

TECHNICAL MEMORANDUM

From: Hal Koechlein
To: Hooshang Boostani
Copies to: Paul Schipfer
Date: September 5, 2003
Subject: Soil Sampling – Coronet Industries Project, Plant City, FL

Objective

The Air Division and Waste Division of EPC completed the collection of soil samples to determine whether long-term deposition of air pollutants from Coronet has rendered the surrounding soils unsafe. The data quality objectives included collection of surficial soil samples that may be contaminated from stack air or other fugitive particulate discharges at the Coronet Industries site. Samples were collected at background locations and at distances within the potential zone of impact (Figure 1). Lead, Arsenic, Cadmium, Cobalt, Beryllium, Boron, Antimony, Nickel, Manganese, Selenium, and Chromium are potential indicator parameters of concern for air emissions from Coronet. The absence or preponderance of such contaminants in the soil will assist in determining whether these areas are impacted by the air emissions. Some of the metals however, are also naturally occurring elements of the soil matrix, or may be introduced by land application of fertilizers, pesticides, fungicides, automobile emissions or other anthropogenic sources. If present, these concentrations will be compared to the permissible levels of metals provided in the Direct Exposure Soil Cleanup Guidance Criteria (Table 1. - Summary from Chapter 62-777). This guidance is set to protect human contact or ingestion of soils.

On 25-26 August 2003, surface soil samples were collected per DEP-SOP-FS 3000. Each soil sample location (Figure 2) selected was beyond an area of suspected drainage erosion or deposition, foot/vehicular traffic, construction or changes in grade, fence posts, tree canopies, active or past citrus groves or other potential sources of cross contamination unless specifically designated. The top inch of soil (organic layer of fresh decaying plant residue) was removed to enable collection of soil less subject to processes of degradation, leaching and chemical speciation. At some locations, the top 2 inches were removed in order to avoid a thick root zone. All samples were collected between a depth of approximately 1 to 3 inches and consisted of moist to dry, silty sand to sandy silt consistent with the Myakka-Basinger-Holopaw poorly drained soil type. The standard operating procedure guidance allows sample collection depth up to 6 to 12 inches. The potential contaminants were not expected to penetrate and accumulate at these depths. At these depths, the soils generally contain more sand, and metals concentrations are expected to be lower than the overlying soil horizon(s) from air deposition.

All samples were collected with plastic spoons individually sealed and transferred into sealed plastic sample bags provided by the Hillsborough County EPC Laboratory. Each sample location was assigned a location number on the sample bag and map (Figure 2). Dates and time of sampling were recorded. The samples were secured in a locked drawer when not under the control of Alain Watson (Air Division) and Hal Koechlein (Waste Division).

Figure 2 shows the locations of the 22 samples collected, two of which were duplicate samples (Location Numbers 9 and 15). A majority of samples were collected approximately 500 to 1000 meters from the Coronet facility (Figure 1). Background samples were collected at two distant residential locations. The background locations were collected at a distance of over 2000 meters from stacks at Coronet and beyond the expected zone of significant particulate deposition. A screening air dispersion model determined this zone, shown in the attached figure (Figure 1).

Laboratory Analytical Results.

The laboratory analytical results of the above samples are shown in the attached (Table 2). The results were compared to the soil cleanup target levels guidance as provided in Chapter 62-777 of the Florida Administrative Code (F.A.C.) (Table 1. - Summary from Chapter 62-777). These concentrations are provided for direct exposure in residential areas and are generally much lower than that of industrial areas.

All metals analyzed were well below direct exposure levels for residential areas when detected. These guidance levels are established to protect human health under normal outdoor activities in residential areas. The concentrations reported are also well below the leachability standards, except for a few lead sample values. This is an indication of little to no potential for leaching of metals from the soil to groundwater.

