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**Tetra Tech EM Inc.**

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November 16, 2001

Mr. Thomas Alcamo
Work Assignment Manager (SR-6J)
Remedial Response Unit No. 1
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: Field Oversight Summary for October 24 and 25, 2001
Neal's Landfill Site, Bloomington, Indiana
Contract No. 68-W6-0037, Work Assignment No. 943-RSBD-0539

Dear Mr. Alcamo:

Tetra Tech EM Inc. (Tetra Tech) has prepared the enclosed summary to document its visit of a treatability study of surface water emerging from overflow during a storm event at the Neal's Landfill site on October 24 and 25, 2001. Viacom, Inc. (Viacom), the responsible party for the site, conducted the treatability study. Appendix A of the summary contains a photographic log of field activities, Appendix B contains a copy of Tetra Tech's field notes, and Appendix C provides a site location map. Viacom's treatability study work plan is provided in the attachment to the summary.

If you have any questions about the enclosed summary, please call me at (847) 818-7189.

Sincerely,

 V. Rajaram, P.E., J.D.
Site Manager

Enclosure

cc: Henry Thompson, EPA Project Officer (letter only)
Cora Stanley, EPA Contracting Officer (letter only)
Lou Barinka, Tetra Tech Program Manager (letter only)
File

ENCLOSURE

**FIELD OVERSIGHT SUMMARY FOR
OCTOBER 24 AND 25, 2001
NEAL'S LANDFILL SITE
BLOOMINGTON, INDIANA**

(Five Pages)

**FIELD OVERSIGHT SUMMARY
NEAL'S LANDFILL SITE
BLOOMINGTON, INDIANA**

Tetra Tech EM Inc. Personnel:
Reporting Period:

Jeff Lifka
October 24 and 25, 2001

INTRODUCTION

As requested by the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W6-0037, Work Assignment No. 943-RSBD-0539, Tetra Tech EM Inc. (Tetra Tech) is conducting site visits and performing oversight activities at the Neal's Landfill site in Bloomington, Indiana. Viacom, Inc. (Viacom), is the responsible party for the site. As part of Viacom's remedial alternatives screening for the site, a treatability study was planned of surface water emerging from overflow springs at the site during a storm event producing at least 0.5 inch of precipitation and a surface water flow of at least 4,000 gallons per minute (gpm). The study consisted of a suspended solid particle size analysis and a settling test. The goals of the treatability study were to evaluate (1) particle size distribution across the storm event, (2) polychlorinated biphenyl (PCB) concentrations in the dissolved and particulate phases across the storm event, (3) settling of suspended solids and its effect on PCB levels in water samples collected at selected points during the storm event, and (4) the variation in PCB concentrations and suspended solids distribution during the storm event.

This report summarizes activities observed by Tetra Tech at the Neal's Landfill site on October 24 and 25, 2001; issues and developments; and future activities at the site. Appendix A contains a photographic log of field activities, Appendix B contains a copy of Tetra Tech's field notes, and Appendix C contains a site location map. The attachment contains a copy of Viacom's treatability study work plan.

ACTIVITIES AND OBSERVATIONS

Tetra Tech's activities and observations at the Neal's Landfill site on October 24 and 25, 2001, are summarized below.

Wednesday, October 24, 2001

Tetra Tech received a call from the EPA work assignment manager (WAM) the morning of October 24, 2001, regarding a large storm event in the Bloomington, Indiana, area. EPA requested Tetra Tech to perform oversight of Viacom's surface water treatability study at the site beginning that evening. Tetra Tech mobilized immediately from its Chicago office and arrived at the spring treatment facility (STF) at the Neal's Landfill site at 6:45 p.m. Mr. Mike McCann of Viacom; Neill Vaughan of PSARA Technologies, Inc. (PSARA), and Dr. Deborah Backhus and a few graduate students from Indiana University (IU) were present at the site.

The treatability study began at approximately 6:15 p.m. Two 16-gallon drums had been filled in the overflow culvert area leading to Conard's Branch during the rising water flow portion (rising limb) of the storm event (water flow of approximately 2,400 gpm). The second drum was the control to be used throughout the test. A small bucket was used to top off the drums with surface water because it was not possible to completely fill the drums because of the high water flow rate. Dr. Backhus collected water samples periodically from the drums at different depth intervals after initial agitation of the water using a stirring rod. All samples collected during the test will be analyzed at the IU laboratory for PCBs and total suspended solids (TSS). In addition, IU students collected separate samples from Conard's Branch for particle size, conductivity, and turbidity analyses to be conducted at the STF.

At 7:15 p.m., Viacom collected one 16-gallon drum during the storm's peak flow at the site (approximately 7,108 gpm according to Mr. McCann). Dr. Backhus first agitated the bucket and then collected samples at various depth intervals for PCB and TSS analyses. IU students continued performing conductivity, turbidity, and particle size analyses at the STF. At 8:20 p.m., an IU student measured the water height at the Conard's Branch weir to determine the flow rate (see Photograph No. 1). The IU student collected a water sample from the weir area, IU students performed conductivity and particle size analyses (see Photographs No. 2 and 3), and Dr. Backhus collected another sample from the peak-flow drum (see Photograph No. 4).

