

Letter Health Consultation

PRE- AND POST-HURRICANE ARSENIC IN ORLEANS PARISH
ORLEANS PARISH, LOUISIANA

AUGUST 27, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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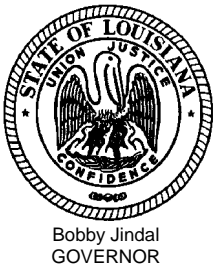
LETTER HEALTH CONSULTATION

PRE- AND POST-HURRICANE ARSENIC IN ORLEANS PARISH

ORLEANS PARISH, LOUISIANA

Prepared By:

Louisiana Department of Health and Hospitals
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry



Bobby Jindal
GOVERNOR

STATE OF LOUISIANA DEPARTMENT OF HEALTH AND HOSPITALS



Alan Levine
SECRETARY

August 5, 2008

Howard Mielke, Ph.D.
Research Professor
Tulane /Xavier Center for Bioenvironmental Research
1430 Tulane Avenue SL-3, New Orleans, LA 70112

Dear Dr. Mielke:

The Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology (DHH/OPH/SEET) has evaluated pre- and post-hurricane soil arsenic samples collected throughout Orleans Parish. The following letter provides the results of SEET's analysis.

Discussion:

Post-Hurricane EPA Data

From August 2005 thru November 2006, the U.S. Environmental Protection Agency (EPA) collected 953 post-hurricane sediment and soil arsenic samples as part of a phased sampling plan throughout Orleans Parish. The sampling plan was intentionally biased to monitor areas and locations likely to have been contaminated in flooded areas; it was not designed to characterize contaminants in New Orleans. The results of their sampling are not representative of contaminants in New Orleans, but indicate areas where hot spots might exist. The crust-like sediment samples were collected to ascertain the presence of any hazardous substances in sediment that was deposited on the land surface by receding floodwaters. The data was used to assess the potential health effects to emergency relief workers and residents from short-term exposure to contaminants found in the sediment. Sediment are no longer present at many of the locations that were sampled early after floodwaters receded[±], and therefore, do not present a viable pathway of exposure. SEET recognizes the importance of excluding the sediment data to present the most current characterization of arsenic levels in Orleans Parish. As mentioned above, EPA also collected surface (0-6 inches) soil arsenic samples during the phased sampling plan. SEET evaluated the total count of surface soil arsenic samples (63) collected from 8 census tracts in Orleans Parish. From the dataset, SEET extracted samples with qualifiers of non-detect, blank and duplicate, thereby decreasing the number of soil samples from 63 to 45 total non-composite samples.

Pre- and Post-Hurricane Soil Data: Mielke, et.al.

SEET evaluated soil arsenic data from two soil metal surveys conducted by Dr. Howard Mielke of the Tulane/Xavier Center for Bioenvironmental Research (CBR). The pre-hurricane survey

[±] Exhibits to Written Testimony of Dr. Mike D. McDaniel, Secretary of Louisiana Department of Environmental Quality. January 2006. Can be accessed at URL:

<http://www.deq.louisiana.gov/portal/portals/0/news/secretary/Exhibit%2017%20-%20Zip%20Code%2070126%20Data%20Summary.pdf>

sample collection (identified as Survey II) was conducted in 2000, consisting of 287 composite soil samples, with 1 composite sample per 1990 census tract. Each composite sample was formed by adding equal parts of approximately 19 soil samples collected from each census tract.

The post-hurricane survey sample collection (identified as Survey III) was conducted in 2006, consisting of 874 soil samples from 46 census tracts (19 samples per tract). Samples from both surveys were collected from the top 2.5 centimeters of soil in residential areas.

SEET proposed to conduct a comparative analysis of the EPA's post-hurricane soil arsenic samples and Surveys II and III, however there are limitations that prevent a full analysis of the data.

1. The number of post-hurricane soil arsenic samples collected by EPA is too small to be considered representative for a parish-wide characterization. Furthermore, the purpose of the EPA sampling was to identify contaminated areas, and was not designed to characterize the parish. SEET anticipated a larger number of soil only samples from the phased EPA sampling event; however the EPA project objectives for those sampling events were not exclusive to soil collection.
2. In evaluating Survey III, there is only one common census tract with the post-hurricane EPA data, thereby decreasing the level of representativeness for a comparative analysis.
3. With respect to the post-hurricane EPA data, sampling of residential yards was conducted in February 2006 and is captured in the soil data that SEET evaluated. However, some of the samples were collected from public right of ways as well as residential yards. Sample collection from Surveys II and III consist of residential yards only.

