

**November 16, 2006**

## **Apex Indoor Environmental Investigation**

**Occupational and Environmental Epidemiology Branch**  
**Division of Public Health**  
**North Carolina Department of Health and Human Services**


### **Introduction**

The State of North Carolina's Departments of Health and Human Services (DHHS) and Environment and Natural Resources (DENR) conducted environmental screening assessments of homes, schools, businesses, and a church in Apex, NC that are near the EQ facility. The NC Division of Air Quality chose the testing sites. The sites are located from 0.16 to 2.17 miles from the EQ facility. The purpose of the assessments was to: determine if these selected sites were affected by the October 5, 2006 fire at the EQ facility; determine if there was a need for additional sampling; and determine if there needed to be more guidance on cleaning nearby structures. The Occupational and Environmental Epidemiology Branch (OEEB) in DHHS conducted indoor environmental evaluations of 31 sites in Apex. The evaluations consisted of collecting wipe samples that were tested for selected metals, total cyanides, and polycyclic aromatic hydrocarbons (PAHs). In addition, indoor and outdoor air monitoring for mercury vapor was done at 26 sites because a private consultant had allegedly found high mercury levels inside a structure that was near the EQ fire and there was some community concern regarding mercury.

### **Methodology**

At each site, surface wipe samples were collected on at least two horizontal surfaces (excluding floors), one in a common area such as a living room or kitchen and one in a bedroom. For the non-residential sites (i.e., schools), a common area such as a cafeteria was chosen in addition to a classroom. Attempts were made to collect wipe samples on surfaces that had not been cleaned since the fire occurred. Since all of the sites reported some type of cleaning since the fire, it was difficult to find surfaces that had not been cleaned. Wipe samples were not collected from surfaces where dust had accumulated for an extended period of time. Sample sites included interior windowsills, smooth surfaces of furniture, shelves, and countertops. Each wipe sample area was 100 square centimeters (0.01 square meters). The following filter materials were used for the wipe samples: for metals – Environmental Express Ghost Wipe™; for PAHs – Ahlstrom™ Grade 111 glass microfiber filters; and for cyanide – Ahlstrom™ Grade 54 quantitative filter papers.

The wipe samples were submitted to the Eastern Research Group (ERG) laboratory, an independent certified lab, in Morrisville, NC and were analyzed for polycyclic aromatic hydrocarbons (PAHs), total cyanides, and the following metals: arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, vanadium, and zinc. Polycyclic aromatic hydrocarbons are possible products of combustion and the metals were present in some of the materials that were stored at EQ and would not be destroyed by the fire. DAQ tested for these same chemicals in outdoor wipe sampling at the sites.

These chemicals (with the exception of cyanide) were on the list, “Settled Dust Screening Values and Supportive Toxicity Criteria,” which was developed following the World Trade Center collapse (1). 

Field blanks for cyanides, metals, and PAHs were collected for every ten wipe samples and were also submitted to ERG for analysis. Results for the blanks are listed in Table 1.

A Lumex mercury vapor analyzer was used for the indoor and outdoor mercury vapor sampling.

The sampling form (attached) used for the environmental investigation included three questions about combustion devices used at the sites that may be potential sources of indoor contaminants. More information can be found in the limitations section of this report. Information collected included questions regarding the presence or absence of unvented combustion devices (i.e., kerosene heater), primary furnace fuel source (gas or electric), and whether or not indoor tobacco smoking takes place at the site.

### **Data Analysis**

For metals, the laboratory reported total micrograms detected per wipe sample for each of the metals on the list. For PAHs, the laboratory reported total micrograms of individual PAHs that were detected and these were added to get a value for total PAHs. For cyanide, the laboratory reported the micrograms of cyanide detected in each wipe sample. For each of the chemicals (metals, total PAHs, and cyanide), the mass of chemical detected was divided by the area of the wipe sample (in square meters) resulting in a value of micrograms of chemical per square meter ( $\mu\text{g}/\text{m}^2$ ). For each site, the wipe sampling data for the common area and for the bedroom/other area were averaged to get one value for each site. If one of the values for a site was below the detection limit, the value for this sample was considered to be zero when calculating the average for the two samples. The average values detected in the wipe samples were compared to settled dust screening values that were developed for evaluating indoor dust contamination resulting from the World Trade Center (WTC) collapse (1). The authors of the WTC report developed the health-based screening values for indoor settled dust using EPA risk assessment methods and current toxicity criteria from EPA’s Integrated Risk Information System (IRIS), EPA’s Health Effects Assessment Summary Tables (HEAST), Agency for Toxic Substances and Disease Registry (ATSDR) minimum risk levels (MRLs), and other toxicity references as needed. These health-based screening values were peer reviewed and are generally accepted standards for such screening.