At 8:30 p.m., Viacom and an IU student collected the last 16-gallon drum sample from the Conard's Branch culvert area (see Photograph No. 5) during the receding limb of the storm event (approximately 6,692 gpm according to Mr. McCann). The drum was topped off with surface water from Conard's

Branch from a 2-gallon bucket (see Photograph No. 6). Dr. Backhus began sampling water in the receding-limb storm sample drum (see Photograph No. 7). Mr. McCann stated that the autosampler was collecting samples for PCB and TSS analyses and that the samples would be shipped to Heritage Laboratories of Indianapolis, Indiana, for analysis. These sample analytical results will be compared to those of Dr. Backhus and the IU laboratory. Viacom left the site at 8:50 p.m.

By 9:00 p.m., all 16-gallon drums had been filled for the treatability study. The only remaining sampling was to be conducted by Dr. Backhus at specified time intervals over a 24-hour period. The sampling intervals used by Dr. Backhus during the study for all samples are as follows:

- Three samples at 15-minute intervals after the first sample was collected from each drum
- Three samples at 1-hour intervals after the last 15-minute sample was collected from each drum
- One sample 8 hours after the first sample was collected from each drum
- One sample 16 hours after the first sample was collected from each drum
- One sample 24 hours after the first sample was collected from each drum

The only site activities at the Neal's Landfill STF consisted of IU students conducting conductivity, turbidity, and particle size analyses. These analyses would continue throughout the night at hourly intervals. Dr. Backhus finished collecting the 15-minute interval samples from the receding-limb storm sample drum and continued with the last 1-hour interval samples for all three drums until approximately 12:30 a.m. on October 25, 2001. The 8-hour samples were to be collected on October 25, 2001, until approximately 4:30 a.m.; the 16-hour samples until 12:30 p.m.; and the 24-hour samples until 8:30 p.m. Because the remaining work was repetitive and to be completed in accordance with a schedule, Tetra Tech left the site at 9:25 p.m.

Thursday, October 25, 2001

Tetra Tech arrived at the Neal's Landfill STF at 10:45 a.m. after collecting storm flow data from Tetra Tech's subcontractor, Earth Tech, at the Illinois Central Spring treatment plant for the Lemon Lane Landfill site. Neill Vaughan and another PSARA employee were present at the Neal's Landfill site inspecting the Conard's Branch weir. Dr. Backhus of IU was not at the site, and the STF was locked.

Mr. Vaughan stated that the autosamplers in Conard's Branch had been set to collect samples at 4-hour intervals.

Tetra Tech inspected Conard's Branch, the surrounding overflow springs, gages, and weirs at the site and took photographs of the following:

- Water flow in Conard's Branch culvert south of the gravel road (see Photograph No. 8)
- Water flow in Conard's Branch culvert north of the gravel road (see Photograph No. 9)
- Autosamplers at Conard's Branch culvert sampling overflow water (see Photograph No. 10)
- Overflow water in Conard's Branch culvert and South Spring (see Photograph No. 11)
- V-notch weir at Conard's Branch (see Photograph No. 12)
- V-notch weir at Overflow Spring 34 (see Photograph No. 13)
- U.S. Geological Survey (USGS) gage at Overflow Spring 34 (see Photograph No. 14)
- V-notch weir and USGS gage at North Spring (see Photograph No. 15)

At 11:15 a.m., Tetra Tech and PSARA drove around the landfill cap perimeter. The landfill cap appeared to be in very good condition except for some erosion on the southeast slope of the landfill. PSARA stated that the situation was in the process of being rectified. At 11:40 a.m., PSARA and Tetra Tech left the Neal's Landfill STF. Tetra Tech then stopped at the bridge over Richland Creek downstream of the landfill to observe the water height in the creek near the historical fish and sediment sampling location no. 2 (see Photograph No. 16). Afterwards, Tetra Tech observed the water height in Richland Creek at historical sampling location no. 3 at Whitehall Road and State Road 43 (see Photograph No. 17). Tetra Tech then went to the Illinois Central Spring treatment plant to pack and ship storm water samples collected by Earth Tech for the Lemon Lane Landfill site.

Tetra Tech arrived back at the Neal's Landfill STF at 5:55 p.m. No one else was present at the site. Tetra Tech inspected two more springs in the area: Overflow Spring 012 and Overflow Spring 0 (see Photographs No. 18 and 19). Dr. Backhus arrived at the site at 6:50 p.m. to collect the 24-hour samples.

At 7:08 p.m., Dr. Backhus collected the 24-hour sample from the drum filled during the rising-limb of the storm (see Photograph No. 20). Tetra Tech photographed the 16-gallon drum set-up in the STF (see Photographs No. 21 and 22). At 7:35 p.m., Dr. Backhus began sampling the drum filled with water

during the storm's peak flow. The only samples that remained for collection were to be collected over the next hour from the receding-limb drum and the control drum. Finally, Dr. Backhus informed Tetra Tech that the treatability study results would not be fully interpreted for a few months. The interpretation is to consist of a comparison of Heritage Laboratories results to the IU laboratory results, which will be broken down into dissolved and particulate concentrations. Tetra Tech left the site at 7:40 p.m.

