

Environmental Assessment of Ogoniland Site Specific Fact Sheets

NWEEKOL/ZORBUKE, K.DERE



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	NWEEKOL/ZORBUKE, K.DERE
Site Number	qc_019-021
LGA	GOKANA
Main community	NWEEKOL ZORBUKE DERE
Surrounding communities	NWEEKOL ZORBUKE DERE
Investigated area (ha)	4.12
Category	SPDC Operating Site
Eastings (WGS 84, Zone 32N)	309519
Northings (WGS 84, Zone 32N)	515630



<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.
---	--

II - Oilfield Infrastructure Type

Wells	BOMU-002 (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	Incident Number	Incident Date
	1987_0097	19870203
	1987_00133	19870721
	1988_0090	19880524
	2006_00078	20060324
Spill reported by community	Yes	

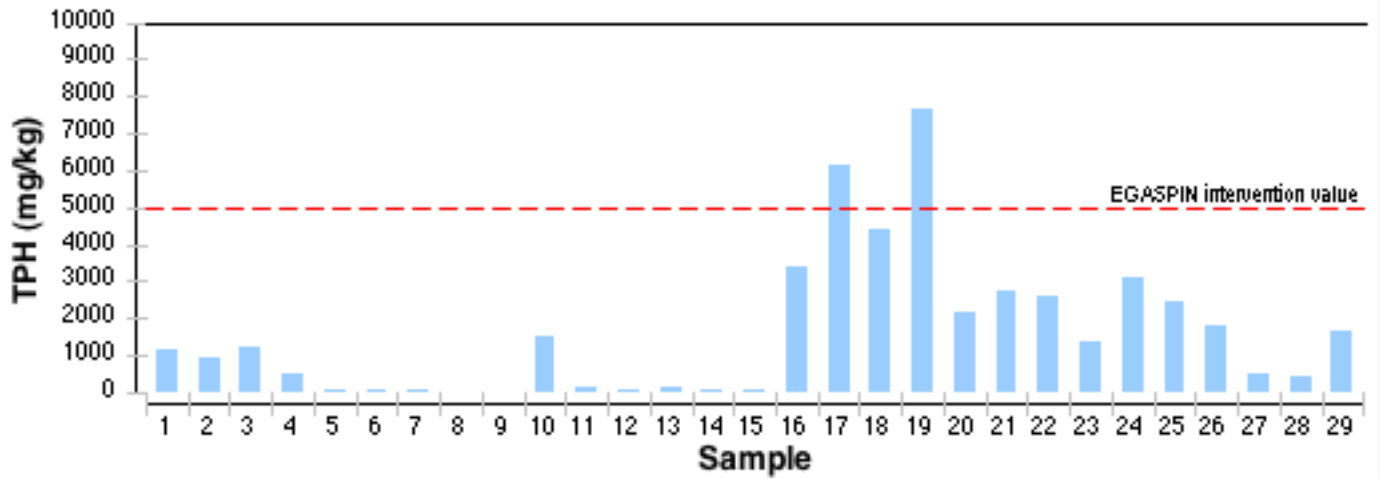
IV - Data Screening

Assessment criteria

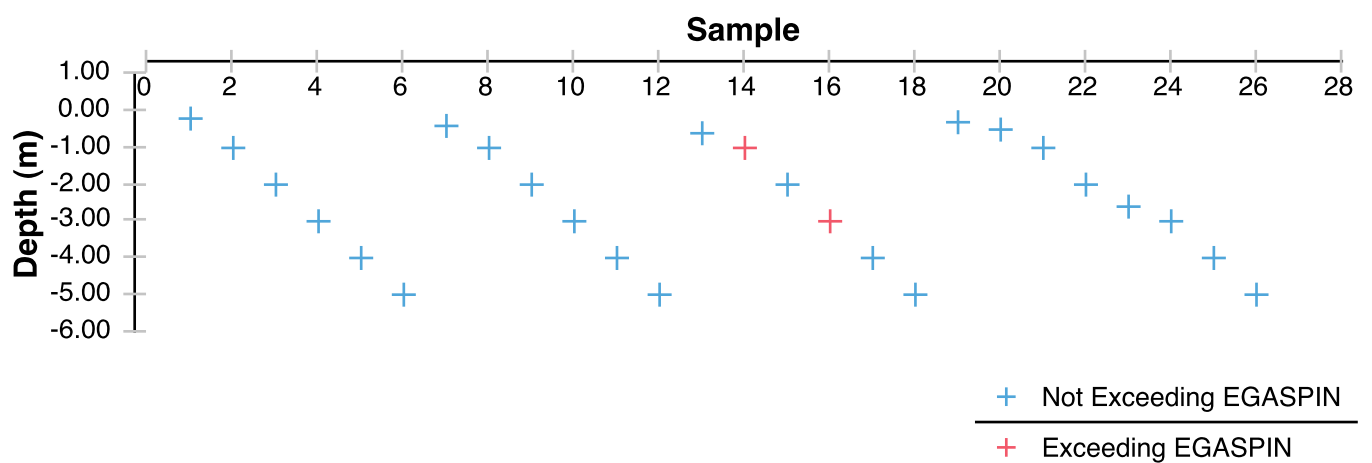
Soil contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 50 mg/kg)
Groundwater contamination	Nigerian standards EGASPIN (intervention value 600 µg/l; target value 50 µg/l)
Sediment contamination	Nigerian standards EGASPIN (intervention value 5000 mg/kg; target value 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	29
Deepest investigation (m)	5
Maximum soil TPH (mg/kg)	7,620.000
Number of soil measurements greater than EGASPIN intervention value	2
Deepest sample greater than EGASPIN (m)	3
Number of soil measurements below 1m	21
Number of soil measurements below 1m greater than EGASPIN intervention value	2
Number of ground water samples	0
Maximum groundwater TPH (µg/l)	Not applicable
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



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).

