CONESTOGA-ROVERS & ASSOCIATES

9110 College Pointe Court
Fort Myers, Florida 33919
Telephone: (239) 936-4003 Fax: (239) 936-0819
www.CRAworld.com

DRAFT MEMORANDUM

TO:	Terrence Byrd	REF. NO.:	070181
FROM:	Richard Lewis, Ph.D., P.E.	DATE:	7/21/2014
CC:	Ellis Road PRP Group		
	Mike Reinhardt, CRA		
RE:	Arsenic Detections, Ellis Road Site, Jacksonville, Florida		

Introduction

Several soil samples were collected using the incremental sampling methodology (ISM) from the 12 Decision Units (DUs) at the Ellis Road Site to determine the areal distribution of polychlorinated biphenyl (PCB), which is a known constituent of concern (COC) at the former American Electric Corporation (AEC) parcels (SU-1 and SU-2) where PCBs were managed in the 1980s. Figure 1 illustrates the Site configuration and ISM Sampling Units (SUs) where ISM sampling was conducted. After examining multiple lines of evidence (discussed below) associated with these soil data, it appears that the slightly elevated arsenic concentrations detected within the sampled area are not attributable to the former AEC facility operations.

While not a COC known to have been released from the AEC parcels, Arsenic was also detected in several ISM samples collected on Ellis Road Site at concentrations slightly exceeding the Florida default residential soil cleanup target level (SCTL), per Chapter 62-777, Florida Administrative Code (FAC). Out of the 12 ISM soil samples, Arsenic was detected slightly above its SCTL in three Decision Units (DUs), two of which (SU-4 and SU-7) were residential parcels and not AEC parcels. The analytical results are depicted on Figure 1. With regard to these samples, the following was noted:

- the ISM sample from one AEC parcel (SU-2) contained the lowest Arsenic concentration of 0.696 mg/kg, and
- the highest ISM result occurred far removed from the AEC parcels, and only at a concentration of 2.78 mg/kg - slightly exceeding the SCTL of 2.1 mg/kg.

Lack of Release Pattern or Correlation Between PCBs and Arsenic

Based on review of the data, no concentration gradient exists with respect to Arsenic from the Ellis Road site. That is, the four low-level detections of Arsenic out of 12 ISM samples are sporadic and do not form a release pattern. Moreover, the highest concentration occurred on the eastern portion of the sampling area far removed from the AEC parcels.

In order to understand whether the release of PCBs was associated with the release of Arsenic, the concentrations of each chemical were plotted for paired samples. As shown in Figure 2, the data

correlation between the concentrations of total PCBs and Arsenic (R^2 = 0.142) provides an additional line of evidence that the Arsenic detections are unrelated to PCB detections or the AEC parcels.

Review of historical aerial photographs (1943 and 1959) indicates citrus groves were historically present nearby the sampled areas, but apparently not directly on the affected properties, as shown in Attachment A. Given the lines of evidence presented above and the lack of any indication of a release, it is probable that historical areal land use resulted in the low-level Arsenic concentrations detected in this investigation.

Evaluation of Arsenic Data

Because the Arsenic distribution cannot be associated with a release and is consistent with background concentrations, it is not appropriate to compare the Arsenic results to regulatory values. Moreover, when risk values for the detected Arsenic concentrations were calculated based on EPA's default residential screening level of 0.67 mg/kg (note Florida's value is 2.1 mg/kg but considers a bioavailability factor of 3), none of the detected concentrations exceed EPA's target range of 1E-04 to 1E-06 (Table 1). Hence, Arsenic would not be considered a risk driver within the sampling area if it were the only COC considered in a human health risk assessment for the sampled area and, at these concentrations, it would not be carried forward into a Feasibility Study or remedial action. In addition, no significant risk reduction will be accomplished through reduction of Arsenic concentrations by less than 1 part per million in the sampling area (e.g., from 2.78 to 2.1 mg/kg). Nevertheless, further evaluation was performed to understand the overall exposure concentration, simply to ensure that, even if the detections were associated with background, they would not exceed default regulatory values on an area-wide basis.

