

The Acreage Soil Sampling Results

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Purpose

- Collect drinking water and soil samples at case and control homes to support DOH's investigation of pediatric brain cancer cases in The Acreage

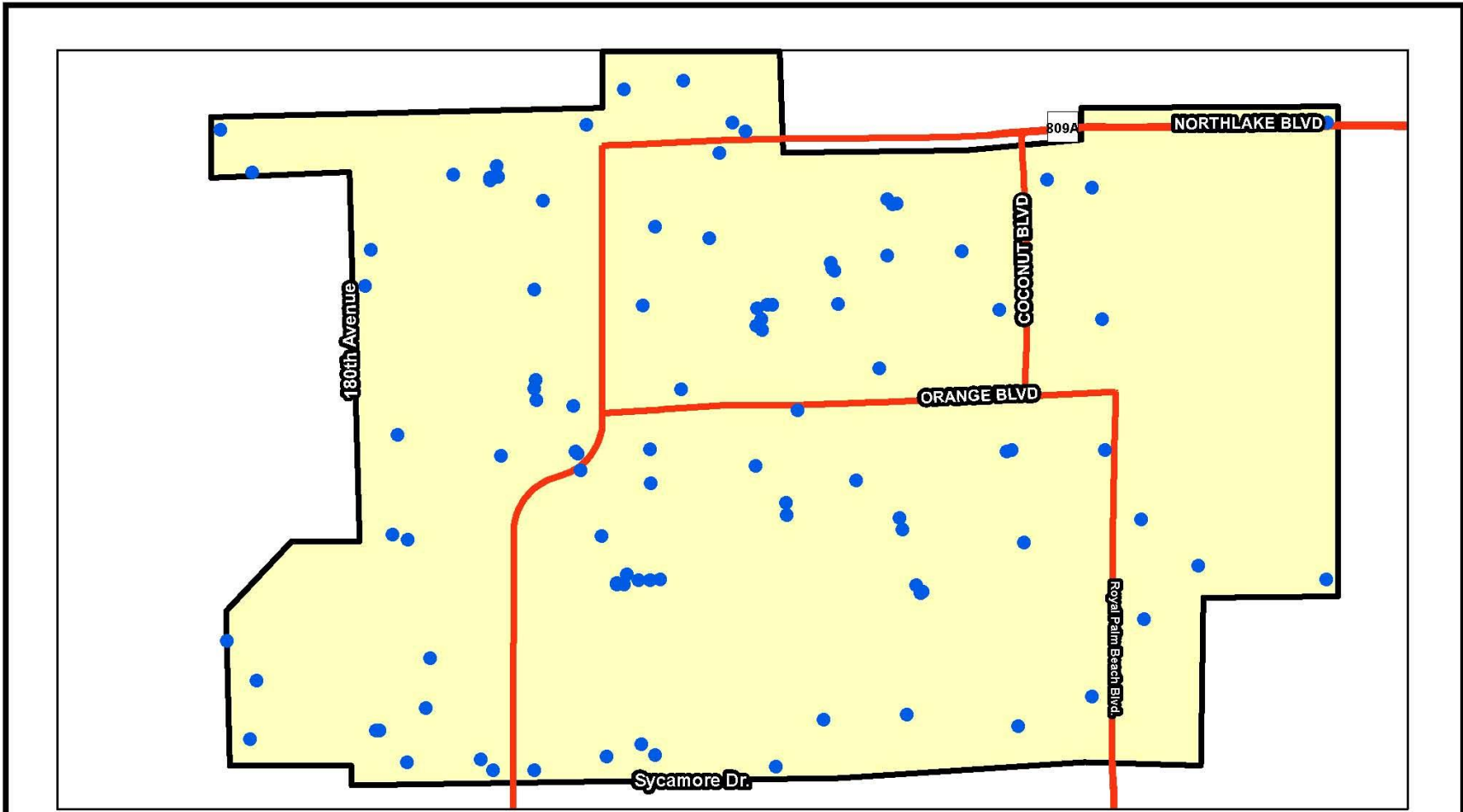


	Exceedances of DEP FDWS/GCTLs in Pre-Treatment Water Samples	Exceedances of DEP FDWS/GCTLs in Post-Treatment Water Samples
A		sodium
B	iron	iron
C		
D	iron	sodium
E		sodium
F	iron	sodium
G		sodium
H	iron	
I	iron	sodium
J	iron	bromodichloromethane, sodium
K	iron	No sample, well is not connected to home
L	iron	iron, manganese
M	iron	sodium
N		
O	iron	
P	total alpha, radium 226/228	iron, sodium
Q		sodium
R	iron, manganese	
S		bromodichloromethane, chloromethane, dibromochloromethane,sodium
T		sodium
U		iron
V		sodium
W		manganese
X		
Y	iron, manganese	sodium
Z		
AA	sodium	bromodichloromethane, dibromochloromethane,sodium
BB	iron	
CC	sodium	bromodichloromethane, sodium
DD		
EE	iron	sodium
FF	iron, manganese, total alpha, radium 226/228	sodium
GG	iron	sodium
HH	iron	
II	iron	