The mercury vapor sampling results were compared to the ATSDR residential cleanup level in air of 1 microgram per cubic meter ( $\mu\text{g}/\text{m}^3$  or 1000 nanograms per cubic meter,  $\text{ng}/\text{m}^3$ ) (2).

### **Summary of Sampling Results**

#### **Responses to questions about potential sources of indoor contaminants**

Of the 31 sites selected for environmental sampling, 6.5% (n=2) reported the use of unvented combustion devices; 52% (n=16) of the sites reported using gas as the main source of energy for home heating purposes; and 16% (n=5) of the sites reported that indoor tobacco smoking had occurred.

### **Mercury Vapor Sampling**

The mercury vapor sampling results are listed in Table 2, Mercury Vapor Sampling Results. Sampling for mercury vapor inside and outside at 26 sites detected mercury vapor concentrations from 1 to 335 ng/m<sup>3</sup>. All of these concentrations are well below the Agency for Toxic Substances and Disease Registry (ATSDR) guidance level of 1000 ng/m<sup>3</sup> for mercury in indoor air at residences and businesses.

### **Surface Wipe Sampling for Cyanide**

The wipe sampling results are listed in Table 1, Wipe Sampling Results. Surface wipe sampling did not detect cyanide in any of the samples.

### **Surface Wipe Sampling for Metals**

The wipe sampling results are listed in Table 1, Wipe Sampling Results. Surface wipe sampling for metals detected lead above WTC health-based screening values for settled dust at one site (site 35). The sampling detected lead at 326 and 294 micrograms per square meter (ug/m<sup>2</sup>) at the two locations for a site average of 310 ug/m<sup>2</sup>. The WTC screening value for lead is 270 ug/m<sup>2</sup>. Occupational and Environmental Epidemiology Branch (OEEB) staff learned that this site (a house) was built in 1961 thus lead-based paint may be the source of this lead dust. OEEB advised the residents of these results and advised them to identify potential indoor sources of lead dust and to control those potential sources.

For all of the other sites, the indoor dust wipe sampling did not detect metals above the WTC health-based screening values for settled dust.

### **Surface Wipe Sampling for Polycyclic Aromatic Hydrocarbons**

The wipe sampling results are listed in Table 1, Wipe Sampling Results. Surface wipe sampling did not detect polycyclic aromatic hydrocarbons above the WTC health-based screening values for settled dust in any of the samples. Most of the sample results are below detection limits.

### **Limitations**

This investigation has the following limitations:

- The wipe samples were collected more than 15 days after the fire started.
- At some sampling sites, it was difficult to find surfaces to collect dust wipe samples because most of the surfaces had been cleaned. Occupants at all of the sites reported that they had done some type of cleaning.
- At some of the sites, there were potential sources of indoor contaminants that could have contaminated indoor surfaces, including unvented combustion devices and indoor tobacco smoking.

### **Conclusions**

Results from this sampling survey revealed that contaminants in settled dust at these sites are not present in concentrations that pose a health risk. In addition, the results do not indicate

significant or widespread contamination associated with the fire at the EQ facility. One site with elevated lead concentrations is under investigation and is most likely due to the older age of this site compared to others sites sampled. Given the limitations cited above and the results of this survey, NCDPH recommends no further sampling. Further, the results indicate that no additional cleaning measures are necessary.

### **References**

- 1) World Trade Center Indoor Environmental Assessment: Response to Peer Review Comments on the Report for Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks, US EPA, NY City Dept of Health and Mental Hygiene, Agency for Toxic Substances and Disease Registry, NY State Dept of Health, and Occupational Safety and Health Administration. May 2003.
- 2) Suggested Action Levels for Indoor Mercury Vapors in Homes or Businesses with Indoor Gas Regulators, ATSDR. This document was produced on December 4, 2000.

### **Attachments**

Table 1 - Wipe Sampling Results  
Table 2 – Mercury Vapor Sampling Results  
Sampling Form

# Apex Fire

## Indoor Environmental Evaluation

### Sampling Form

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Telephone numbers: \_\_\_\_\_

#### Information about the site:

Description (house, school, business, etc): \_\_\_\_\_

Unvented combustion devices: \_\_\_\_\_

Energy source for the furnace: \_\_\_\_\_

Indoor tobacco smoking: \_\_\_\_\_

Cleaning history since the fire on October 5, 2006: \_\_\_\_\_

\_\_\_\_\_

#### Wipe Samples:

<u>Location</u>	<u>Type</u>	<u>Sample #</u>
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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### Mercury vapor monitoring results:

Time: \_\_\_\_\_ inside: \_\_\_\_\_

Time: \_\_\_\_\_ outside: \_\_\_\_\_

Person(s) collecting information: \_\_\_\_\_

**Table 1 - Wipe Sampling Results**  
**Summary of Indoor Surface Sampling Results (Sorted By Sample #) in micrograms per square meter**  
**Apex, NC**

Site	Distance‡ (Miles)	Sample	ug/m2	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Nickel	Zinc	Vanadium	Total PAH	HCN	
				387*	109752*	3136*	1557*	4704*	31358*	62716*	270*	31358*	157*	7839*	7839*	31358*	470366*	10975*	145*	(Ref)	
1	0.16																				
		001	CR																	<0.077	
		002	CR																	<0.077	
		003	CR																		< 40
		004	CR																		< 40
		005	CR	1.94	50.40	<0.55	5.38	16.50	0.58	124.00	45.60	16.00	0.46	<0.52	2.46	66.30	1680.00	1.23			
		N/A	BR																		
		SITE 1 AVERAGE		1.94	50.40	<0.55	5.38	16.50	0.58	124.00	45.60	16.00	0.46	<0.52	2.46	66.30	1680.00	1.23	<0.077	< 40	
2	0.21																				
		010	CR	1.72	34.8	<0.55	4.03	12.90	3.33	114.00	41.0	18.60	<0.41	<0.52	< 0.57	12.40	169.00	1.17			
		011	CR																	<0.077	
		012	CR																		< 40
		013	BR	1.47	44.6	<0.55	2.20	12.0	0.36	68.20	39.60	14.10	<0.41	<0.52	<0.57	7.80	883.00	1.10			
		014	BR																	<0.077	
		015	BR																		< 40
		SITE 2 AVERAGE		1.60	39.70	<0.55	3.12	12.45	1.85	91.10	40.30	16.35	<0.41	<0.52	<0.57	10.10	526.00	1.14	<0.077	< 40	
5	0.52																				
		016	CR	7.85	95.1	<0.55	4.88	28.60	1.99	163.00	44.30	87.90	3.80	1.09	<0.57	33.90	3150.00	3.59			
		017	CR																	<0.077	
		018	CR																		< 40
		019	BR	1.74	55.90	<0.55	13.40	13.70	0.43	67.50	27.90	15.20	<0.41	<0.52	<0.57	16.50	1430.00	1.05			
		020	BR																	<0.077	
		021	BR																		< 40
		022	Blank	1.56	16.9	<0.55	<0.45	12.80	0.36	52.20	24.90	10.60	<0.41	<0.52	<0.57	3.59	1760.00	0.80			
		023	Blank																	<0.077	
		024	Blank																		< 40
		SITE 5 AVERAGE		4.80	75.50	<0.55	9.14	21.15	1.21	115.25	36.10	51.55	1.90	0.55	<0.57	25.20	2290.00	2.32	<0.077	< 40	
3	0.24																				
		025	CR	1.60	30.5	<0.55	4.91	12.50	0.27	52.60	25.20	12.10	<0.41	<0.52	<0.57	6.32	1850.00	0.84			
		026	CR																	<0.077	
		027	CR																		< 40
		028	BR	2.76	78.90	<0.55	5.94	16.70	1.11	86.80	142.00	29.10	<0.41	<0.52	<0.57	17.10	1540.00	2.55			
		029	BR																	<0.077	
		030	BR																		< 40
		SITE 3 AVERAGE		2.18	54.70	<0.55	5.43	14.60	0.69	69.70	83.60	20.60	<0.41	<0.52	<0.57	11.71	1695.00	1.70	<0.077	< 40	
10	0.76																				
		031	CR	2.63	36.30	<0.55	1.87	15.80	16.0	82.30	41.90	48.70	<0.41	0.55	<0.57	9.73	3100.00	1.76			
		032	CR																	<0.077	
		033	CR																		< 40
		034	BR	2.23	68.90	<0.55	7.38	15.60	0.61	8.82	48.20	19.20	<0.41	<0.52	<0.57	27.30	1140.00	1.34			
		035	BR																	<0.077	
		036	BR																		< 40
		SITE 10 AVERAGE		2.43	52.60	<0.55	4.63	15.70	8.31	45.56	45.05	33.95	<0.41	0.28	<0.57	18.52	2120.00	1.55	<0.077	< 40	
Site	Distance‡	Sample		Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Nickel	Zinc	Vanadium	Total PAH	HCN	