ISSUES AND DEVELOPMENTS

Because this was a time-critical oversight performance, Tetra Tech was able to mobilize to the site within 8 hours of EPA's request. Deviations during the treatability study were noted during the reporting period. Specifically, on October 25, 2001, Dr. Backhus informed Tetra Tech that the two sampling time intervals at 8 and 16 hours were modified to 7 and 13 hours, respectively, because of time constraints with Dr. Backhus' class schedule. Another deviation noted during the treatability study involved the collection of the initial sample from the water surface of each 16-gallon drum. Instead of pumping the first sample from each drum, Dr. Backhus collected the samples by dipping sample bottles into each drum to save time. A last deviation to the plan involved IU students transporting some of the water samples to the IU laboratory for dilution in order to perform particle size analysis. These were the only deviations noted by Tetra Tech.

FUTURE ACTIVITIES

Tetra Tech will continue to conduct site visits and perform oversight and sampling activities at the Neal's Landfill site as directed by EPA.

APPENDIX A
PHOTOGRAPHIC LOG
(13 Pages)



Photograph No. 1

Orientation: North

Description: Indiana University (IU) student measuring height of flow at Conard's Branch weir

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 2

Orientation: Northwest

Description: IU student performing particle size analysis at spring treatment facility (STF)

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 3

Orientation: North

Description: IU student and Viacom, Inc. (Viacom) measuring conductivity and turbidity of samples at STF

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 4

Orientation: South

Description: IU Professor Dr. Backhus collecting sample from peak-flow storm sample drum

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 5

Orientation: Northwest

Description: Viacom and IU student collecting receding-limb storm sample in Conard's Branch culvert

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 6

Orientation: Southwest

Description: Viacom and IU students using bucket to top off receding-limb storm sample drum

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 7

Orientation: Southwest

Description: Dr. Backhus collecting initial sample from receding-limb storm sample drum

Location: Neal's Landfill

Date: October 24, 2001



Photograph No. 8
 Orientation: South
 Description: Conard's Branch culvert area south of gravel road at STF

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 9
 Orientation: North
 Description: Conard's Branch culvert area north of gravel road at STF

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 10
 Orientation: East
 Description: Autosamplers at Conard's Branch culvert area

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 11
 Orientation: Southwest
 Description: Overflow to Conard's Branch in foreground; South Spring with drainage pipe to STF in background

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 12
 Orientation: Southwest
 Description: Overflow at V-notch weir in Conard's Branch

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 13
 Orientation: Southwest
 Description: Overflow at V-notch weir in Overflow Spring 34

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 14

Orientation: Southeast

Description: U.S. Geological Survey (USGS) gage at Overflow Spring 34

Location: Neal's Landfill

Date: October 25, 2001



Photograph No. 15
 Orientation: North
 Description: V-notch weir and USGS gage at North Spring

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 16
 Orientation: South
 Description: Water height in Richland Creek near historical fish and sediment sampling location no. 2

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 17

Orientation: West

Description: Water height in Richland Creek at historical fish and sediment sampling location no. 3

Location: Neal's Landfill

Date: October 25, 2001



Photograph No. 18

Orientation: Southwest

Description: Overflow at V-notch weir at Overflow Spring 012

Location: Neal's Landfill

Date: October 25, 2001



Photograph No. 19
 Orientation: Northwest
 Description: Overflow at V-notch weir at Overflow Spring 0

Location: Neal's Landfill
 Date: October 25, 2001



Photograph No. 20
 Orientation: South
 Description: Dr. Backhus collecting 24-hour sample from rising-limb storm sample drum