Soil Sampling Overview

- 140 soil samples from 35 residences and 11 background locations
- Residences sampled included 12 case homes and 23 control homes (DOH and DEP)
- Samples analyzed for: VOCs, SVOCs, metals, pesticides/herbicides, dioxins/furans, diquat/paraquat, PCBs and radionuclides

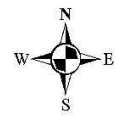




DEP Water and Soil Sample Collection Points for Fall 2009 and Spring 2010 Investigations of The Acreage.

Details of specific locations have been removed to protect confidential medical information of members of The Acreage community who participated in the investigation.

- Sample Location
- DEP Investigation Area

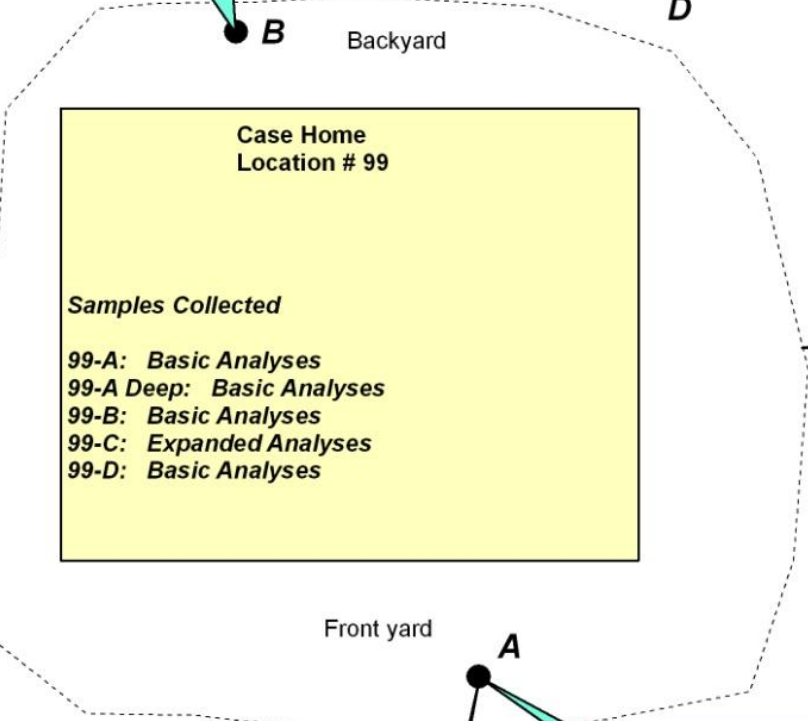


**dredge material
residents greatest concern**

Shallow soil sample (0-3")
99-C: Expanded Analyses

Shallow soil sample (0-3")
99-B: Basic Analyses

playground area
Shallow soil sample (0-3")
99-D: Basic Analyses



**Case Home
Location # 99**

Samples Collected

- 99-A: Basic Analyses
- 99-A Deep: Basic Analyses
- 99-B: Basic Analyses
- 99-C: Expanded Analyses
- 99-D: Basic Analyses