Although SEET was unable to conduct a comparative analysis of the three datasets, evaluating them individually provides some insight, however limited, on the pre- and post- hurricane soil arsenic levels throughout Orleans Parish. In reference to the post-hurricane EPA data, only one non-composite sample collected from 1990 census tract 17.32 yielded a result above the state background level for arsenic of 12 milligrams per kilogram (mg/kg). That result was 13.8 mg/kg. Pre-hurricane survey II noted three composite samples above background, while post-hurricane survey III reported none above 12 mg/kg. Each of the four arsenic concentrations detected above the state background level are below the Agency for Toxic Substances and Disease Registry's (ATSDR) child Environmental Media Evaluation Guide (EMEG) for arsenic of 20 mg/kg.

Arsenic detected above state background levels in soil from Orleans Parish:

Data Source	1990 Census Tract	Arsenic Concentration (mg/kg)¹
Post-hurricane EPA	17.32	13.8
Survey II	33.06	14 [*]
Survey II	24.01	14.7 [*]
Survey II	25.02	16.4 [*]

¹ mg/kg- milligrams per kilogram; ^{*} composite sample

Conclusions:

Data limitations prevented SEET from conducting the proposed comparative analysis of post-hurricane EPA soil arsenic data and Surveys II and III. However, SEET was able to conduct a limited analysis of each of the individual datasets and conclude that soil arsenic concentrations detected above state background levels are below ATSDR's child EMEG of 20 mg/kg for arsenic, and do not require further evaluation.

Recommendations:

There are no actions recommended at this time.

If there are any questions, please contact Darcie Olexia (504) 219-4579 or Kathleen Aubin (504) 219-4575.

Sincerely,

Darcie Olexia, MSPH
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Louisiana Office of Public Health
Section of Environmental Epidemiology & Toxicology

Kathleen G. Aubin, MSPH
Environmental Health Scientist Supervisor
Louisiana Office of Public Health
Section of Environmental Epidemiology & Toxicology

Appendix A: Evaluation Process

Screening Process

Health based comparison values (CVs) were used to determine which samples needed further evaluation. CVs are not used to predict health effects or to set clean-up levels. Contaminants with media concentrations above a health based comparison value do not necessarily represent a health threat, but are selected for further evaluation. Contaminants with media concentrations below a health based comparison value are unlikely to be associated with illness and are not evaluated further.

ATSDR's child Environmental Media Evaluation Guide (EMEG) for arsenic (20 mg/kg), was used as a CVs in this evaluation. EMEGs are estimated contaminant concentrations that are unlikely to cause adverse non-carcinogenic health effects. EMEGs are calculated by using ATSDR's Minimal Risk Level (MRL) for arsenic (.0003 mg/kg/day), which is also an estimate of daily exposure to contaminants that are unlikely to cause adverse non-cancer health effects.

A-1: Post-hurricane EPA detected soil arsenic concentrations, Orleans Parish

1990 Census Tract	Soil Arsenic Concentration (mg/kg) ¹	Qualifier
14.01	3.34	
17.03	1.25	J
17.03	0.99	J
17.03	0.98	J
17.03	1.17	J
17.03	4.32	
17.03	3.46	
17.03	3.17	
17.03	2.87	
17.27	7.48	
17.27	0.00	U
17.27	7.90	
17.27	5.78	
17.27	0.310	J
17.27	0.38	J
17.27	1.47	J
17.27	0.00	U
17.27	0.00	U
17.27	0.00	U
17.27	0.00	U
17.27	0.31	B
17.27	0.00	U
17.27	0.58	B
17.27	1.46	B
17.27	0.73	B
17.32	4.31	
17.32	0.20	J
17.32	0.75	J
17.32	0.24	J
17.32	13.80	

1990 Census Tract	Soil Arsenic Concentration (mg/kg) ¹	Qualifier
17.32	11.40	
17.32	7.71	
17.32	6.71	
25.02	0.30	J
25.02	0.57	J
25.02	1.09	J
25.02	1.55	J
25.02	1.40	J
25.02	0.95	J
25.02	2.76	
25.02	3.23	
25.02	2.26	
25.02	5.31	
25.02	0.00	U
25.04	0.23	J
25.04	0.40	J
25.04	1.66	J
25.04	0.93	J
25.04	1.22	J
25.04	5.87	
25.04	3.08	
25.04	8.67	
25.04	9.51	
33.01	1.09	J
33.01	1.15	J
33.01	1.32	J
33.01	1.23	J
33.01	1.44	J
33.01	0.95	J
33.01	0.82	J
33.01	0.75	J
33.01	1.19	J
72.00	6.59	