Location: Neal's Landfill
 Date: October 25, 2001



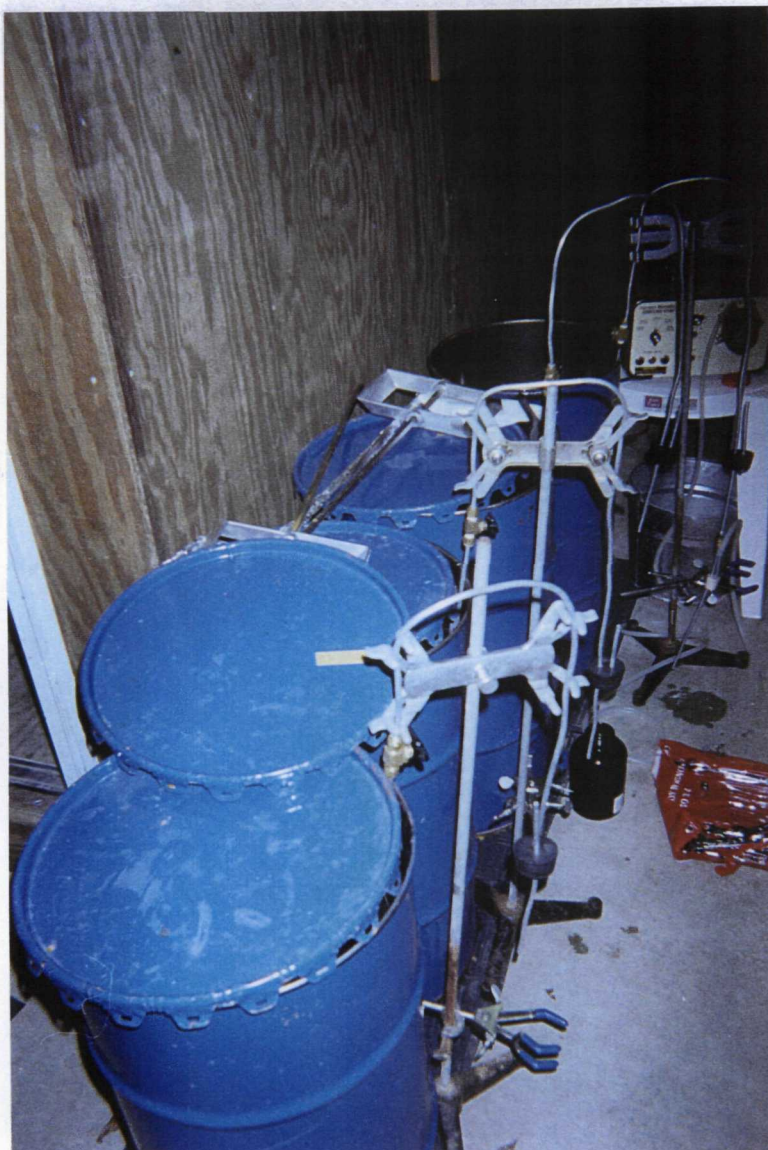
Photograph No. 21

Orientation: Overview

Description: Rising-limb storm sample drum with pump in background

Location: Neal's Landfill

Date: October 25, 2001



Photograph No. 22

Orientation: Overview

Description: Treatability study storm sample drums from front to back: receding limb, peak flow, control, and rising limb

Location: Neal's Landfill

Date: October 25, 2001

APPENDIX B
FIELD NOTES
(Five Sheets)

- Neal's Landfill 10/24/01
- 1845 Tr onsite at Neal's STF.
Viacom - Mike McCann,
Neill Vaughan, & IU prof.
Backhus onsite. Particle
study has begun.
2 15-16 gal. buckets filled
during rising limb of storm.
Study began w/ flow ~2400 gpm.
- 1915 2 15-16 gal buckets
filled at peak flow by
Viacom. Extra buckets & all
15 gal buckets collected at culvert leading
to Conards Branch and STF
before gravel road. Flow
was very fast during sampling.
Dr. Backhus is performing
Sampling measurements from buckets
w/ help of 2 grad students.
- 1930 Receding limb sampling will
be next followed by hourly
sampling. So far all procedures
have followed the particle
study plan. According to Mike,
Peak flow was ~1708 gpm.
As Dr. Backhus agitates the

- Neal's Landfill 10^{IL} 8/24/01
- the 15 gal. buckets to suspend
particles, she is pulling
samples from various portions
of each bucket, top, middle,
bottom, etc. A control
bucket is also present
for each sampling of the
rising limb and peak flow
sampling. One barrel will
be filled for receding limb.
- 1950 IU students continuing
collecting measurements for
conductivity, etc. and turbidity.
- 2015 Dr. Backhus working on add'l
samples from barrels.
- 2020 **PHOTO** - Measuring flow @ CB
Weir (IU student)
- 2021 **PHOTO** - IU measuring samples
in STF for particle analysis
- 2022 **PHOTO** - same as above for conducting
- 2025 **PHOTO** - Dr. Backhus collecting
sample from peak flow bucket.
- 2030 Viacom & IU student
collecting receding limb
bucket. **PHOTO** in culvert.

- 2032 Neal's Landfill 10/24/01
 PHOTO → Viacom & IU students
 adding additional bucket
 to top off receding limb
 15 gal. bucket.
- 2035 Flow has decreased to
 6692 gpm. Dr. Backhus
 has moved to receding
 limb bucket for sampling.
- 2038 PHOTO Dr. Backhus collecting
 sample from last bucket.
- 2040 All samples will be analyzed
 for particle study and
 taken to IU lab. Viacom
 is also taking samples
 at CB weir w/ autosampler
 that will be sent to
 Heritage in the morning.
- 2050 Dr. Backhus describes particle
 analysis instrument - as it
 separates particles one by
 one based on size (in microns)
 and determines size by using
 a laser in instrument. Water
 samples are collected and

IL

- Neal's Landfill 10/24/01
 taken to lab to determine
 amount of PCBs in particulate
 matter and amount in water.
 These results will be
 compared to ~~Viacom's~~ ^{STET} ~~IU's~~ ^{40%K}
 total PCB results for
 samples collected at the
^{Viacom's} ~~IL~~ ^{autosampler} ~~barrels~~ ^{data} for
 each part of the storm
 rising limb, peak, and
 receding limb. These total
 PCBs will be analyzed by the
 Heritage Laboratory in
 Indianapolis. Viacom offsite.
- 2100 Sampling from all barrels
 at each stage of the storm
 is done at the following
 intervals → 3X at 15 mins. after
 the first sample
 → 3X at 1 hour interval after
 the last 15 minute sample
 → 1X @ 8 hours after 1st sample
 → 1X @ 16 hours after 1st sample
 → 1X @ 24 hours after 1st sample

IL

Neal's Landfill 10/24/01

- 2110 IU students continue collecting additional water samples from the ^{Conard's Branch} peristaltic pump for conductivity.
- 2115 Sampling will continue from all drums and CB at designated intervals throughout the night. Time of study is expected to last 24 hours.
- 2120 IU student continues taking 11 samples collected to IU lab. All other procedures remain the same - none have been observed to deviate from the settling test procedures outlined in plan, except for the total # of samples collected may be less than originally estimated according to Dr. Backhaus.
- 2125 It offsite, will stop by tomorrow to check on progress.