While the decision units were selected appropriately for understanding the PCB distribution for the entire sampling area, separately they are not as useful in understanding the significance of the detected Arsenic. As discussed above, there is no evidence that attributes the Arsenic detections to activities related to the AEC parcels. There are several lines of evidence that the detections are not related to the site, namely: there is no reported use of Arsenic as a COC at the site, no release pattern associated with the AEC parcels, and no correlation indicating a co-release with PCBs. Hence, the presence of Arsenic is most likely associated with an overall background level due to historical activities unrelated to the subject site.

Therefore, data from all ten of non-AEC parcels (SU-3 through 12) were combined in order to understand the background exposure concentration in the vicinity of two AEC parcels (SU-1 and SU-2). That is, data from the two AEC parcels were excluded from the analysis because the remediation of PCBs on for the AEC parcels (i.e., excavation and backfill with clean material at SU-1 and SU-2) will remove the any Arsenic impacts detected on AEC parcels to below the default residential SCTL.

Based on the above, the ten "PCB assessment" DUs were combined into a single "Arsenic assessment" DU and the arsenic concentration in each sampling unit were weighted using the sampling area per the Interstate Technology & Regulatory Council (ITRC)'s guidance for ISM. Using the FLUCL tool (which is the accepted tool offered by the Florida Department of Environmental Protection), the average and 95% upper confidence limit (95% UCL) in the mean of the Arsenic concentrations are 1.59 mg/kg and 2.06 mg/kg, respectively, neither of which exceed the default residential SCTL (Table 1). According to the ITRC's technical and regulatory guidance for ISM, if 95% UCL for the DU is below the action level, the entire DU passes, even if the ISM result for one or more of the partitioned areas is above the action level. The

combination of "PCB assessment" DUs into one "Arsenic assessment" DU provides insight into the exposure concentration for the entire area, which is below the default residential SCTL.

Conclusion

To summarize, the detections of Arsenic cannot be attributed to the activities related to the former AEC facility operations, a release pattern associated with the subject site, or a co-release with PCBs. The presence of Arsenic is more likely associated with the localized background concentration. By combining the DUs into one residential decision unit, the 95% UCL of the Arsenic data does not exceed the SCTL of 2.1 mg/kg per Chapter 62-777, FAC.

Figures

SU-10	12/3/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.862
Arsenic	1.900
Total PCBs	248 J

SU-1	12/4/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.575 U
Arsenic	**2.470**
Total PCBs	**5800 J**

SU-4A	12/10/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.386 J
Arsenic	**2.170**
Total PCBs	191

SU-4C	12/10/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.646 U
Arsenic	**2.780**
Total PCBs	350

SU-4B	12/10/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.682 U
Arsenic	1.640
Total PCBs	450

SU-2	12/4/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.570 U
Arsenic	0.696
Total PCBs	**633 J**

SU-5	12/10/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.666 U
Arsenic	1.940
Total PCBs	36 J

SU-6	12/11/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.587 U
Arsenic	1.430
Total PCBs	17 J

SU-3	12/10/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.623 U
Arsenic	1.680
Total PCBs	111 J

SU-7	12/11/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.623 U
Arsenic	**2.210**
Total PCBs	41 J

SU-11	12/3/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.331 J
Arsenic	1.200
Total PCBs	190 J

SU-8	12/11/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.663 U
Arsenic	1.480
Total PCBs	32 J

SU-12	12/9/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.656 U
Arsenic	0.835
Total PCBs	31 J

SU-9	12/11/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.529 U
Arsenic	1.050
Total PCBs	ND

SU-BG	12/10/2013
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.569 U
Arsenic	1.080
Total PCBs	ND

SU-BG (approximately 800 feet West)

SU-1 SU-2 SU-3 SU-4 SU-5 SU-6 SU-7 SU-8 SU-9 SU-10 SU-11 SU-12

Arnold Ave
Tyler Ave
Harriet Ave
Leaming Ave
Harrold Ave
Cynthia St
Ellis Rd S
Roberts St
Stevens St
Overmyer Dr

Legend

- Incremental Composite Sampling Unit
- ND/U — Not Detected
- J — Estimated Concentration
- Approximate Parcel or Property Boundary
- Source Area Decision Unit
- Adjacent Property Decision Unit
- North Residential Decision Unit
- East Residential Decision Unit
- South Residential Decision Unit
- Drainage Ditch Decision Unit

Residential Standards

Parameter	Unit	Limit
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	ng/kg	7
Arsenic	mg/kg	2.1
Total PCBs	ug/kg	500

Note: Values in bold exceed criteria (see table for criteria).