(Miles)	ug/m2		387*	109752*	3136*	1557*	4704*	31358*	62716*	270*	31358*	157*	7839*	7839*	31358*	470366*	10975*	145*	(Ref)	
8	0.6																			
		040	CR	1.84	63.40	<0.55	1.16	16.0	0.35	65.60	27.40	15.90	<0.41	<0.52	<0.57	8.70	2500.00	1.08		
		041	CR															<0.077		
		042	CR																< 40	
		043	BR	1.57	42.70	<0.55	2.37	14.0	0.79	78.40	26.50	13.70	<0.41	<0.52	0.85	16.80	4060.00	0.99		
		044	BR															<0.077		
		045	BR																< 40	
		SITE 8 AVERAGE		1.71	53.05	<0.55	1.77	15.00	0.57	72.00	26.95	14.80	<0.41	<0.52	0.43	12.75	3280.00	1.04	<0.077	< 40
21	1.72																			
		046	CR	6.46	59.20	<0.55	4.07	22.30	1.10	74.60	29.80	28.70	<0.41	<0.52	<0.57	19.40	3540.00	1.39		
		047	CR															<0.077		
		048	CR																< 40	
		049	BR	2.62	76.90	<0.55	1.41	16.30	6.24	67.20	58.90	49.80	<0.41	0.61	<0.57	7.47	1090.00	1.48		
		050	BR															<0.077		
		051	BR																< 40	
		052	Blank	1.52	16.60	<0.55	0.54	12.60	<0.25	49.80	23.50	10.20	<0.41	<0.52	<0.57	3.22	3940.00	0.81		
		053	Blank															<0.077		
		054	Blank																< 40	
		SITE 21 AVERAGE		4.54	68.05	<0.55	2.74	19.30	3.67	70.90	44.35	39.25	<0.41	<0.52	<0.57	13.44	2315.00	1.44	<0.077	< 40
27	0.76																			
		055	CR	1.73	47.70	<0.55	7.86	1.22	0.29	57.20	24.50	13.90	<0.41	<0.52	<0.57	11.70	2960.00	0.93		
		056	CR															<0.077		
		057	CR																< 40	
		058	BR	2.25	73.20	<0.55	2.93	14.90	0.78	70.60	65.60	16.90	<0.41	0.74	<0.57	8.39	1370.00	1.56		
		059	BR															<0.077		
		060	BR																< 40	
		SITE 27 AVERAGE		1.99	60.45	<0.55	5.40	8.06	0.54	63.90	45.05	15.40	<0.41	0.30	<0.57	10.05	2165.00	1.25	<0.077	< 40
24	1.23																			
		061	CR	2.13	3.80	<0.55	2.69	16.10	0.39	67.0	29.90	26.0	<0.41	<0.52	<0.57	6.81	951.00	2.91		
		062	CR															<0.077		
		063	CR																< 40	
		064	BR	2.05	91.80	<0.55	2.43	16.20	0.38	76.40	27.80	37.50	<0.41	<0.52	<0.57	13.50	788.00	1.73		
		065	BR															<0.077		
		066	BR																< 40	
		SITE 24 AVERAGE		2.09	47.80	<0.55	2.56	16.15	0.39	71.70	28.85	31.75	<0.41	<0.52	<0.57	10.16	869.50	2.32	<0.077	< 40
23	0.86																			
		070	CR	2.51	55.90	<0.55	2.20	18.60	0.52	86.0	32.60	18.70	<0.41	<0.52	0.79	12.50	912.00	1.23		
		071	CR															<0.077		
		072	CR																< 40	
		073	BR	2.98	135.00	<0.55	4.68	20.80	59.10	87.80	40.90	82.90	<0.41	0.59	0.97	13.30	919.00	1.56		
		074	BR															<0.077		
		075	BR																< 40	
		SITE 23 AVERAGE		2.75	95.45	<0.55	3.44	19.70	29.81	86.90	36.75	50.80	<0.41	0.30	0.88	12.90	915.50	1.40	<0.077	< 40
25	0.71																			
		076	CR	3.23	41.30	<0.55	1.20	18.50	0.47	74.0	28.50	22.10	<0.41	<0.52	<0.57	5.41	2110.00	1.38		
		077	CR															<0.077		
		078	CR																< 40	
		079	BR	3.32	70.90	<0.55	7.42	17.30	0.38	74.80	31.10	18.70	0.65	0.67	<0.57	8.52	964.00	1.29		

Site	Distance‡	Sample	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Nickel	Zinc	Vanadium	Total PAH	HCN
	(Miles)	ug/m2	387*	109752*	3136*	1557*	4704*	31358*	62716*	270*	31358*	157*	7839*	7839*	31358*	470366*	10975*	145*	(Ref)