There appears to be no consistent, conclusive occurrence and distribution of metals to correlate the presence of those detected with a natural or man-made source. The concentrations for the metals were compared to the Background Concentrations of Trace Metals in Florida Surface Soils (Ma, Lena Q. et. al., 1997). Only lead, at location numbers 6 and 10; cadmium, at locations 5 and 6; chromium, at locations numbers 4, 5 and 6; and manganese, at location numbers 3, and 14 appear somewhat elevated above the mean concentrations. This may reflect air deposition but all values are below residential exposure guidance. All values were also well below the highest concentration reported for background soils. Some or all of these metals may result from potential automobile emissions and fertilizer application. Additional soil sample results collected around these and other locations may indicate actual elevated concentrations resulting from long-term air emissions.

Conclusions and Recommendations:

1. All sampling point data reflect concentration values that are well below the specified direct exposure guidance concentrations utilized in State programs for residential environments. In direct terms, all values are within standards considered safe for play and daily activities for private residences.

2. The data reflect values below the leachability criteria and are thus not expected to result in groundwater or surface water contamination. A few locations provided values for lead that approached the “rule of thumb” leachability value of 30 mg/kg, however, they were proximal to roadways and are likely influenced accordingly.
3. The data results indicate expected deposition from an air emissions source such as Coronet, but again, all values were well below action levels for residential environments. It is important to point out that the model used to identify sampling locations is preliminary and EPC is incorporating greater amounts of data into a more accurate Air model to ensure the sampling locations selected were indeed best and representative. If the more precise model(s) identifies additional sampling is needed, EPC will collect more samples.
4. EPC did not address radionuclides in the study for air dispersion based on the history of the facility. It is well known that the Coronet facility and surrounding property are located in an area of former phosphate mining, and that radionuclides are naturally occurring within the matrix of phosphate mined materials. Therefore, the data would not assist in the evaluation of air disposition. Additionally, the Florida Department of Health is performing well sampling that includes evaluation of radionuclides and additional soil sampling may be directed resultant of their sampling study.
5. This report and follow-up studies will be forwarded to the Florida Department of Health to assist in their Coronet Industries area wide health study.

Table 1 - Summary from Chapter 62-777 F.A.C., Soil Cleanup Target Levels (SCTLs)

Contaminant	Direct Exposure – Residential (mg/kg)	Direct Exposure – Industrial (mg/kg)	Leachability Based on GW Criteria (mg/kg)
Antimony	26	240	5
Arsenic	0.8	3.7	29
Beryllium	120	800	63
Boron	7000	160000	***
Cadmium	75	1300	8
Chromium	210	420	38
Cobalt	4700	110000	***
Lead	400	920	***
Manganese	1600	22000	***
Nickel	110	28000	130
Selenium	390	10000	5