IL

Neal's Landfill 10/25/01

- 1045 It arrives at STF at Neal's Landfill. ^{A PSARA employee} Mike McCune and Neill Vaughan onsite.
- 1055 **PHOTO** South-flow in culvert leading to Conard's Branch.
- 1100 Neill Vaughan says autosamplers have been set to 4 hr. sample intervals now-beginning at 1000.
- 1102 **PHOTO** North-flow on north side of gravel road to Conard's Branch.
- 1104 **PHOTO** East - TSCO autosampler at culvert sampling overflow.
- 1107 **PHOTO** Southwest - Overflow in foreground and South Spring w/ drainage pipe to treatment facility in background.
- 1110 Flow at V-notch is 1372 gpm @ 0.87 feet measured at V-notch step.
- 1115 It + PSARA take a ride around landfill cap. Everything looks good except for some erosion problems in southeast slope area that they are trying to rectify.

IL

- Neal's Landfill 10/25/01
- 1126 **PHOTO** Southwest → V-notch Weir at Coward's Branch w/ overflow.
- 1134 **PHOTO** Southwest → V-notch Weir and USGS gage at Overflow Spring 34.
- 1135 **PHOTO** Southeast → USGS gage 34 at overflow spring, showing height of ~~0.74~~ ^{feet IL} inches, closer to 0.73 ^{feet IL} inches. Also, sandbags near gage are beginning to deteriorate and many are ripped open.
- 1140 Neill Vaughan hasn't been able to contact Deb Backhus of IDJ, doesn't know exactly when they'll be back. They definitely will be back to collect the 24 hour samples for each bucket between 6 and 9pm tonight. Te will stop by later again, need to go to ICS for water sample and air sample processing.
- 1145 Te off site after **PHOTO** North → USGS gage, further into CB → ^{North Spring} level = 0.28 feet.

- Neal's Landfill 10/25/01
- 1154 **PHOTO** → South → Richland Creek flow at bridge near location #2.
- 1200 **PHOTO** → West → Richland Creek flow at bridge near location #3.
- 1201 **PHOTO** → Overview of sampling location #3 in Richland Creek, sample location markers from August sampling event are completely under water.
- 1755 Te arrives at Neal's STF. No one else onsite. 24 hr. interval samples will be taken soon from 15-gal drums for particle study.
- 1800 **PHOTO** Southwest → USGS gage at Overflow 012, Water height ~ 0.78 ft.
- * Just Saw Buck! Gt P was huge!
1804 **PHOTO** Northwest → USGS gage at Overflow 0 → Water height ~ 0.5 ft.
- 1850 Dr. Backhus onsite to perform last samples at 24 hr. interval.

- Neal's Landfill 10/25/01
- 1855 Dr. Backhus informs T_6 of any deviations to plan. The last 2 time-intervals at 8 hrs and 16 hrs, were changed to 7 and 13 hrs, respectively because of time constraints with her classes. The other deviation was instead of pumping the initial sample at each interval in the buckets, to save time she just placed the sample jar into the bucket.
- 1908 **PHOTO** Dr. Backhus collecting 24 hr. sample from rising limb bucket.
- 1925 **PHOTO** Overview of rising limb barrel and pump.
- 1926 **PHOTO** Overview of all 4 buckets: from front to back $\rightarrow$ receding limb, peak flow, peak flow control, & rising limb.
- 1930 Dr. Backhus will remain to sample remaining two buckets and control bucket over next hour or so. T_6 Dr. Backhus noted