UNEP 2011

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

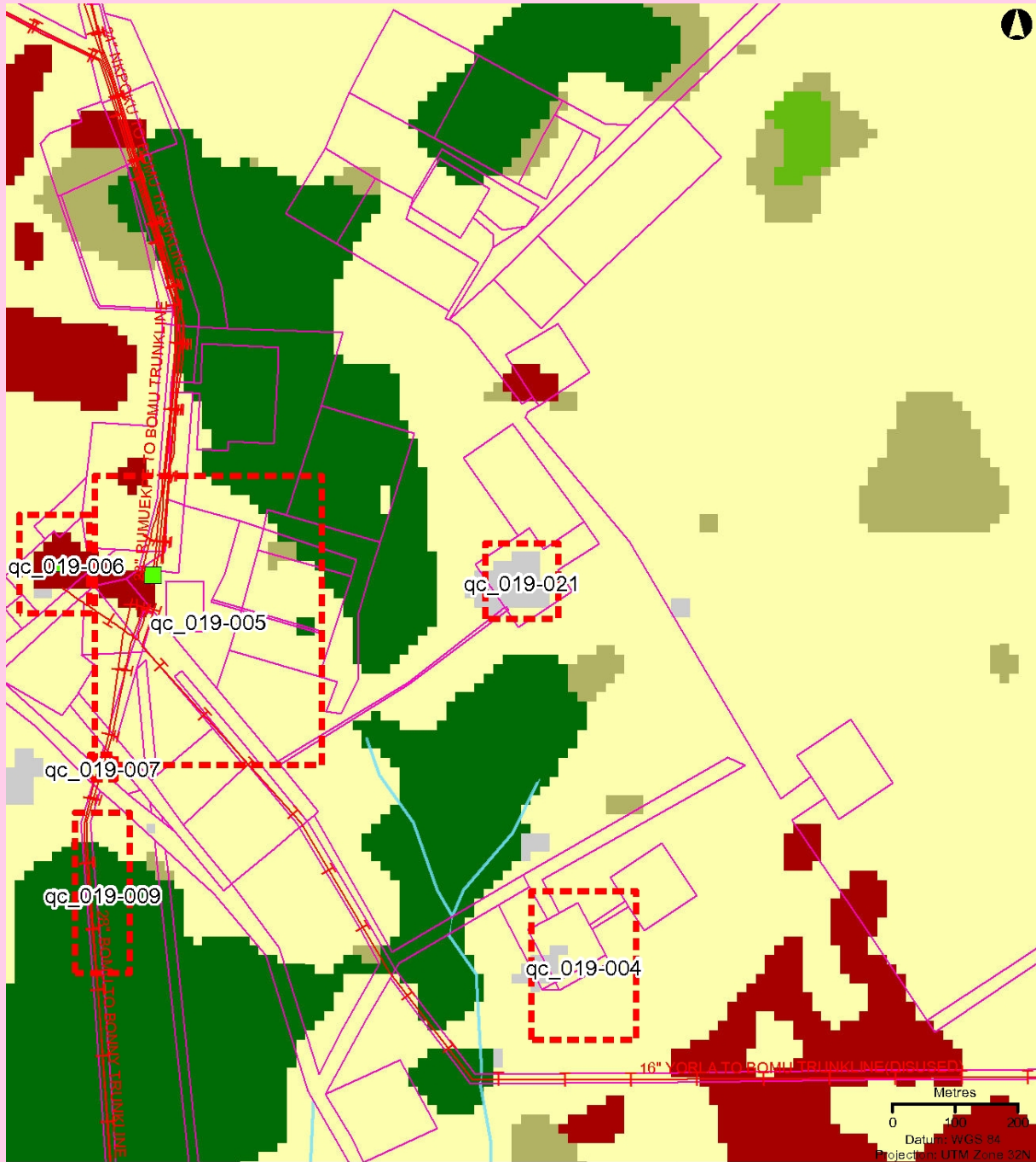
- Grassplot centroid
- Soil samples
- Soil Samples from GW monitoring well
- Grassplot sampling area
- Approximate site investigation area (that area does not correspond to contamination extent).
- Others**
- ▲ Air quality sampling
- Fish tissue sampling
- Sediment samples from Acquatic team
- Water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

