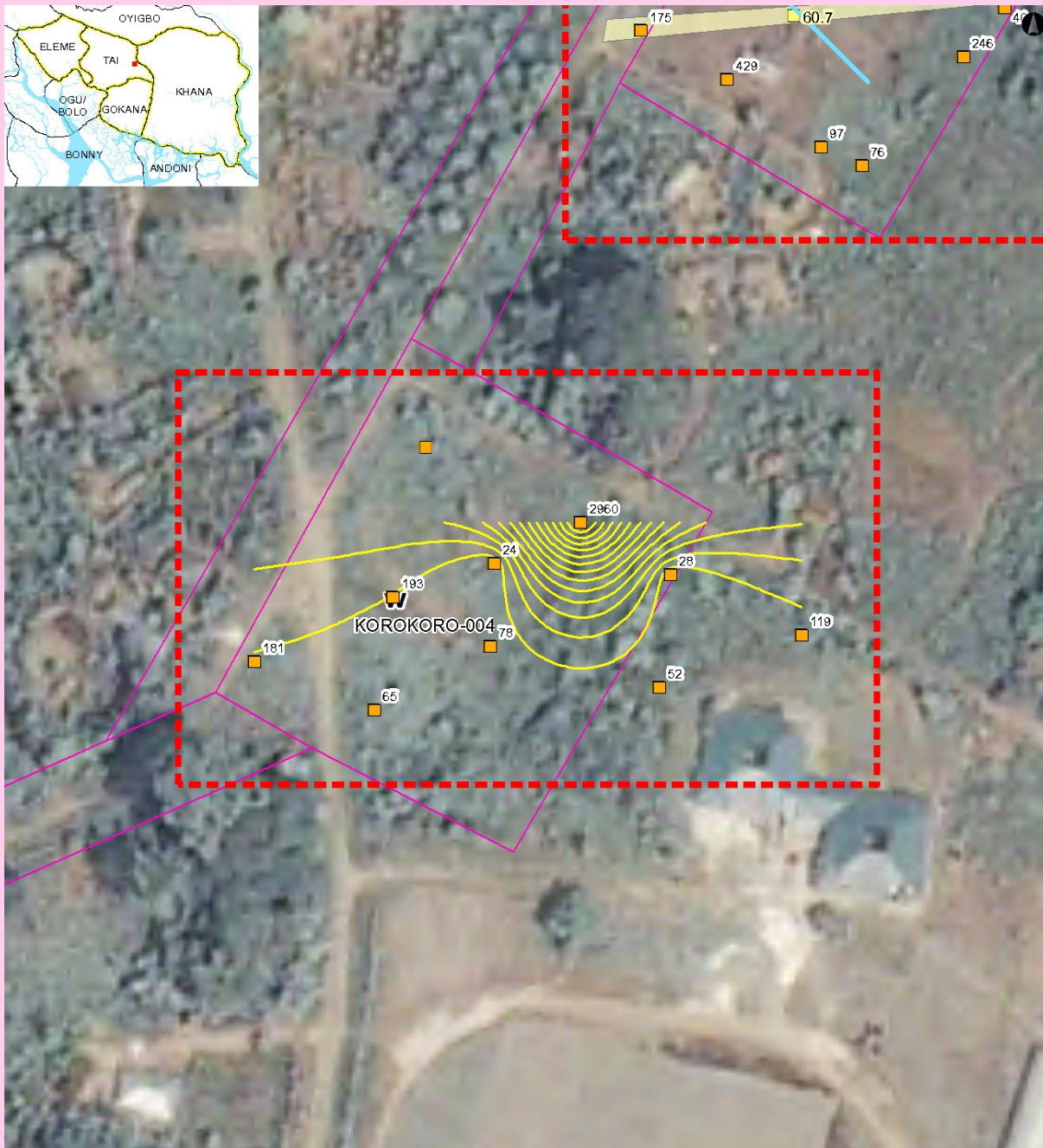
Approximate site investigation area (that area does not correspond to contamination extent).

- 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

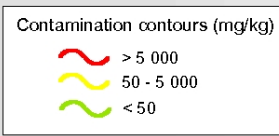
Source:  
land cover 2007  
from Aster imagery

UNEP 2011

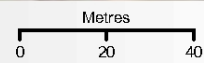
# Soil Contamination Map



- 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



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.



***Ground photograph***



VII - Sample List

**Soil sample list**

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2417856	816.000	1.00	312353	523991
2417898	935.000	1.40	312353	523991
2417920	3,630.000	3.00	312353	523991
2417937	4,030.000	4.00	312353	523991
2417963	3,770.000	5.00	312353	523991
2418009	124.000	1.00	312298	523941
2418055	31.600	2.00	312298	523941
2418086	37.000	3.00	312298	523941
2418114	79.800	4.00	312298	523941
2418132	53.700	5.00	312298	523941
2418150	162.000	1.00	312329	523958
2418165	52.000	2.00	312329	523958
2418180	109.000	3.00	312329	523958
2418209	41.100	4.00	312329	523958
2418219	25.900	5.00	312329	523958
2418235	6.250	1.00	312374	523947
2418243	179.000	2.00	312374	523947
2418250	4.830	3.00	312374	523947
2418265	44.800	4.00	312374	523947
2418278	25.800	5.00	312374	523947
2418294	40.200	0.40	312377	523977
2418309	25.000	1.40	312377	523977
2418322	2.630	2.40	312377	523977
2418338	41.200	3.40	312377	523977
2418357	35.500	5.00	312377	523977
2418373	21.700	0.40	312303	523971
2418385	19.100	1.00	312303	523971
2418396	10.500	2.00	312303	523971
2418408	202.000	3.00	312303	523971
2418423	10.600	4.00	312303	523971
2418434	722.000	5.00	312303	523971
2418450	26.400	0.40	312266	523954
2418487	70.600	1.00	312266	523954
2418498	121.000	2.00	312266	523954
2418510	8.260	3.00	312266	523954
2418534	42.000	4.00	312266	523954
2418552	679.000	5.00	312266	523954
2418828	5.430	0.40	312412	523961
2418854	21.700	1.00	312412	523961
2418866	5.360	2.00	312412	523961

Sample Identifier	Total petroleum hydrocarbon (mg/kg)	Depth (m)	Easting	Northing
2418885	576.000	3.00	312412	523961
2418904	BDL	4.00	312412	523961
2418914	BDL	5.00	312412	523961
2420546	65.200	5.00	312330	523980
2420547	18.800	3.00	312330	523980
2420548	7.500	4.00	312330	523980
2420549	8.740	1.00	312330	523980
2420550	21.200	2.00	312330	523980
2420551	not analyzed for TPH	2.00	312312	524011
2420697	not analyzed for TPH	5.00	312312	524011
2420706	not analyzed for TPH	3.00	312312	524011
2420711	not analyzed for TPH	4.00	312312	524011
2420716	not analyzed for TPH	1.00	312312	524011

***Groundwater sample list***

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
2698047	BDL	312320	523940
2698050	1,180,000	312351	523993

***Community well sample list***

Sample Identifier	Total petroleum hydrocarbon (µg/l)	Easting	Northing
2418961	BDL	312246	523988
2419016	BDL	312229	523862
2419070	BDL	312199	523814
2419088	BDL	312407	524004
2698044	BDL	312362	523970



**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