***Leachability values may be derived using the SPLP test to calculate site specific (SCTLs)

ENVIRONMENTAL PROTECTION COMMISSION LABORATORY

TABLE 2. Coronet Industries Special Study Results

	29	63	8	38	***	***	130	5	***	5	***	
Leachability Based on Groundwater	29	63	8	38	***	***	130	5	***	5	***	
Direct Exposure-Industrial (mg/kg)	3.7	800	1300	420	920	22000	28000	240	110000	10000	160000	
Direct Exposure-Residential (mg/kg)	0.8	120	75	210	400	1600	110	26	4700	390	7000	
Florida Background (mg/kg)**	1.34	0.67	0.07	15.90	11.20	48.80	13.00	0.28	NR	0.25	NR	
	Arsenic	Beryllium	Cadmium	Chromium	Lead	Manganese	Nickel	Antimony	Cobalt	Selenium	Boron	
MDL	0.3581	0.0120	0.0141	0.1459	0.1160	0.0319	0.7667	2.0629	0.0410	0.1616	2.5*	
Lab ID / Sample Location												
4779	Location #1	<0.3581	0.1259	<0.0141	1.8670	2.8240	8.9680	<0.7667	<2.0629	<0.0410	<0.1616	<2.5
1601 MLK Jr. Blvd.												
4780	Location #2	<0.3581	0.1860	<0.0141	4.1640	7.0230	4.8700	0.8554	<2.0629	<0.0410	<0.1616	<2.5
801 Alsobrook St.												
4781	Location #3	<0.3581	0.1648	<0.0141	1.5720	1.8690	3.9830	<0.7667	<2.0629	<0.0410	<0.1616	<2.5
Coronet & Roberts Branch												
4782	Location #4	<0.3581	0.5200	0.9929	17.9400	18.5500	63.5000	3.2680	<2.0629	0.6403	<0.1616	11.6
P.C. Golf Club Entrance												
4783	Location #5	<0.3581	0.4090	2.3430	20.0400	7.9140	16.3000	2.2040	<2.0629	0.2550	<0.1616	3.8
500m wsw of Facility on Coronet Rd												
4784	Location #6	<0.3581	0.4832	2.8760	20.5900	29.6700	42.9200	3.5980	<2.0629	0.7897	<0.1616	5.5
200m South on Clemons Rd.												
4785	Location #7	<0.3581	0.2386	0.2797	14.1300	16.1200	39.4300	2.5570	<2.0629	0.2580	<0.1616	<2.5
3108 Laurel Ln.												
4786	Location #8	<0.3581	0.2969	0.6477	8.8360	17.9400	15.7500	3.3580	<2.0629	0.3812	<0.1616	<2.5
2201 Clemons Rd.												
4787	Location #9A	<0.3581	0.3543	0.0800	9.1500	8.0440	14.2500	1.8950	<2.0629	0.1658	<0.1616	<2.5
Fire Station #25												
4788	Location #9B	<0.3581	0.3596	0.1219	9.9310	8.8870	12.9300	2.0790	<2.0629	0.1782	<0.1616	<2.5
Fire Station #25 (Duplicate Sample)												
4789	Location #10	<0.3581	0.4032	0.9207	13.5100	25.1700	22.3100	3.4660	<2.0629	0.4239	<0.1616	<2.5
Coronet & Cason												
4790	Location #11	<0.3581	0.3125	0.2174	8.2470	14.9200	12.3500	2.1320	<2.0629	0.1935	<0.1616	<2.5
3600 Century & Cason Rd.												
4791	Location #12	<0.3581	0.1733	<0.0141	4.4900	8.1400	26.7900	1.8740	<2.0629	0.1088	<0.1616	<2.5
204 N. Webb Rd.(Background Sample)												
4792	Location #13	<0.3581	0.1702	<0.0141	2.4620	8.1570	1.4750	1.8720	<2.0629	<0.0410	<0.1616	<2.5
Wilder Rd. & Sansone Blvd. (Background Sample)												
4793	Location #14	<0.3581	0.1218	<0.0141	2.8240	10.8200	50.5200	1.4380	<2.0629	0.1135	<0.1616	3.6
1500 S. Wiggins Rd.												
4794	Location #15A	<0.3581	0.1474	<0.0141	3.4090	1.5910	1.4550	<0.7667	<2.0629	<0.0410	<0.1616	<2.5
Springhead Church												
4795	Location #15B	<0.3581	0.2007	<0.0141	3.6100	0.3548	1.7890	<0.7667	<2.0629	<0.0410	<0.1616	<2.5
15B Springhead Church (Duplicate Sample)												
4796	Location #16	<0.3581	0.3743	<0.0141	10.4500	2.6660	20.8100	2.4290	<2.0629	0.1865	<0.1616	<2.5
Fancy Farms Rd.												
4797	Location #17	<0.3581	0.1694	0.5011	6.9840	9.5190	33.8400	1.4810	<2.0629	0.2090	<0.1616	5.8
2119 S. Wiggins Rd.												
4798	Location #18	<0.3581	0.1780	<0.0141	5.3840	3.0110	14.0400	2.0450	<2.0629	0.1398	<0.1616	<2.5
Former Grove on Cason Rd.												
4799	Location #19	<0.3581	0.2926	0.4143	9.4420	3.5750	11.4900	1.0500	<2.0629	0.1191	<0.1616	<2.5
Lexie Ln.												
4800	Location #20	<0.3581	0.1458	0.0873	5.9590	5.2600	40.0600	1.2750	<2.0629	0.1703	<0.1616	2.5
Cason & S. Wiggins												

* Estimated ** Mean Background for Florida Soils (Lena Q. Ma, 1977) *** Leachability Values may be derived by the SPLP Test to Calculate Site Specific Concentration Target Levels