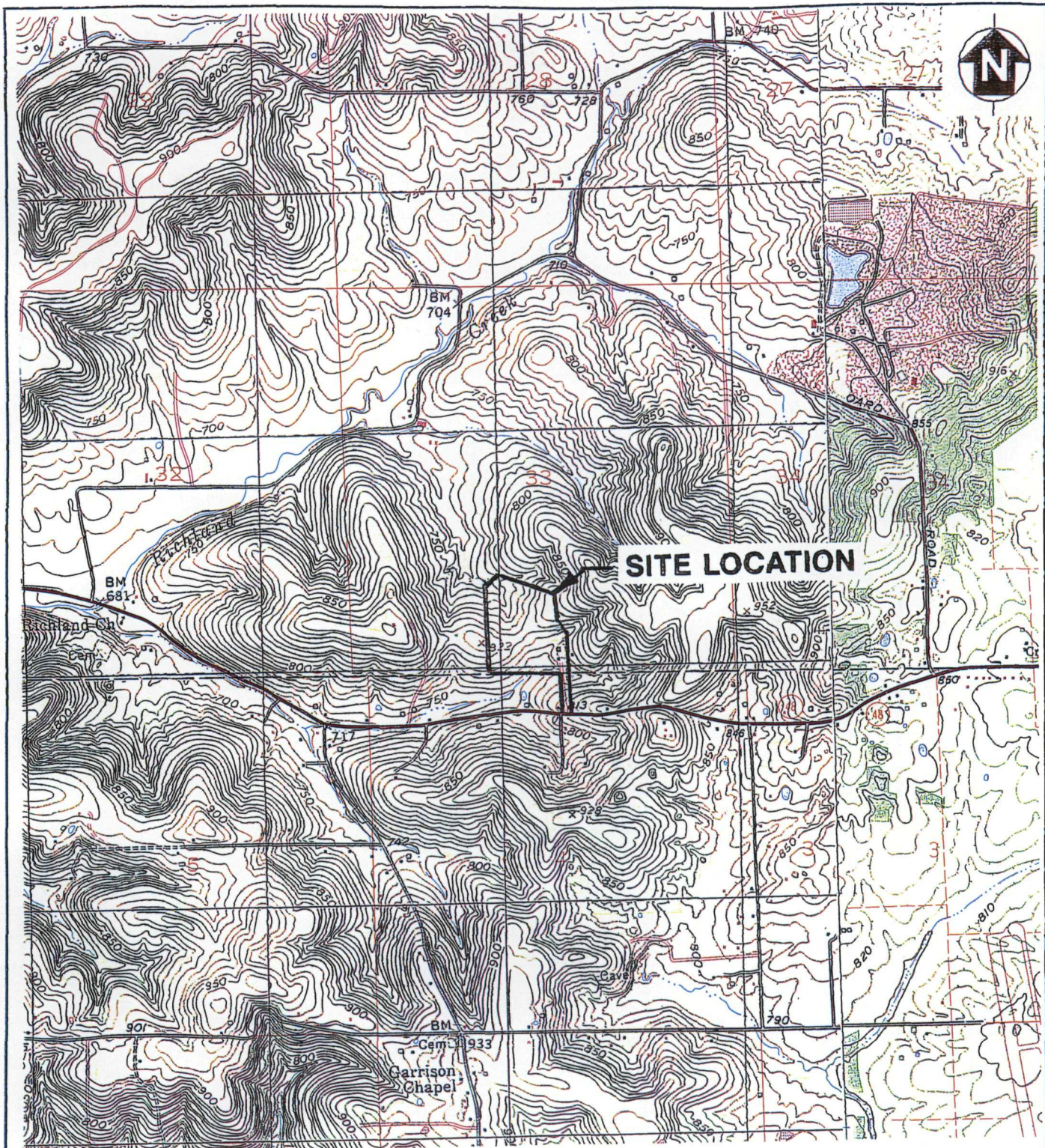
- Neal's Landfill 10/25/01
- that during the early morning hours, the IU students took some samples back to the IU lab to do particle study as they needed dilutions. Also, as far as results interpretation, will take a few months. Heritage data for PCBs + TSS will be available within a few weeks, but particle and settling study will take some time she says.
- 1935 Dr. Backhus continues sampling, at this moment ~~IL~~ from the peak flow bucket. This routine of sampling each will continue for approx. another hour for the 24 hr. interval samples.
- 1940 T_6 offsite.

IL

APPENDIX C

**NEAL'S LANDFILL
SITE LOCATION MAP**

(One Sheet)



SOURCE: MODIFIED FROM USGS,
BLOOMINGTON, INDIANA, QUADRANGLE, 1980, AND,
WHITEHALL, INDIANA, QUADRANGLE, 1980



Quadrangle Location

VIACOM, INC.
NEAL'S LANDFILL SITE
BLOOMINGTON, INDIANA

FIGURE
SITE LOCATION MAP

Tetra Tech EM Inc.

ATTACHMENT
TREATABILITY STUDY WORK PLAN
VIACOM, INC.

(Six Sheets)

Scoping Test Description for Evaluation of Sediment Settling as a Water Treatment Alternative

(5/25/01)

Test Goals:

During a major storm event evaluate the following:

1. Particle size distribution across the storm event
2. The distribution of PCB contamination between the dissolved phase and particulate phase at various times during the storm
3. The effect over time of particulate settlement on PCB level in samples taken at selected points during the storm event
4. The variation of the PCB concentration and total suspended solids across the storm event.

Collect relevant data to determine storm characteristics including flow, ground water level and conductivity.

General Description

To meet the goals listed above water will be collected from Conard's Branch (CB) during a major storm event. A major storm event is considered to be one producing in excess of 4000-gpm flow in CB. Pre-storm conditions will govern what total rain in inches will produce this flow rate. The attached Table 1 provides a rough guide relating pre-storm flow rate in CB to the rain in inches to produce 4000 gpm flow. For background information Table 2 provides data on storm events for 2000 including measured peak flow, total rain and pre-flow conditions. Mike McCann will coordinate the storm conditions related to developing storms and determine if and when sampling would proceed.

Stormwater samples will be collected from an area of Conard's Branch just south of the site access road culvert. This culvert is about 50 feet east of the Spring Treatment Facility at Neal's Landfill. Upstream of this area all waters except North Spring converge from the Northwest Spring system converge.

Samples will be collected and placed in a 16 -gallon drum. It is anticipated that three to four drums will be collected during the event. Initially one drum will be collected in anticipation of capturing the peak concentrations of PCB's in the water. Two or three additional barrels will be collected at various times after the anticipated peak. Conductivity and flow rate data will be used to determine the initial and subsequent sample times.

Once filled the barrels will be moved inside the spring treatment facility. In this area the barrels will stay undisturbed while periodic samples are taken from the barrels. Water samples taken periodically from the barrels will be analyzed for PCB concentration and total suspended solids (TSS).

Additional data will be collected during the storm event in support of the settlement evaluation. ISCO samplers will be used to take hourly water samples

from CB for PCB and TSS analysis. At approximately the same time the ISCO are taking water samples an additional sample will be taken for particle count analysis. Water conductivity will be measured periodically and manual reads from a rain gage will be recorded. Manual readings from a staff gauge will be used to obtain flow rate data for use during the storm and flow data from a stilling well will be recorded automatically for later use. Ground water elevations will be recorded in monitoring well MW EPA5a. Additional periodic water samples will be taken from CB for particle size evaluation and for separation analysis.