0 75 150 Feet

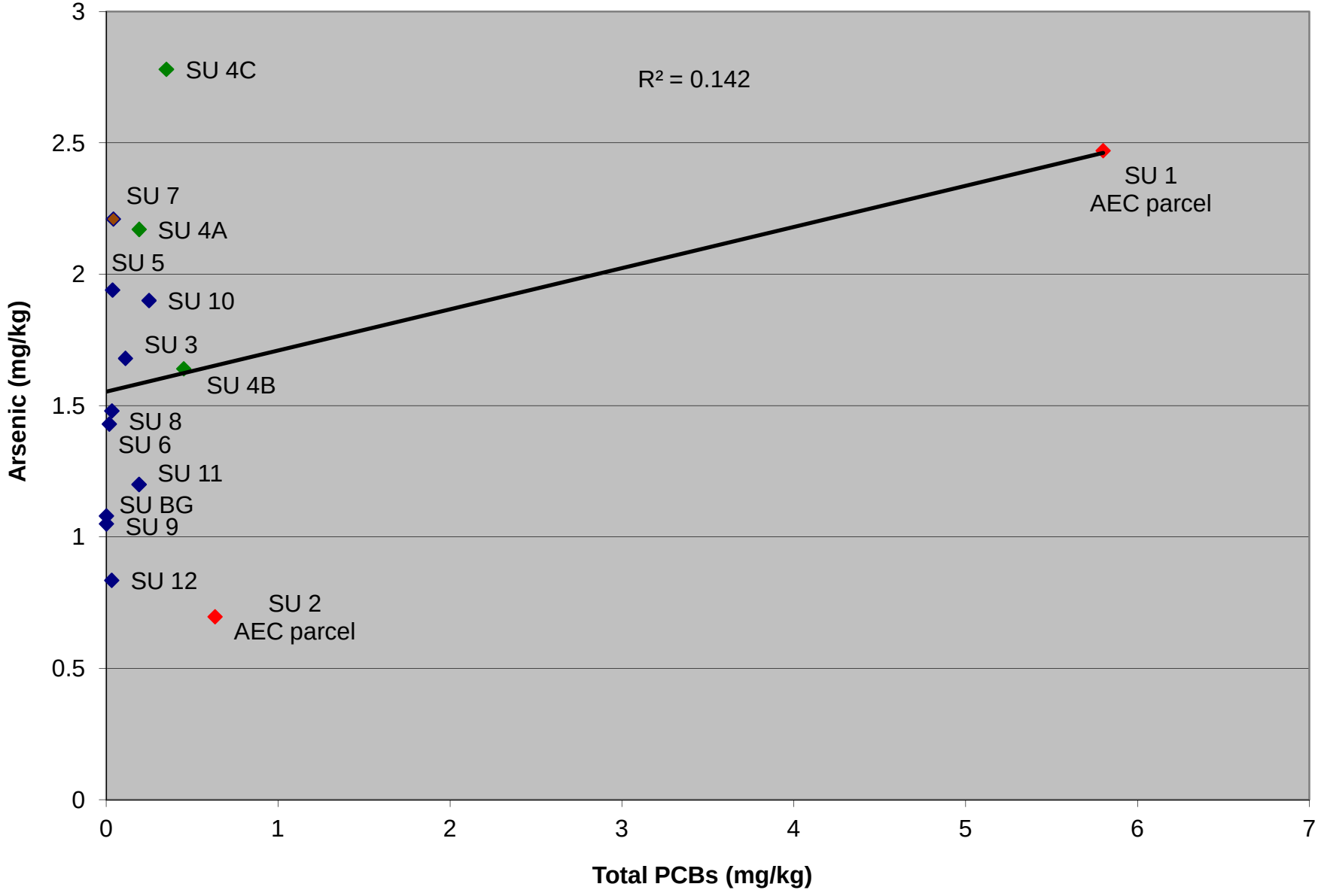
Figure 1
INCREMENTAL COMPOSITE SAMPLING RESULTS, DECEMBER 2013
SAMPLING UNITS
ELLIS ROAD SITE
JACKSONVILLE, FLORIDA

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

RE: Esri World Imagery (2011).

