FARM FIELDS AND RESIDENTIAL YARDS SAMPLING AND ANALYSIS PLAN Addendum

Tannery Sludge Farm Fields
Andrew, Buchanan, Clinton and DeKalb Counties

Prepared By:

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Division of Environmental Quality
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Farm Fields and Residential Yards
Sampling and Analysis Plan Addendum

This addendum to the Farm Fields and Residential Yards Sampling and Analysis Plan (SAP) is specifically designed to address two primary modifications to the plan. The first is regarding collection of farm field background and replicate SU samples. The second change has to do with residential yard sample collection and analysis. These changes are discussed separately below.

Farm Field Background and Replicate SU Sampling

The initial plan outlined in the SAP called for on-site sample preparation, XRF analysis and statistical evaluation in real time. Decisions on how many increments per SUIS and how many SUs per DU were to be made in the field based on these analyses. However, adverse weather conditions and other practical considerations required alteration to this plan. All farm field samples were collected over a short period (3 days) in late January, and returned to the ESP laboratory for processing under more controlled conditions.

Analysis of the results from the January event showed even lower concentrations and spatial variability of Cr^{+6} than expected based on the August 2009 pilot study. This was primarily due to the removal of positive matrix interferences achieved by the modification to the analytical method. Although the SAP called for a minimum of 5 SUs per DU based on the original pilot study results, it was determined that a decision could be made for the farm fields within the stated level of uncertainty using data from fewer SUs. The sampling team determined that the 10 increments per SU and 3SUs per DU collected during the January 2010 event would be sufficient.

The January 2010 event however did not include farm field background samples or replicate SU samples as required in the SAP. Therefore, these samples will be collected as part of a second mobilization planned for early April 2010. An updated table from page 23 of the SAP for the re-sampling of the farm fields is provided on the following page.

Table of Analytical Parameters & Sample Numbers for Farm Field Samples

Analyte/Method	Minimum Volume (g)	Sensitivity Requirements	Sample Container	Preservative	Holding Time	Estimated Number of Samples
Cr6+/EPA SW-846 Method 3060a/7199	100	2.0 mg/kg	8 oz glass jar	Cool, 4^0C	30 days	35
Total Fe, Mn, Mo, V, Al, Cr / EPA SW-846 Method 6010	10	0.1 mg/kg	8 oz glass jar	Cool, 4^0C	6 months	10
Total Organic Carbon/ SW-846 Method 9060 *	50	0.05%	8 oz amber glass jar	Cool, 4^0C no sunlight/no head space	30 days	10
Redox Potential / SW-846 Method 9045	20	NA	8 oz glass jar	Cool, 4^0C	30 days	10
pH / SW-846 Method 9045	20	NA	8 oz glass jar	Cool, 4^0C	30 days	10

*Note that all Farm Field samples that were analyzed for TOC were analyzed by SW-846 9060 and not the method listed in the Table on page 23 of the SAP.

Residential Yard Sampling

Residential yard samples were also collected during the January 25-28 sampling event as describe in the SAP. Review of the residential yard analytical data revealed very low recoveries for matrix spikes in one of the three analytical data batches (<1%). Review of all other associated quality control samples from the residential yard analytical batch appeared to point to the soil matrix being strongly reducing and may explain the low matrix spike recoveries. Also a review of the additional parameters (pH, ORP, TOC and total Al, FE, Mn, Mo, amd V) that were analyzed on some of the farm field samples indicated that the soil matrix could be the cause of the low recoveries observed in that analytical batch.. due to the strong reducing nature of some of the soil matrices. However

these additional analytical parameters that may enable us to demonstrate reducing conditions in the yard soils were not requested as part of the initial sampling event.

In order to improve confidence in our ability to determine whether Cr+6 concentrations in residential yard soil is below the screening level of 2.0 ppm, the sampling team decided that the residential yards would be re-sampled and analyzed for additional parameters in order to provide supporting multiple lines of evidence.

Comparison of results from the previously collected SUIS yard samples to the 2nd tier DUIS samples demonstrated that the DU sample provided a representative estimate of the average concentration of Cr^{+6} across each yard. Based on this finding, the yards will be re-sampled by collecting one DUIS sample per yard. The DUIS sample will consist of 5 increments collected from each previously established SU. For example, if the yard contains 4 SUs, the DUIS sample to be collected will contain 20 increments.

The DUIS samples will be processed as describe in the SAP and sent to the contract laboratory for Cr^{+6} analysis by modified SW-846 method 7199 Ion Chromatography Inductively Coupled Plasma Dynamic Reaction Cell Mass Spectrometry. In addition to Cr^{+6}, the yard DU samples will also be analyzed for all the additional parameters that some of the farm field samples were analyzed for (total Al, Fe, Mn, Mo, V, ORP, TOC and pH.) Also yard samples will be analyzed for total Cr. Total Cr was added because the total Cr levels in the yards are below the detection limit of the XRF of soil. An updated table from page 23 of the SAP for the re-sampling of the residential yards is provided below.

Table of Analytical Parameters and Sample Numbers for Residential Yards

Analyte/Method	Minimum Volume (g)	Sensitivity Requirements	Sample Container	Preservative	Holding Time	Estimated Number of Samples
Cr6+/EPA SW-846 Method 3060a/7199	100	0.2 mg/kg	8 oz glass jar	Cool, 4^0C	30 days	15

Analyte/Method	Minimum Volume (g)	Sensitivity Requirements	Sample Container	Preservative	Holding Time	Estimated Number of Samples
Total Fe, Mn, Mo, V, Al, Cr / EPA SW-846 Method 6010	10	0.1 mg/kg	8 oz glass jar	Cool, 4^0C	6 months	15
Total Organic Carbon/ SW-846 Method 9060 *	50	0.05%	8 oz amber glass jar	Cool, 4^0C no sunlight/no head space	30 days	15
Redox Potential / SW-846 Method 9045	20	NA	8 oz glass jar	Cool, 4^0C	30 days	15
pH / SW-846 Method 9045	20	NA	8 oz glass jar	Cool, 4^0C	30 days	15

*Note that all Farm Field samples that were analyzed for TOC were analyzed by SW-846 9060 and not the method listed in the Table on page 23 of the SAP.

As a further line of evidence, an aqueous Cr^{+6} matrix spike will be conducted on <u>each</u> residential yard DUIS sample. Correlation of low Cr^{+6} DUIS sample results with poor matrix spike recovery and strong soil reducing conditions in both the residential yard and farm field samples will demonstrate that the soil matrix does not support formation of Cr^{+6}. Such findings will allow us to confidently determine that the Cr^{+6} concentrations are below the risk-based screening level.

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Date: 4/15/10

To be signed by all staff participating in the sampling event:

"I have read and understand the Sampling and Analysis Plan Addendum"

Name:	Date
[illegible]	4-6-10
Bradley D. Swank	4-6-2010
[illegible]	4-6-2010
Shelly Jackson	4-6-10
Valerie Wilder	4-6-10