121	CR	2.25	181.00	<0.55	3.24	20.70	0.65	91.80	31.50	33.10	<0.41	0.69	<0.57	33.70	3010.00	2.11		
122	CR																1.00	
123	CR																	< 40
124	BR	1.90	56.70	<0.55	6.15	17.30	0.29	61.40	26.80	66.10	0.57	1.07	<0.57	10.50	10300.00	1.43		
125	BR																1.00	
126	BR																	< 40
<b>SITE 28 AVERAGE</b>		<b>2.08</b>	<b>118.85</b>	<b>&lt;0.55</b>	<b>4.70</b>	<b>19.00</b>	<b>0.47</b>	<b>76.60</b>	<b>29.15</b>	<b>49.60</b>	<b>0.28</b>	<b>0.88</b>	<b>&lt;0.57</b>	<b>22.10</b>	<b>6655.00</b>	<b>1.77</b>	<b>1.00</b>	<b>&lt; 40</b>
<b>33</b>	<b>1.12</b>																	
130	CR	2.04	43.60	<0.55	1.67	16.70	<0.25	63.30	28.00	57.00	<0.41	0.80	<0.57	6.80	9490.00	1.36		
131	CR																1.00	
132	CR																	< 40
133	BR	2.17	145.00	<0.55	1.81	14.90	0.50	125.00	47.30	20.80	<0.41	0.54	<0.57	8.97	1890.00	1.10		
134	BR																1.00	
135	BR																	< 40
<b>SITE 33 AVERAGE</b>		<b>2.11</b>	<b>94.30</b>	<b>&lt;0.55</b>	<b>1.74</b>	<b>15.80</b>	<b>0.25</b>	<b>94.15</b>	<b>37.65</b>	<b>38.90</b>	<b>&lt;0.41</b>	<b>0.67</b>	<b>&lt;0.57</b>	<b>7.89</b>	<b>5690.00</b>	<b>1.23</b>	<b>1.00</b>	<b>&lt; 40</b>
<b>36</b>	<b>1.25</b>																	
136	CR	3.67	78.20	<0.55	1.89	22.90	1.14	120.00	38.90	101.00	<0.41	0.73	<0.57	13.70	5720.00	2.71		
137	CR																1.00	
138	CR																	< 40
139	BR	1.99	182.00	<0.55	7.26	12.10	0.35	74.60	30.10	41.20	0.60	<0.52	1.43	8.44	1470.00	1.22		
140	BR																1.00	
141	BR																	< 40
<b>SITE 36 AVERAGE</b>		<b>2.83</b>	<b>130.10</b>	<b>&lt;0.55</b>	<b>4.58</b>	<b>17.50</b>	<b>0.75</b>	<b>97.30</b>	<b>34.50</b>	<b>71.10</b>	<b>&lt;0.41</b>	<b>0.37</b>	<b>&lt;0.57</b>	<b>11.07</b>	<b>3595.00</b>	<b>1.97</b>	<b>1.00</b>	<b>&lt; 40</b>
<b>32</b>	<b>1.38</b>																	
142	CR	2.08	102.00	<0.55	2.66	15.20	4.06	64.50	30.10	73.00	0.43	0.60	0.91	6.83	9370.00	1.38		
143	CR																1.00	
144	CR																	< 40
145	BR	1.49	226.00	<0.55	3.55	11.20	<0.25	52.50	23.80	17.70	<0.41	<0.52	0.59	11.00	1770.00	0.88		
146	BR																1.00	
147	BR																	< 40
<b>SITE 32 AVERAGE</b>		<b>1.79</b>	<b>164.00</b>	<b>&lt;0.55</b>	<b>3.11</b>	<b>13.20</b>	<b>2.03</b>	<b>58.50</b>	<b>26.95</b>	<b>45.35</b>	<b>0.22</b>	<b>0.30</b>	<b>0.75</b>	<b>8.92</b>	<b>5570.00</b>	<b>1.13</b>	<b>1.00</b>	<b>&lt; 40</b>
<b>22</b>	<b>0.84</b>																	
148	CR	1.89	98.90	<0.55	2.74	15.60	0.29	64.40	27.00	51.20	<0.41	0.57	<0.57	8.05	8530.00	1.25		
149	CR																<0.077	
150	CR																	< 40
151	BR	1.77	239.00	<0.55	6.97	13.00	<0.25	58.60	28.40	17.50	<0.41	<0.52	0.69	8.20	2440.00	0.95		
152	BR																<0.077	
153	BR																	< 40
<b>SITE 22 AVERAGE</b>		<b>1.83</b>	<b>168.95</b>	<b>&lt;0.55</b>	<b>4.86</b>	<b>14.30</b>	<b>0.15</b>	<b>61.50</b>	<b>27.70</b>	<b>34.35</b>	<b>&lt;0.41</b>	<b>0.28</b>	<b>0.35</b>	<b>8.13</b>	<b>5485.00</b>	<b>1.10</b>	<b>&lt;0.077</b>	<b>&lt; 40</b>
<b>7</b>	<b>0.63</b>																	
157	CR	2.22	103.00	<0.55	4.43	16.70	1.11	89.50	31.40	78.80	<0.41	<0.52	0.63	12.40	7090.00	1.56		
158	CR																<0.077	
159	CR																	< 40
160	BR	1.91	100.00	<0.55	33.10	14.80	55.00	92.50	33.40	39.80	<0.41	<0.52	0.85	22.00	4110.00	1.38		
161	BR																<0.077	
162	BR																	< 40
<b>SITE 7 AVERAGE</b>		<b>2.07</b>	<b>101.50</b>	<b>&lt;0.55</b>	<b>18.77</b>	<b>15.75</b>	<b>28.06</b>	<b>91.00</b>	<b>32.40</b>	<b>59.30</b>	<b>&lt;0.41</b>	<b>&lt;0.52</b>	<b>0.74</b>	<b>17.20</b>	<b>5600.00</b>	<b>1.47</b>	<b>&lt;0.077</b>	<b>&lt; 40</b>