70181-00(MEMO001)PR-BR001 7/22/2014

Figure 2. Correlation Between total PCBs and Arsenic



Tables

TABLE 1

RELATIVE CARCINOGENIC RISK RATIO COMPARISON FOR AS AT ELLIS ROAD

Derivation of Concentration	Arsenic Concentration (mg/kg)	Associated Carcinogenic Risk Ratio[1,2]	Does Associated Risk Ratio Exceed EPA's Target Risk Range of 1E-04 to 1E-06 to Identify Site Related Contaminants of Concern
Florida STL	2.1	3.13433E-06	Not Applicable Florida STL
Highest ISM Result Non-AEC Parcels (SU-04)	2.78	4.14925E-06	NO
Lowest ISM Result Non-AEC Parcels (SU-04)	0.835	1.24627E-06	NO
Lowest ISM Result AEC Parcel (SU-04)	0.696	1.03881E-06	NO
Average Non-AEC Parcels (SU-3 through 12)	1.59	2.37313E-06	NO
95% UCL Non-AEC Parcels (SU-3 through 12)	2.06	3.07463E-06	NO

Footnotes:

1 - Residential screening level for inorganic Arsenic carcinogenic equal 1E-06 of 0.67 mg/kg used to complete risk ratio. Screening value taken from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/ressoil_sl_table_run_MAY2014.pdf

2 - Equation used Calculated Risk Ratio = (1E-06 * Associated As Concentration)/residential As screening level of 0.67 mg/kg