Site Setup

Based on site conditions, a location for access to collect water samples from Conard's Branch was selected about 20 ft. south of the culvert entrance. The location is just north of the South Spring overflow. At this location a temporary set of concrete block steps was installed to allow sample personnel safe access to the water. A level area was established at the top edge of the steps to set the barrels during the filling process. The location selected for the steps will not interfere with water flow cross section such that it will effect staff gage readings.

Once filled the barrels will be taken to an area in the Spring Treatment Facility (STF). An area within the building will be identified and lined with caution tape so the barrels are not disturbed for the duration of the settling test. Rubber mats will be placed on the concrete floor to insulate the filled barrels from any vibration associated with operation of the treatment facility main pumps. To provide a rough indication of the vibration associated with the pumps a bucket with several inches of water was placed on the concrete floor next to the pumps. While the pumps were running no ripples or movement of water was observed.

Inside surfaces of the barrels and lids are to be cleaned with soap and water and rinsed thoroughly to remove any residual materials that may be present from the manufacturing process. The barrels are to be cleaned to insure that there are no contaminants present that will interfere with the PCB levels in the water. Once the barrels are cleaned 4 to 5 gallons of bottled water are to be placed in the barrel and allowed to remain in the barrel for at least 6 hours. A water sample is to be taken after the 6 hours and analyzed for PCB content. Barrels will be labeled prior to the storm event. The label will include space to mark the start and stop time of collecting water, segment of the storm the contents represents and a measurement of the initial level of water from the top of the barrel and the final level after the last water sample is taken. To obtain the water samples from each barrel, the barrel will have a piece of aluminum tube clamped to the inside of the barrel. The end of the tube will be bent in an "L" shape so that water samples will be taken radially. The clamp will allow the tubing to be moved down as the water level changes.

Prior to the start of sampling a peristaltic pump will be located on a platform near the edge of CB. The pump will be located adjacent to the hourly ISCO samplers and take a sample from approximately the same inlet location as the ISCO

sample inlet. The peristaltic pump will be used to obtain samples for the particle distribution, conductivity measurements and particle separation analysis. The available peristaltic pumps are not weather proof so a 24" x 18" x 18 " high plastic housing will be placed over the unit. An opening in the side will provide access to operate the pump and obtain samples.

Portable lights will be available as needed at the Conard's Branch sampling locations. Extension cords will be available to provide power from the STF to pumps, lighting and other devices. A wall clock will be placed in the STF building to provide sample time information.

A temporary storage area will be established in the STF building to store sampling equipment and materials. Personnel parking will be along the edge of the access road about 100 ft. north of the access road culvert. Portable sanitary facilities will be placed at the site near the STF. A phone (land line connection) is located in the STF.

Conard's Branch Water Sample Collection

Viacom personnel will observe storm conditions and advise IU personnel when there is a potential for a storm to occur that would meet the major storm criteria. As a storm approaches with a potential to meet the criteria the ISCO samplers are to be started prior to the rain starting. The start time of the ISCO sampler will be recorded. As the storm continues the rainfall is to be monitored and as a total of 0.5 inches of rain is reached an evaluation is to be made if the storm has the potential of meeting the storm criteria. If the storm potential is good the sampling crew is to be mobilized. To help support the evaluation process a computer with Internet access will be available at the STF office so that current weather information can be obtained.

At a flow rate in excess of 2000 gpm in CB the first barrel is to be filled. Based on the attached curves generated from the February 25 data this will be the approximate peak of PCB concentration in CB. A second barrel is to be filled in parallel to the first. A 2-gallon or 3-gallon bucket is to be used to fill each barrel. It is anticipated that filling the two barrels should take less than five minutes. A lid is to be placed on the barrels and the barrels taken by two-wheeled handcart to the area in the Spring Treatment Facility (STF). Barrels can be filled while strapped to the handcart. In the STF barrels are to be placed on rubber mats. Once placed in this area the barrels will be stirred to insure particles are well mixed. After the stirring is complete the barrels and contents are not to be disturbed until particle sampling is completed. The label on each barrel is to be filled in with the start and stop time of filling and the level of the water from the top of the barrel at the start and at the completion of sampling.

The second barrel will be used as a control barrel. A sample will be taken from the second barrel at the time the first sample is taken from the first barrel. No

other water will be removed from this second barrel until the last sample is taken from the first barrel. At that time the second barrel will be sampled. The second barrel will be used to indicate if periodic sampling of the first barrel had any impact on the particle settlement data obtained.

The second sampling condition at CB will be at the second conductivity peak if one is detected based on conductivity data. If no peak is detected then the second time that CB is to be sampled is at the peak flow condition once it is determined a peak has been reached. The third sample is to be taken one hour after the peak flow condition was reached. Timing for peak conductivity and flow will vary based on storm conditions and soil moisture conditions. However the February 25 curves can provide an indication of timing. Once the barrels are filled the label on the barrel is to be completed.

