CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: April 13, 2011 FILE REF: BRRTS#02-20-000915
TO: Ripon Hwy FF/NN Landfill File
FROM: Christine F Lilek – WDNR Hydrogeologist
SUBJECT: Natural Attenuation Sampling Parameters with a Flow Cell Procedures Audit

Ripon Hwy FF/NN Landfill Superfund Site
Wednesday, April 13, 2011
1030 – 1200 Hours
SE, SE, Section 7, T16N, R14E, Town of Ripon, Fond du Lac Co
License/Permit #: Landfill License #467, BRRTS #02-20-000915

DNR Regulatory Program: Wisconsin Remediation and Redevelopment Program
Weather (temp., cloudiness, bar. pres., wind): Sunny, clear, slight wind, approximately 50 Degrees F
Persons Sampling and Title: Kevin Lincicum, Project Hydrogeologist & Ashley Weimer, Staff Geologist (Tetratech)

Water Level Equipment (type, model): Contact Meter – Sounding Tape, Heron Dipper-T

Purging Equipment (type, model, material): QED Micro Purge http://www.micropurge.com/

Purging Method: 4 well volume at wells with dedicated bailers, stabilization method used on wells with in-line sample tubing

How Purge Volume Measured? (eg., calibrated bucket): Bailing Not Observed, Observed Stabilization

Sample Collection Equipment (type, model, material): QED Microcell Flow through Cell

Method of Sample Withdrawal (bottom emptying device, low flow): QED Micropurge Low Flow

Type of Transfer Containers: Labeled VOC Vials, Disposable Plastic Medicine Cups for Ferrous Iron

Filtering Equipment (type, material): Not applicable

Filter Membrane (type, pore size): Not applicable

When Were Samples Sent to Lab? Not observed, reported to be April 15, 2011

What Lab Were the Samples Sent to? Pace Analytical Services

How Were Samples Kept Cool (ice, other)? Cooler with Ice

Decontamination Procedures? Dedicated bailers & rope, Sample Tubing, Disposable Gloves

Purge Water Disposal? On road – asphalt pavement helps volatilize any VOC levels.

In-Situ Meters (type, model): QED Flow Cell - multi-parameter sonde with individual probes for pH/ORP, specific conductance and dissolved oxygen
Person calibrating: Lincicum & Weimer
Frequency calibrated: At beginning of each field sampling project.
Calibration procedures (buffers used): QED Buffer Solutions

Calibration Buffer	Sensor Calibrated	Bottle Volume	Part Number
pH 4	pH	475 ml	37658
pH 7	pH	475 ml	37659
pH 10	pH	475 ml	37660
73.9 uS/cm2 Conductivity	Conductivity	475 ml	37655
717.8 uS/cm2 Conductivity	Conductivity	475 ml	37656
6668 uS/cm2 Conductivity	Conductivity	475 ml	37657
Zobell Solution	ORP	500 ml	37690

Problems with meter: None, all probes in good condition & moist. ORP Probe still had floating salt tablet inside glass solution. DO Probe did not have bubble in glass solution. Samplers kept the flow through cell tipped downward in the bottom of a bucket between sampling locations to keep probes from developing bubbles in the flow cell. pH 4 solution available to store the sonde cell in, when not in use.

Ferrous Iron Meter (type, model): CHEMetrics Photometer for Ferrous Iron
Person calibrating/set-up: Lincicum & Weimer
Frequency calibrated: Every morning
Calibration procedures: Use CHEMetrics Zero Ferrous Iron Vial
Problems with meter: Needed to replace batteries.

Additional Sampling Audit Observations:

The depth to water was referenced to the measuring point marked at the top of the innermost well casing.

Low-flow calculations have been done for each well to determine the flow settings on the Micropurge pump. For example: Monitoring well P-116 was set at 2 cycles per minute with a discharge cycle of 10 seconds and a recharge cycle of 50 seconds and an air pressure of 210 ft. Using this setting, sample collection will occur from the well screen aquifer formation.

Readings are taken every 2 minutes until the in-situ field parameters have stabilized. This usually takes about 10 to 20 minutes. For monitoring well P-116, it took 24 minutes for the water quality to stabilize. Typically the flow cell runs for 5 minutes before the DO probe takes a reading for stabilization. This lets the DO levels fall to lower levels where stabilization will occur. When the water quality parameters stabilize, all the probe readings are recorded on the field logs and the meter records are deleted. For monitoring well P116 the readings were: Temperature 10.72 degrees C, Specific Conductivity 556 Mhos/cm (corrected to 25 degrees C), pH 7.49 su, Dissolved Oxygen 5.1%, ORP – 106 mV.

After the in-situ field readings were taken, Lincicum filled the VOC glass sample vials, using the VOC vial cap to collect and fill the vial with a slight meniscus above the vial top and then screwed on the cap. Lincicum filled and closed each vial, one by one. There were no bubbles in the VOC sample vials.

Lincicum then filled a disposable plastic medicine cup with well water (>25mL) and handed it to Weimer for iron sampling. Weimer added the activator solution to the cup, mixed it for approximately 1 minute and then placed a Vacu-vial in the cup and snapped the tip on the bottom of the cup. After the sample liquid entered the vial, Weimer turned the vial upside down and inverted it several times until color appeared in the vial. Weimer then placed the vial in the photometer and waited for 5 minutes for the reading. The reading value was transferred to the field log and the vial disposed into a plastic garbage bag.

The VOC vials were then put in a cooler with ice.

Weimer stated that the tubing on the Flow Cell is changed between each site and that the plastic cover to the sonde cell is rinsed and wiped off between each project.

Lilek asked how the bailed wells (MW-101), (MW-102), (MW-107), (MW-112), (P-102), (P-108), and (P-111) were sampled for the in-situ field parameters. Lincicum stated they collected a sample in a bottle and then slowly poured it into the Flow Cell for analysis.

Specific conductance, pH, dissolved oxygen and ORP can change rapidly due to aeration, oxidation and the loss or gain of dissolved gasses as you remove groundwater from a well; especially if you introduce atmospheric contact with the sample through pouring activities.

Lincicum agreed that the pouring would likely affect the dissolved oxygen and the ORP readings, but he felt the specific conductivity and pH readings would be OK. The in-situ iron readings with the Vacu-vials follow the same procedures with the bailed wells as well as the dedicated tubing wells. So, there should be no differences for iron readings across the site.

This "pouring" procedure difference between the bailed and the dedicated tubing wells should be considered when reviewing the ORP and DO levels in the future. More emphasis should be placed on daughter product data and the iron data in documenting the natural attenuation process at this site.