All values in mg/kg, NR - Not Reported, MDL - Minimum Detection Level

Figure 1- Screening Air Dispersion Model

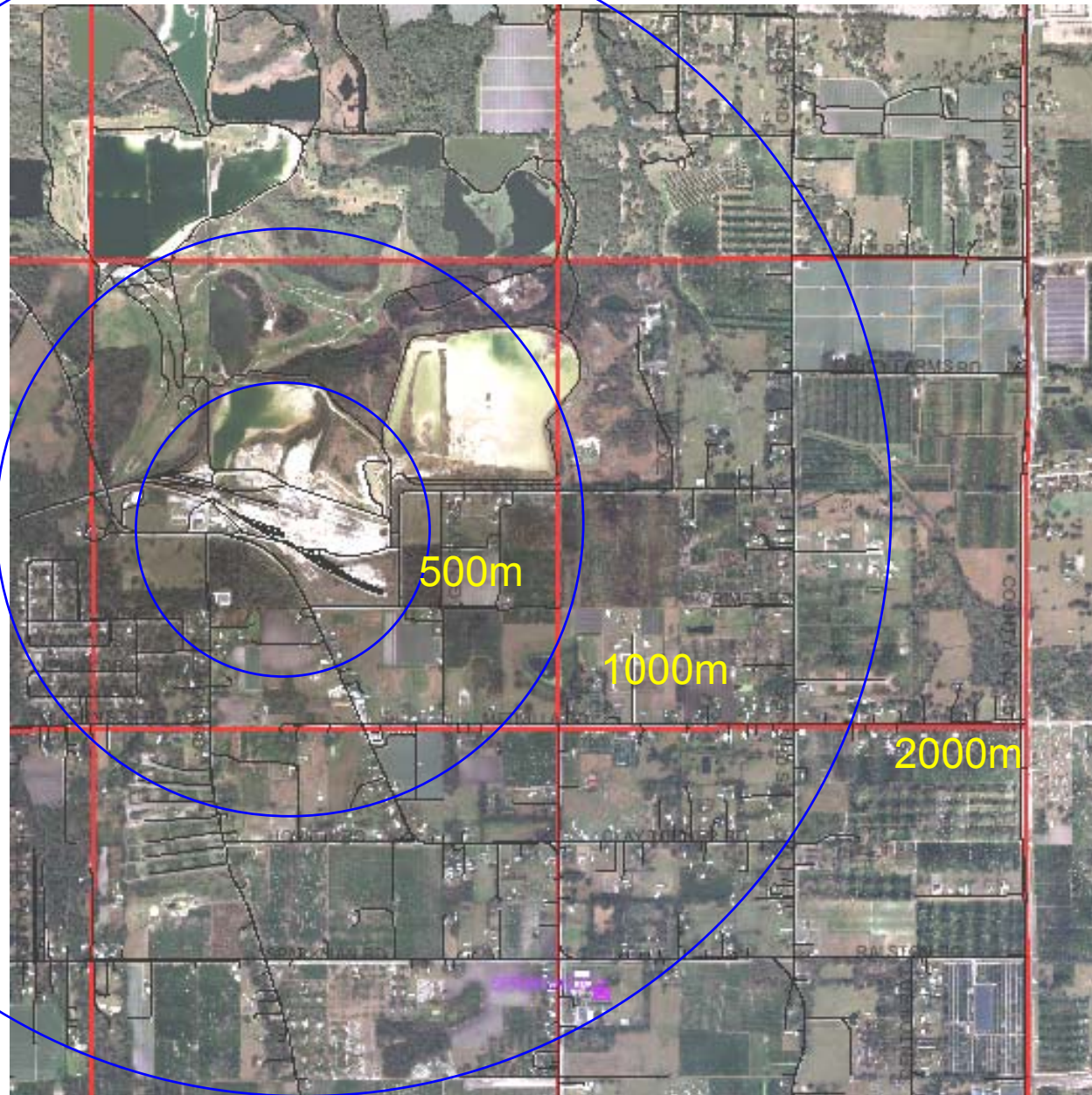


Figure 2 -Soil Sampling Locations