Besides the barrel samples water samples for PCB and TSS analysis will be taken automatically every hour from CB using the ISCO sampling system. Sampling will start just prior to any significant change in water flow rate in CB. Each hour a half-liter water sample will be collected by the ISCO from CB. Sampling will continue hourly until 18 hours after the peak flow at which time sampling will change to 4-hour intervals for one day and finally to 12-hour intervals for 2 more days. Once the jars are filled they will be taken into the STF building to be labeled and stored temporarily in a cooler with ice prior to shipment to Heritage. Jars are to be labeled with the date, time of day sample was obtained, sample number and sample location. A chain of custody sheet is to be prepared and the analysis required identified on the sheet. This sheet will be the record of what jars were sent to Heritage. Heritage will analyze for PCB and total suspended solids (TSS). (Need to get sample number sequence for all samples to Heritage)

Additional water samples will be collected from the peristaltic pump located at the edge of CB for several purposes.

- Particle size distribution - Sampling will start at the time the ISCO samplers are started and sampling intervals will coincide with the ISCO intervals. Half-liter jars will be filled with water and marked with the date and time of the sample. Each sample will be analyzed to determine the particle size distribution.
- Particle Separation analysis – A one-liter sample will be taken prior to the flow rate increase in CB. This sample will be analyzed at the IU lab to determine the PCB content in the particulate and in the dissolved phase. Two additional samples will be taken for separation analysis from the barrels as described below.
- Conductivity – A sample will be drawn every half-hour to be tested to determine the conductivity using a hand held instrument.
- Turbidity – As time permits samples will be taken for turbidity analysis.

Field Measurements

The following sampling or data acquisition activities will be conducted:

- Rain gage – A manual reading rain gage will be placed near the water collection location to record rain levels at the time of the storm. Readings will be taken approximately every half-hour.
- Water depth recorder – A stilling well exists about ten feet south of the culvert opening. A rating curve needs to be developed for this well. A data logger will be used to record water levels in the stilling well. Need to download and process data after storm event.
- Staff Gage – During the storm event the water flow rate in CB will be determined by a staff gage located on the side of the concrete opening to the culvert that is under the access road. A rating curve has been prepared and is posted in the STF. Manual readings from the gage will be taken approximately every half-hour to provide an estimate of water flow conditions during the storm. (Include copy of rating curve)
- USGS flumes – Flow data will also be obtained from these upstream flumes.
- Conductivity – A hand held conductivity meter will be available to obtain conductivity readings. A grab sample of water will be taken every half-hour during the storm and the conductivity of that sample will be measured. The meter will be calibrated prior to the storm event.
- Groundwater elevation – Water level data will be recorded automatically at MW EPA5a

Drum Sampling and Analysis

The first 16-gallon barrel will be filled at the expected point of the PCB peak concentration in the CB water during a major storm event. A second barrel will be filled in parallel as a control volume. After moving the barrel to the STF, the first drum will be sampled as follows:

- Three times at 15 minute intervals after the first sample
- Three times at 1 hour intervals after the last 15 minute sample
- Once 8 hours after the first sample
- Once 16 hours after the first sample
- Once 24 hours after the first sample

The second or control drum will be sampled for the second time at 24 hours after the initial sample was taken. No other water samples will be taken from this second drum.

To insure that particles are thoroughly distributed after filling the barrels the water will be stirred prior to taking the initial sample. A peristaltic pump will be used to remove the water from the barrel at the times listed above. Viton hose from the pump will be connected to the aluminum-tubing clamp to the side of the barrel.

Each time the barrel is going to be sampled the tubing will be moved so that the water sample will be collected from the top two-inch zone of water. Prior to taking each sample one volume of water is to be purged from the hose and the water discarded. A sample of at least one half liter will be collected which will be sent to Heritage for analysis to determine PCB content and total suspended solids (TSS). Jars are to be labeled with the date, the time of day sample was obtained, sample number and sample location. A chain of custody sheet is to be prepared and the analysis required identified on the sheet. This sheet will be the record of the jars that were sent to Heritage.

Two additional one-liter jars will be taken from each of the barrels. One liter at the initial time the settling test starts and another when the last sample is taken from each barrel. IU will use these jars for the separation analysis. Jars are to be labeled with date, time and the segment of the storm that the barrel sampled represents.

As described previously additional barrels will be filled during the storm event and the same sample time schedule will be followed for each as listed above. No control barrels will be filled in parallel with the subsequent barrels.

Particle Distribution Analysis

A Model WGS267 Liquid Particle Counter/Sampler will be set up in the STF to analyze the hourly water samples taken at the edge of CB using the peristaltic pump. A 37-micron pre-filter will be used prior to the instrument to protect the instrument from clogging. The particles collected in the pre-filter will be rinsed into collection bottles and will be included with the particle distribution determined by the particle sample analyzer.

The analyzer is battery powered and includes a power cord to charge the battery. The unit can be run with the power cord connected. Particle size ranges detected are <2, <3, <5, <8, <10 and <15 microns. The unit has a printout to record analysis data and also has data logging capabilities to permit downloading and processing of data at a later time.

Decontamination of Sample Equipment

Prior to taking samples from any pump system for analysis or measurements the hose or tubing is to be purge of at least one volume of water. This will aid in assuring that the sample taken represents present conditions.

Glass ware or containers that will be reused to collect samples are to be decontaminated after each sample event. Detailed decontamination procedures are provided in the Bloomington Project QAPjP, Field Procedure FP-2.