Property Line

Shallow soil sample (0-3")
99-A: Basic Analyses

Deep soil sample (~24")
99-A Deep: Basic Analyses

Limit of Fill



Example Chemical Results Table from Residential Packet

Table 2: Location H Soil Sample Chemical Results

Volatile Organic Compounds	Units	H-A	MDL	Remark	H-A Deep	MDL	Remark	H-B	MDL	Remark	H-C	MDL	Remark	H-D	MDL	Remark
1,1,1-Trichloroethane	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
1,1,2,2-Tetrachloroethane	ug/kg	14	14	UJ	12	12	UJ	12	12	UJ	21	21	UJ	12	12	UJ
1,1,2-Trichloroethane	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
1,1-Dichloroethane	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
1,1-Dichloroethene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
1,2-Dichlorobenzene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
1,2-Dichloroethane	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
1,2-Dichloropropane	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
1,3-Dichlorobenzene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
1,4-Dichlorobenzene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
2-Butanone	ug/kg	140	140	U	120	120	U	120	120	U	210	210	U	120	120	U
2-Chloroethylvinyl ether	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
Benzene	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
Bromodichloromethane	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
Bromoform	ug/kg	14	14	UJ	12	12	UJ	12	12	UJ	21	21	U	12	12	UJ
Bromomethane	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
Carbon tetrachloride	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
Chlorobenzene	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
Chloroethane	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
Chloroform	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U
Chloromethane	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
cis-1,2-Dichloroethene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
cis-1,3-Dichloropropene	ug/kg	14	14	UJ	12	12	UJ	12	12	UJ	21	21	UJ	12	12	UJ
Dibromochloromethane	ug/kg	5.7	5.7	UJ	4.8	4.8	UJ	4.9	4.9	UJ	8.3	8.3	U	4.9	4.9	UJ
Ethylbenzene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
m,p-Xylene	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
Methylene chloride	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
Methyl-t-butyl ether	ug/kg	14	14	U	12	12	U	12	12	U	21	21	U	12	12	U
o-Xylene	ug/kg	5.7	5.7	U	4.8	4.8	U	4.9	4.9	U	8.3	8.3	U	4.9	4.9	U



Example Radionuclide Results Table from Residential Packet

Table 3: Location H Soil Sample Radionuclide Results

Radionuclides	Units	H-A	Remark	H-A Deep	Remark	H-B	Remark	H-C	Remark	H-D	Remark
Actinium-228	pCi/g	0.393		0.248	U	0.154	U	0.224	U	0.18	U
Actinium-228 Uncertainty	pCi/g	0.116		0.15		0.08		0.115		0.116	
Alpha Uncertainty	pCi/g	1.73		2.31		2.47		2.31		1.77	
Alpha, Total	pCi/g	3.11	U	3.23		3.7		3.71	U	3.2	U
Americium-241	pCi/g	0.134	U	0.0506	U	0.08	U	0.163	U	0.113	U
Americium-241 Uncertainty	pCi/g	0.0778		0.0287		0.0455		0.0879		0.0637	
Antimony-124	pCi/g	0.168	U	0.157	U	0.121	U	0.156	U	0.163	U
Antimony-124 Uncertainty	pCi/g	0.0955		0.0987		0.0801		0.0911		0.0846	
Antimony-125	pCi/g	0.0962	U	0.088	U	0.0767	U	0.123	U	0.0998	U
Antimony-125 Uncertainty	pCi/g	0.0536		0.0521		0.0413		0.0684		0.0562	
Barium-133	pCi/g	0.0415	U	0.0451	U	0.0294	U	0.0531	U	0.0446	U
Barium-133 Uncertainty	pCi/g	0.0281		0.0292		0.0206		0.0364		0.0278	
Barium-140	pCi/g	5.22	U	5.74	U	4.69	U	7.26	U	4.11	U
Barium-140 Uncertainty	pCi/g	2.99		3.39		2.55		3.96		2.43	
Beryllium-7	pCi/g	0.648	U	0.586	U	0.521	U	0.825	U	0.727	U
Beryllium-7 Uncertainty	pCi/g	0.383		0.336		0.305		0.466		0.425	
Beta Uncertainty	pCi/g	2.11		2.32		3.23		2.34		2.27	
Beta, Total	pCi/g	3.48		3.49	U	5.59	U	3.91	U	4.1	U
Bismuth-212	pCi/g	0.598	U	0.64	U	0.46	U	0.567	U	0.486	U
Bismuth-212 Uncertainty	pCi/g	0.299		0.354		0.249		0.353		0.263	
Bismuth-214	pCi/g	0.129	U	0.148	U	0.148		0.135	U	0.151	
Bismuth-214 Uncertainty	pCi/g	0.0799		0.0909		0.0545		0.101		0.0864	
Cerium-139	pCi/g	0.0366	U	0.036	U	0.0289	U	0.0406	U	0.0294	U
Cerium-139 Uncertainty	pCi/g	0.0214		0.0201		0.0156		0.0258		0.0196	
Cerium-141	pCi/g	0.203	U	0.177	U	0.145	U	0.246	U	0.183	U
Cerium-141 Uncertainty	pCi/g	0.113		0.0998		0.0785		0.138		0.103	
Cerium-144	pCi/g	0.215	U	0.204	U	0.155	U	0.24	U	0.202	U
Cerium-144 Uncertainty	pCi/g	0.122		0.113		0.085		0.145		0.11	
Cesium-134	pCi/g	0.0468	U	0.0576	U	0.0276	U	0.0453	U	0.0468	U