TABLE 2

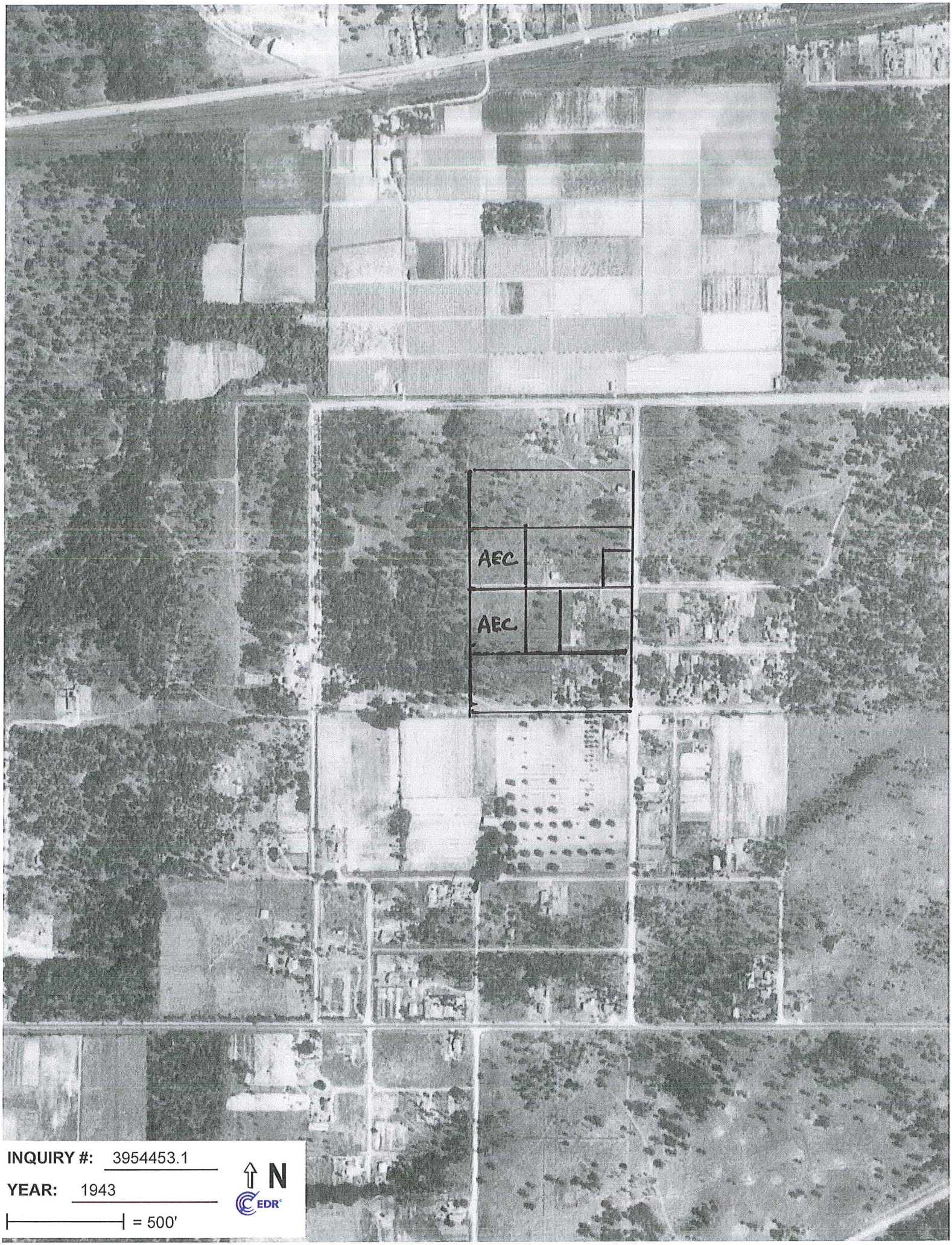
Average and 95% UCL of Arsenic Data

sample_name	loc_name	sampledate	sampletype	Depth	ARSENIC
ISM and/or Average ISM					
SU-10-120313-DH	SU-10	12/3/2013	ICS	(0-6) in BGS	1.9
SU-11-120313-DH	SU-11	12/3/2013	ICS	(0-6) in BGS	1.2
SU-12-120913-DH	SU-12	12/9/2013	ICS	(0-6) in BGS	0.835
SU-3-121013-DH	SU-3	12/10/2013	ICS	(0-6) in BGS	1.68
SU-5-121013-DH	SU-5	12/10/2013	ICS	(0-6) in BGS	1.94
SU-6-121113-DH	SU-6	12/11/2013	ICS	(0-6) in BGS	1.43
SU-7-121113-DH	SU-7	12/11/2013	ICS	(0-6) in BGS	2.21
SU-8-121113-DH	SU-8	12/11/2013	ICS	(0-6) in BGS	1.48
SU-9-121113-DH	SU-9	12/11/2013	ICS	(0-6) in BGS	1.05
Mean of SU-4	SU-4				2.20
Total					15.92
Sampling Area Weighted ISM for Each DU					
SU-10-120313-DH	SU-10	12/3/2013	ICS	(0-6) in BGS	1.29
SU-11-120313-DH	SU-11	12/3/2013	ICS	(0-6) in BGS	1.23
SU-12-120913-DH	SU-12	12/9/2013	ICS	(0-6) in BGS	1.34
SU-3-121013-DH	SU-3	12/10/2013	ICS	(0-6) in BGS	1.71
SU-5-121013-DH	SU-5	12/10/2013	ICS	(0-6) in BGS	0.85
SU-6-121113-DH	SU-6	12/11/2013	ICS	(0-6) in BGS	1.59
SU-7-121113-DH	SU-7	12/11/2013	ICS	(0-6) in BGS	1.27
SU-8-121113-DH	SU-8	12/11/2013	ICS	(0-6) in BGS	3.35
SU-9-121113-DH	SU-9	12/11/2013	ICS	(0-6) in BGS	1.38
Mean of SU-4	SU-4	12/10/2013	ICS	(0-6) in BGS	1.92
Total					15.92
Mean					1.59
95% UCL					2.06
Florida Residential SCTL					2.1

Attachments

Attachment A

Historical Aerial Photographs



INQUIRY #: 3954453.1

YEAR: 1943

= 500'

N

EDR

INQUIRY #: 3954453.1

YEAR: 1959

= 500'

N

EDR