Site	Distance‡ (Miles)	Sample	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Nickel	Zinc	Vanadium	Total PAH	HCN
41	0.63	163 CR	387*	109752*	3136*	1557*	4704*	31358*	62716*	270*	31358*	157*	7839*	7839*	31358*	470366*	10975*	145*	(Ref)
			2.72	186.00	<0.55	17.50	16.30	0.54	72.70	34.80	138.00	<0.41	0.85	<0.57	9.96	11300.00	1.86		

164	CR																	<0.077	
165	CR																		< 40
166	BR	2.35	152.00	<0.55	5.59	18.80	0.40	92.70	45.20	37.40	<0.41	0.56	<0.57	10.00	2130.00	1.63			
167	BR																	<0.077	
168	BR																		< 40
169	Blank	1.55	173.00	<0.55	1.74	12.10	<0.25	49.30	24.40	29.70	<0.41	<0.52	<0.57	4.57	2490.00	0.93			
170	Blank																	<0.077	
171	Blank																		< 40
<b>SITE 41 AVERAGE</b>		<b>2.54</b>	<b>169.00</b>	<b>&lt;0.55</b>	<b>11.55</b>	<b>17.55</b>	<b>0.47</b>	<b>82.70</b>	<b>40.00</b>	<b>87.70</b>	<b>&lt;0.41</b>	<b>0.71</b>	<b>&lt;0.57</b>	<b>9.98</b>	<b>6715.00</b>	<b>1.75</b>	<b>&lt;0.077</b>	<b>&lt; 40</b>	
<b>43</b>	<b>0.63</b>																		
172	CR	4.47	105.00	<0.55	3.92	17.80	1.09	76.70	256.00	122.00	<0.41	0.99	<0.57	10.20	13200.00	2.93			
173	CR																	<0.077	
174	CR																		< 40
175	BR	5.17	243.00	<0.55	16.30	33.00	1.06	237.00	133.00	54.40	0.51	<0.52	<0.57	13.30	3850.00	2.25			
176	BR																	1.00	
177	BR																		< 40
<b>SITE 43 AVERAGE</b>		<b>4.82</b>	<b>174.00</b>	<b>&lt;0.55</b>	<b>10.11</b>	<b>25.40</b>	<b>1.08</b>	<b>156.85</b>	<b>194.50</b>	<b>88.20</b>	<b>&lt;0.41</b>	<b>0.50</b>	<b>&lt;0.57</b>	<b>11.75</b>	<b>8525.00</b>	<b>2.59</b>	<b>0.50</b>		
<b>9</b>	<b>1.25</b>																		
178	CR	2.18	229.00	<0.55	4.89	15.70	2.92	86.60	30.60	29.80	<0.41	<0.52	0.66	9.58	2770.00	1.66		< 40	
179	CR																	<0.077	
180	CR																		< 40
181	BR	2.14	94.30	<0.55	1.55	15.40	1.07	85.30	29.40	51.70	0.60	0.71	<0.57	78.10	8340.00	1.38			
182	BR																	<0.077	
183	BR																		
<b>SITE 9 AVERAGE</b>		<b>2.16</b>	<b>161.65</b>	<b>&lt;0.55</b>	<b>3.22</b>	<b>15.55</b>	<b>2.00</b>	<b>85.95</b>	<b>30.00</b>	<b>40.75</b>	<b>&lt;0.41</b>	<b>0.36</b>	<b>0.33</b>	<b>43.84</b>	<b>5555.00</b>	<b>1.52</b>	<b>&lt;0.077</b>	<b>&lt; 40</b>	
<b>26</b>	<b>0.76</b>																		
187	CR	1.87	223.00	<0.55	1.74	12.70	1.35	71.30	53.60	34.30	<0.41	1.14	<0.57	25.00	6330.00	2.55			
188	CR																	<0.077	
189	CR																		< 40
190	BR	1.88	389.00	<0.55	9.74	13.20	3.54	71.80	68.90	62.00	<0.41	0.58	<0.57	11.30	3000.00	1.45			
191	BR																	<0.077	
192	BR																		< 40
<b>SITE 26 AVERAGE</b>		<b>1.88</b>	<b>306.00</b>	<b>&lt;0.55</b>	<b>5.74</b>	<b>12.95</b>	<b>2.45</b>	<b>71.55</b>	<b>61.25</b>	<b>48.15</b>	<b>&lt;0.41</b>	<b>0.86</b>	<b>&lt;0.57</b>	<b>18.15</b>	<b>4665.00</b>	<b>2.00</b>	<b>&lt;0.077</b>	<b>&lt; 40</b>	
<b>11</b>	<b>0.71</b>																		
193	CR	2.58	158.00	<0.55	4.04	14.90	0.56	137.00	36.20	46.20	<0.41	0.68	<0.57	16.70	7100.00	1.65			
194	CR																	<0.077	
195	CR																		< 40
196	BR	1.66	194.00	<0.55	4.31	12.90	0.27	68.90	24.70	18.00	<0.41	<0.52	<0.57	5.86	2440.00	1.07			
197	BR																	<0.077	
198	BR																		< 40
<b>SITE 11 AVERAGE</b>		<b>2.12</b>	<b>176.00</b>	<b>&lt;0.55</b>	<b>4.18</b>	<b>13.90</b>	<b>0.42</b>	<b>102.95</b>	<b>30.45</b>	<b>32.10</b>	<b>&lt;0.41</b>	<b>0.34</b>	<b>&lt;0.57</b>	<b>11.28</b>	<b>4770.00</b>	<b>1.36</b>	<b>&lt;0.077</b>	<b>&lt; 40</b>	
<b>42</b>	<b>2.17</b>																		
199	CR	3.91	56.60	<0.55	2.33	18.30	0.43	84.20	30.80	67.50	<0.41	1.06	<0.57	8.70	8650.00	2.14			
200	CR																	1.00	
201	CR																		< 40
202	BR	6.72	158.00	<0.55	15.60	24.50	1.01	135.00	36.60	62.50	<0.41	2.31	<0.57	17.20	3490.00	2.85			