¹mg/kg- milligrams per kilogram; J= estimated value; U= non-detect; B= analyte detected in blank

A-2: Pre-hurricane Survey II detected soil arsenic concentrations, Orleans Parish

1990 Census Tract	Soil Arsenic Concentration (mg/kg)^{1*}
1.00	3.45
2.00	2.64
3.00	0.81
4.00	0.24
6.01	1.48
6.02	1.32
6.03	1.96
6.04	1.09
6.05	1.88
6.06	0.84
6.07	4.24
6.08	1.88
6.11	4.12
6.12	2.78
6.13	1.16
6.14	1.09
7.01	1.38
7.02	0.67
8.00	0.76
9.01	0.56
9.02	0.23
9.03	0.23
9.04	0.23
11.00	2.23
12.00	3.88
13.01	2.09
13.02	1.32
13.03	5.94
13.04	4.97
14.01	1.53
14.02	1.66
15.00	5.32
16.00	6.90
17.01	1.85
17.02	0.94
17.03	0.67
17.06	1.53
17.14	1.80
17.20	0.32
17.21	0.49
17.22	1.57
17.23	1.69
17.24	0.62
17.25	0.33
17.26	1.61
17.27	0.23
17.28	0.26

1990 Census Tract	Soil Arsenic Concentration (mg/kg) ^{1*}
17.32	0.71
18.00	1.85
19.00	4.34
20.00	1.40
21.00	1.14
22.00	1.04
23.00	2.41
24.01	
24.02	2.59
25.01	2.74
25.02	16.47
25.03	1.72
25.04	0.55
26.00	2.56
27.00	4.82
28.00	1.55
29.00	1.12
30.00	1.66
31.00	0.37
33.01	0.95
33.02	1.12
33.03	0.25
33.04	2.07
33.05	2.87
33.06	14.06
33.07	0.97
33.08	2.43
34.00	2.87
35.00	2.39
36.00	2.12
37.01	2.90
37.02	1.34
38.00	4.49
39.00	3.04
40.00	3.20
41.00	0.92
42.00	4.09
44.01	1.82
44.02	0.90
45.00	3.04
46.00	2.93
46.98	3.29
47.00	0.93
48.00	1.70
49.00	2.27
50.00	2.92
54.00	3.42
55.00	1.58

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1990 Census Tract	Soil Arsenic Concentration (mg/kg) ^{1*}
56.01	1.53
56.02	1.33
56.03	0.80
56.04	0.73
57.00	0.41
58.00	0.23
59.00	1.16
60.00	3.65
63.00	2.38
64.00	3.79
65.00	2.09
67.00	4.41
68.00	3.23
69.00	2.09
70.00	1.35
71.00	2.42
72.00	0.98
75.01	1.48
75.02	2.26
76.03	3.01
76.04	0.71
76.05	1.17
77.00	4.78
78.00	6.12
79.00	3.93
80.00	1.64
81.01	7.12
81.02	3.52
82.00	2.74
83.00	4.24
84.00	2.30
85.00	2.48
86.00	2.07
87.00	4.03
88.00	3.02
89.00	4.27
90.00	2.01
91.00	2.88
92.00	7.18
93.01	6.80
93.02	2.19
94.00	1.98
96.00	3.75
97.00	1.52
99.00	2.37
100.00	11.85
101.00	2.75
102.00	2.08
103.00	1.70

1990 Census Tract	Soil Arsenic Concentration (mg/kg) ^{1*}
104.00	1.91
105.00	4.63
106.00	2.70
107.00	2.58
108.00	3.14
109.00	2.49
111.00	1.70
112.00	2.14
114.00	4.03
115.00	2.05
116.00	3.01
117.00	2.05
119.00	1.98
120.00	6.02
121.01	3.97
121.02	1.29
122.00	3.20
123.00	2.02
124.00	1.77
125.00	1.48
126.00	1.59
127.00	1.89
128.00	2.67
129.00	2.39
130.00	1.63
131.00	4.07
132.00	3.82
133.01	0.88
133.02	1.22
201.01	0.23
201.02	1.42
202.01	0.95
202.02	1.90
202.03	1.07
203.01	0.23
203.02	0.65
203.03	0.77
204.00	0.23
205.01	1.56
205.02	0.49
205.03	0.70
205.05	0.70
205.06	0.23
205.07	0.90
205.08	1.12
205.09	0.80
206.00	0.69
207.00	0.41