Example Summary of Exceedances from Residential Packet

*Table 1: Summary of Residential SCTL Exceedances in Soil Samples Collected from Location H
March/April 2010
The Acreage Community, Loxahatchee, Palm Beach County, Florida
FDEP Site Investigation*

Analyte	Residential SCTL	H-A	H-A Deep	H-B	H-C	H-D
<i>Exceedances</i>						
Arsenic	2.1 mg/Kg	1.40	0.84	0.32	7.32	0.18

SCTL=Soil Cleanup Target Level
 ND=Non Detect
 NA=Not Analyzed
 Yellow Shading=Exceedance of SCTL
 ng/Kg= nanograms per Kilogram
 mg/Kg=milligrams per kilogram



Soil Cleanup Target Levels (SCTLs)

- Health-based goals for contaminated sites
- Used to determine when cleanup of contaminated site is complete
- Intended to eliminate any potential health risk due to illegal discharge
- Assume higher than average exposures to protect sensitive individuals
- Less than one in one million cancer risk



	Exceedances of DEP Soil Cleanup Target Levels (SCTL)
A	
B	
C	
D	
E	
F	1 benzo(a)pyrene
G	1 arsenic
H	
I	2 benzo(a)pyrene, 1 arsenic, 2 TRPH
J	
K	
L	1 benzo(a)pyrene
M	
N	2 arsenic
O	
P	
Q	1 arsenic
R	2 arsenic
S	
T	
U	
V	
W	
X	
Y	
Z	1 arsenic
AA	1 arsenic
BB	
CC	
DD	
EE	
FF	
GG	
HH	1 benzo(a)pyrene
II	1 benzo(a)pyrene

Results

- 140 soils from 35 residences (12 case and 23 control homes) and 11 background locations
- At 24 of the 35 residences and all background locations, soils met all applicable SCTLs. These 24 residences included 8 case and 16 control homes
- US EPA and DOH have advised DEP that radionuclide levels were within the range of general background conditions in Florida



Results

- At eleven residences (4 case and 7 control homes), 14 of 41 soil samples exceeded an SCTL for one or more of the following contaminants:
 - arsenic
 - benzo(a)pyrene
 - TRPH



Results

Arsenic

- Nine soil samples exceeded the 2.1 mg/Kg SCTL at seven residences (2 case and 5 control homes)
- Two residences had two soil samples with an arsenic exceedance; the other five residences had one
- Arsenic ranged from 2.4 mg/Kg to 7.3 mg/Kg



Results

Benzo(a)pyrene (BaP)

- Six soil samples exceeded the 0.1 mg/Kg SCTL at five residences (3 case and 2 control homes)
- One residence had two BaP exceedances
- BaP ranged from 0.13 mg/Kg to 1.9 mg/Kg



Results

TRPH (Total Recoverable Petroleum Hydrocarbons)

- Two soil samples exceeded the 460 mg/Kg SCTL at one case home.
- Concentrations were 700 and 710 mg/Kg



	Exceedances of DEP Soil Cleanup Target Levels (SCTL)	Exceedances of DEP FDWS/GCTLs in Pre-Treatment Water Samples	Exceedances of DEP FDWS/GCTLs in Post-Treatment Water Samples
A			sodium
B		iron	iron
C			
D		iron	sodium
E			sodium
F	1 benzo(a)pyrene	iron	sodium
G	1 arsenic		sodium
H		iron	
I	2 benzo(a)pyrene, 1 arsenic, 2 TRPH	iron	sodium
J		iron	bromodichloromethane, sodium
K		iron	No sample, well is not connected to home
L	1 benzo(a)pyrene	iron	iron, manganese
M		iron	sodium
N	2 arsenic		
O		iron	
P		total alpha, radium 226/228	iron, sodium
Q	1 arsenic		sodium
R	2 arsenic	iron, manganese	
S			bromodichloromethane, chloromethane, dibromochloromethane,sodium
T			sodium
U			iron
V			sodium
W			manganese
X			
Y		iron, manganese	sodium
Z	1 arsenic		
AA	1 arsenic	sodium	bromodichloromethane, dibromochloromethane,sodium
BB		iron	
CC		sodium	bromodichloromethane, sodium
DD			
EE		iron	sodium
FF		iron, manganese, total alpha, radium 226/228	sodium
GG		iron	sodium
HH	1 benzo(a)pyrene	iron	
II	1 benzo(a)pyrene	iron	