Site	Distance‡ (Miles)	Sample	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Selenium	Silver	Nickel	Zinc	Vanadium	Total PAH	HCN (Ref)	
		ug/m2	387*	109752*	3136*	1557*	4704*	31358*	62716*	270*	31358*	157*	7839*	7839*	31358*	470366*	10975*	145*		
		203 BR																	<0.077	
		204 BR																		< 40
		<b>SITE 42 AVERAGE</b>	<b>5.32</b>	<b>107.30</b>	<b>&lt;0.55</b>	<b>8.97</b>	<b>21.40</b>	<b>0.72</b>	<b>109.60</b>	<b>33.70</b>	<b>65.00</b>	<b>&lt;0.41</b>	<b>1.69</b>	<b>&lt;0.57</b>	<b>12.95</b>	<b>6070.00</b>	<b>2.50</b>	<b>0.50</b>	<b>&lt; 40</b>	

<b>37</b>	<b>1.88</b>																	
205	CR	2.08	148.00	<0.55	1.24	14.40	<0.25	75.70	26.10	14.10	<0.41	<0.52	<0.57	7.26	2630.00	1.18		
206	CR																1.00	
207	CR																	< 40
208	BR	2.43	291.00	<0.55	2.57	12.50	<0.25	57.20	24.80	11.30	<0.41	<0.52	<0.57	5.21	1780.00	1.02		
209	BR																1.00	
210	BR																	< 40
211	Blank	1.66	58.90	<0.55	0.87	12.00	<0.25	55.70	23.50	10.00	<0.41	<0.52	<0.57	4.88	1510.00	0.89		
212	Blank																	<0.077
213	Blank																	< 40
<b>SITE 37 AVERAGE</b>		<b>2.26</b>	<b>219.50</b>	<b>&lt;0.55</b>	<b>1.91</b>	<b>13.45</b>	<b>&lt;0.25</b>	<b>66.45</b>	<b>25.45</b>	<b>12.70</b>	<b>&lt;0.41</b>	<b>&lt;0.52</b>	<b>&lt;0.57</b>	<b>6.24</b>	<b>2205.00</b>	<b>1.10</b>	<b>1.00</b>	<b>&lt; 40</b>
<b>45</b>	<b>0.29</b>																	
214	CR	3.95	219.00	<0.55	11.00	23.40	1.14	246.00	64.50	57.00	1.60	1.18	1.56	54.40	5440.00	3.24		
215	CR																1.00	
216	CR																	< 40
217	BR	2.45	401.00	<0.55	11.10	17.70	0.77	150.00	58.30	41.40	1.53	0.90	<0.57	27.30	2040.00	2.82		
218	BR																	<0.077
219	BR																	< 40
<b>SITE 45 AVERAGE</b>		<b>3.20</b>	<b>310.00</b>	<b>&lt;0.55</b>	<b>11.05</b>	<b>20.55</b>	<b>0.96</b>	<b>198.00</b>	<b>61.40</b>	<b>49.20</b>	<b>1.57</b>	<b>1.04</b>	<b>0.78</b>	<b>40.85</b>	<b>3740.00</b>	<b>3.03</b>	<b>0.50</b>	<b>&lt; 40</b>
<b>35</b>	<b>0.68</b>																	
220	CR	65.00	472.00	<0.55	112.00	71.00	7.72	270.00	326.00	270.00	2.46	1.87	<0.57	160.00	6380.00	8.74		