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1990 Census Tract	Soil Arsenic Concentration (mg/kg) ^{1*}
208.00	1.23
209.00	0.84
210.00	1.37
211.00	0.23
212.00	0.77
213.00	1.17
214.00	0.93
215.00	0.85
216.00	0.38
217.00	0.45
218.01	0.61
218.02	0.54
219.00	1.27
220.01	1.85
220.02	2.13
221.01	0.93
221.02	3.39
222.00	0.66
223.01	0.97
223.02	0.48
223.03	0.88
224.00	1.41
225.00	1.61
226.00	1.11
227.00	4.71
228.00	1.64
229.00	0.26
230.01	0.33
230.02	1.03
230.03	1.47
231.00	0.38
232.00	0.83
233.00	0.85
234.00	0.28
235.00	0.60
236.00	0.94
237.00	0.99
238.00	0.82
239.01	0.53
239.02	1.14
239.03	1.38
239.04	1.13
240.01	0.89
240.02	0.78
241.00	1.02
242.00	0.27
243.00	3.39
244.00	1.03
245.00	0.60

1990 Census Tract	Soil Arsenic Concentration (mg/kg) ^{1*}
246.00	2.66
247.00	0.69
248.00	0.90
249.00	0.85
250.02	1.16
250.03	1.57
250.98	5.35
251.01	1.81
251.02	0.90
252.01	1.63
252.02	0.65
253.00	1.42
254.00	1.02
255.00	1.17
256.00	3.19
257.98	2.89
258.79	2.00
259.00	9.26
260.00	2.00
261.00	1.31
262.00	0.23
263.00	0.86
264.00	0.99
265.00	3.12
266.00	2.00
267.00	1.16
268.00	1.13
269.00	1.16
270.00	1.65
271.00	0.38
272.00	2.98
273.00	1.04
274.00	1.32
275.01	0.77
275.02	0.23
302.03	0.67
302.06	1.10
302.07	2.49
303.00	0.23
304.00	0.86
305.00	1.78
306.01	1.54
306.02	1.14
306.03	1.48
307.00	1.63
308.00	2.41

¹ mg/kg- milligrams per kilogram; * composite samples

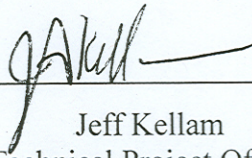
A-3: Post-hurricane Survey III detected soil arsenic concentrations, Orleans Parish

1990 Census Tract	Soil Arsenic Concentration (mg/kg)¹*
1.00	1.2
6.01	2.0
6.02	0.6
7.01	3.0
7.02	3.8
9.02	2.0
12.00	4.4
13.02	2.3
16.00	4.9
17.21	2.8
17.25	0.7
17.98	2.4
19.00	3.2
25.02	1.5
33.02	3.2
37.02	4.1
40.00	1.5
44.01	2.3
44.02	2.3
48.00	4.7
56.01	3.1
59.00	4.8
64.00	4.7
68.00	1.8
69.00	1.3
80.00	2.9
81.01	2.2
81.02	2.6
88.00	5.5
89.00	11.0
93.02	5.7
94.00	2.2
103.00	2.5
108.00	2.1
115.00	2.0
126.00	2.2
203.02	1.3
205.06	0.7
230.03	0.7
240.02	0.3
248.00	1.2
250.03	0.5
257.98	7.0
266.00	5.2
271.00	0.4
306.02	1.9

¹ mg/kg- milligrams per kilogram; * composite samples

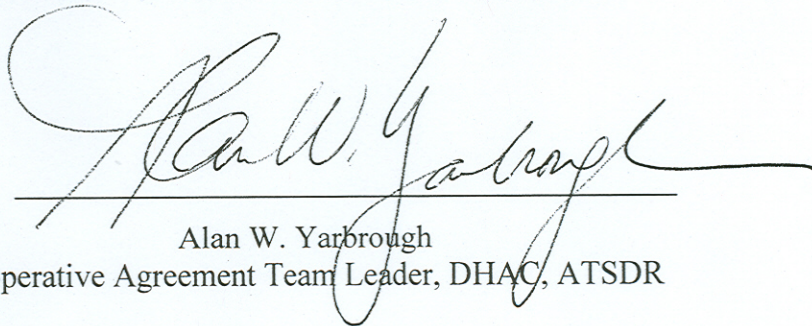
Certification

This health consultation evaluating arsenic in Orleans Parish was prepared by Louisiana Department of Health and Hospitals under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedure existing at the time the health consultation was initiated.



Jeff Kellam
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.



Alan W. Yarbrough
Cooperative Agreement Team Leader, DHAC, ATSDR