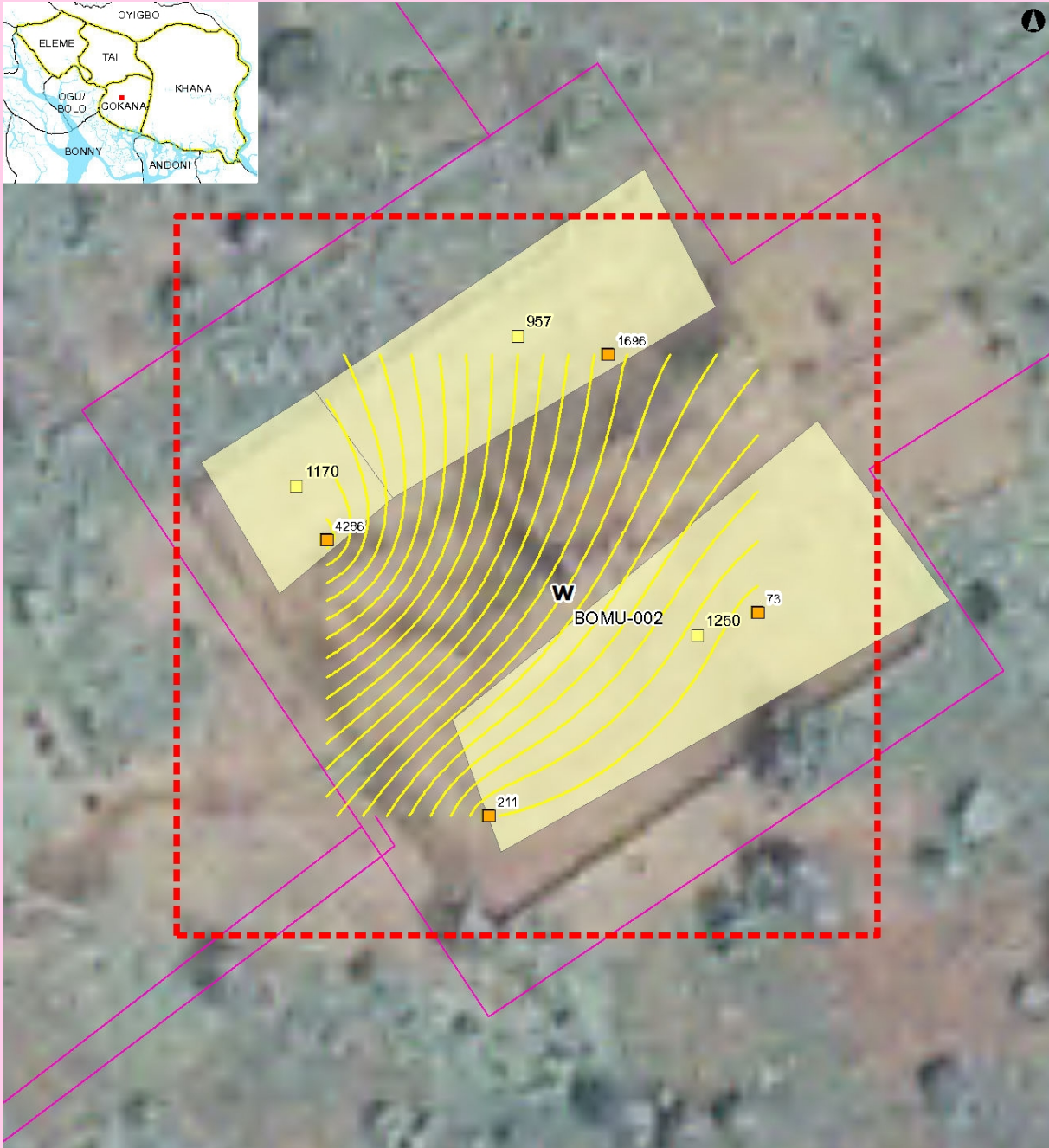
Approximate site investigation area (that area does not correspond to contamination extent).

- 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

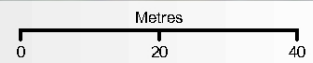
- SPDC Right of way (ROW)
- w** Wells
- Manifold
- ▲ FlowStation
- Pipeline
 - NNPC Crude
 - NNPC Refined product
 - SPDC Oil Pipe in operation

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).

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
2536039	957.000	-	309517	515670
2536062	1,170.000	-	309480	515645
2536089	6,160.000	1.00	309485	515636
2536104	4,420.000	2.00	309485	515636
2536144	2,170.000	4.00	309485	515636
2536160	2,720.000	5.00	309485	515636
2536188	3,390.000	0.60	309485	515636
2536214	7,620.000	3.00	309485	515636
2536363	3,080.000	1.00	309532	515667
2536382	1,790.000	2.60	309532	515667
2536402	1,690.000	5.00	309532	515667
2536422	2,630.000	0.30	309532	515667
2536436	1,380.000	0.50	309532	515667
2536477	2,470.000	2.00	309532	515667
2536497	449.000	4.00	309532	515667
2536510	475.000	3.00	309532	515667
2537337	1,250.000	-	309547	515620
2537924	101.000	1.00	309557	515624
2537933	517.000	0.20	309557	515624
2537944	59.800	3.00	309557	515624
2537956	58.800	2.00	309557	515624
2537964	33.200	5.00	309557	515624
2537972	28.400	4.00	309557	515624
2538139	95.900	4.00	309512	515590
2538142	66.700	2.00	309512	515590
2538143	58.600	5.00	309512	515590
2538145	1,550.000	0.40	309512	515590
2538146	148.000	3.00	309512	515590
2538148	111.000	1.00	309512	515590

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