221	CR																1.00	
222	CR																	< 40
223	BR	34.20	580.00	<0.55	19.00	64.00	25.00	298.00	294.00	184.00	4.58	2.37	1.51	80.40	4370.00	9.39		
224	BR																2.00	
225	BR																	< 40
<b>SITE 35 AVERAGE</b>		<b>49.60</b>	<b>526.00</b>	<b>&lt;0.55</b>	<b>65.50</b>	<b>67.50</b>	<b>16.36</b>	<b>284.00</b>	<b>310.00</b>	<b>227.00</b>	<b>3.52</b>	<b>2.12</b>	<b>0.76</b>	<b>120.20</b>	<b>5375.00</b>	<b>9.07</b>	<b>1.50</b>	<b>&lt; 40</b>

\* Settled dust screening values from the World Trade Center Report (1)

‡ Distance in miles from the EQ facility

**Table 2 - Mercury Vapor Sampling Results**  
**Summary of Indoor and Outdoor Mercury Vapor Readings**  
**Apex, NC**

Site #	Date	Time	Hg Reading	Hg Reading	
			Indoor (ng/m3) (Ref)	Outdoor (ng/m3) (Ref)	
1	10/20/2006	1603	295	335	
2	10/23/2006	1230	72	72	
3	10/23/2006	1427	111	113	
4	Declined	Declined	Declined	Declined	Declined
5	10/23/2006	1306	93	93	
6	Declined	Declined	Declined	Declined	Declined
7	10/25/2006	1435	66	69	
8	10/23/2006	1531	83	84	
9	10/25/2006	1633	57	35	
10	10/23/2006	1459	90	94	
11	10/26/2006	0952	65	70	
12	10/24/2006	1315	57	68	
13	10/24/2006	N/A	N/A	N/A	Dead Batt
14	10/24/2006	1350	72	80	
15	Blanks	Blanks	Blanks	Blanks	Blanks
16	Blanks	Blanks	Blanks	Blanks	Blanks
21	10/23/2006	N/A	N/A	N/A	Dead Batt
22	10/25/2006	1348	50	41	
23	10/24/2006	0959	57	60	
24	10/24/2006	0934	44	59	
25	10/24/2006	1050	3	1	
26	10/25/2006	1734	57	62	
27	10/23/2006	N/A	N/A	N/A	Dead Batt
28	10/24/2006	N/A	N/A	N/A	Dead Batt
29	10/24/2006	1100	21	30	
30	10/24/2006	1135	29	28	
31	Declined	Declined	Declined	Declined	Declined
32	10/25/2006	1330	40	13	
33	10/24/2006	N/A	N/A	N/A	Dead Batt
34	Declined	Declined	Declined	Declined	Declined
35	10/26/2006	1436	91	78	
36	10/25/2006	1158	4	5	
37	10/26/2006	1208	57	55	
38	Blanks	Blanks	Blanks	Blanks	Blanks
39	Blanks	Blanks	Blanks	Blanks	Blanks
41	10/25/2006	1512	61	50	

42		10/26/2006	1130	66	55	
43		10/25/2006	1555	58	51	
44		Declined	Declined	Declined	Declined	Declined
45		10/26/2006	1315	77	70	
46		Blanks	Blanks	Blanks	Blanks	Blanks
47		Blanks	Blanks	Blanks	Blanks	Blanks