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ENVIRON

September 26, 2003

Mr. Dion Novak
Superfund Division
United State Environmental Protection Agency
77 West Jackson Boulevard
Mail Code: SR-6J
Chicago, Illinois 60604

Re: Revised Draft Phase 2 Technical Memorandum
Remedial Investigation/Feasibility Study
Eagle Zinc Company Site, Hillsboro, Illinois

Dear Mr. Novak:

This letter transmits two copies of the proposed revisions to the draft Phase 2 Technical Memorandum for the Eagle Zinc Company Site in "track changes" format and copies of all tables, figures and appendices. Initial comments on the Work Plan were provided orally to the Technical Group during the August 28, 2003 technical review meeting and were summarized in a letter from the Agency to Roy Ball of ENVIRON dated September 8, 2003.

The Agency's comments are repeated below in italics, followed by a response and a reference to the portion of the Phase 2 Technical Memorandum that was modified in response to the comment.

1. Page 1 Section A, par 1. Please refer to 5/30 as the date of the Environ letter, referenced in the 3rd to last line.

Edit made where referenced.

2. Page 4 Piezometer Installation. Please list the piezometers that were moved from their original locations and a schematic to demonstrate distances.

The piezometers that were not installed at their proposed locations as a result of various access limitations, as well as the distances and direction from the locations proposed in the Phase 1 Technical Memorandum, have been added to Section II.B.1.

3. Page 6 1st bullet. Well G108 should be replaced. As was discussed at our meeting, you had proposed to locate a well more downgradient of the pond to replace this one-

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please indicate when this work will be completed.

As discussed during the August 28, 2003 technical review meeting, the location selected for monitoring well MW8, installed in March 2003, is directly downgradient of the southwest pond and upper portions of the Western Drainageway. As MW8 was installed close to G108 and is actually in a better position as a downgradient monitoring well than G108, well G108 was not replaced with a new monitoring well. This discussion has been added to Section II.B.2.

4. Page 6 2nd bullet. Please indicate how far from the original location this well was installed.

Addition made to the referenced section.

5. Page 6 1st full par. Please delete the sentence beginning with "USEPA's on-site..."

Revision made to the referenced section.

6. Page 7 1st complete par. Were water quality parameters measured during well purging?

A revision was made to the referenced section indicating that field parameters were not measured during well development.

7. Page 7 par 2. Were the temporary wells developed before sampling and were water quality parameters measured during well development?

Details concerning the development of the temporary wells have been added to the second paragraph of Section II.B.3.

8. Page 8 Section 5 1st sentence. Please insert "with the exception of sulfate from MW-11" after temporary monitoring wells in this sentence.

This clarification has been made within Footnote 3.

9. Page 8 Section 5 2nd sentence. Groundwater from MW-11 should have been sampled for TCL organics, PCBs and TAL inorganics as requested in EPA's 6/19/03 email to Environ.

A well should be placed in the originally proposed location, when surface conditions permit. The results from this well will be used to further investigate the chlorinated VOCs previously detected in sediment and surface water samples from this area.

Review of the Phase 2 RI analytical results indicates that cis-1,2-DCE and TCE were

detected at low concentrations in surface water samples collected from the drainage area just upstream of the pond. Surface water sample SW-WD-9 had detectable concentrations of cis-1,2-DCE (2 ppb) and TCE (6.3 ppb). The northern pond sample SW-WD-PN had detectable concentrations of cis-1,2-DCE (2.2 ppb) and TCE (1.4 ppb). Sediment sample SD-WD-9 had detectable concentrations of vinyl chloride (13 ppb) during Phase 1. This indicates that there may be chlorinated solvents in soil and/or groundwater that may be contributing to the concentrations detected in surface water/sediment in the drainage area and pond. Based on the groundwater contour map presented as Figures IV-1 and IV-2, it appears that the shallow groundwater in the area is hydraulically connected to the pond, and, at times, the western drainageway, which is a tributary to Middle Fork Shoal Creek. Soil and groundwater samples should be collected from the proposed well location mentioned above to properly characterize potential VOCs near the drainage swale in this area.

As discussed in ENVIRON's response to the referenced June 19, 2003 e-mail, the purpose of MW11 was to investigate the occurrence of cadmium detected in soil sample WA-9 above the screening level. Figures IV-3 and VI-2 of the Phase 1 Technical Memorandum depict sample WA-9 and the proposed location for MW11. As proposed, MW11 was sampled for TAL Metals only.

Soil boring WA-9 was conducted within the broad valley formed by the Western Drainageway during an extremely dry period. Therefore, this location was accessible at that time using a Geoprobe drilling rig. However, throughout 2003, the entire floor of the valley forming the Western Drainageway has been almost completely submerged, preventing drill rig access. As this lowland area appears to be a discharge area for ground water, a monitoring well at the proposed location, if it could be installed, would in effect be a surface water monitoring point.

The low levels of VOCs detected in surface water samples SW-WD-9 and SW-WD-PN were not detected in either the ground water sample collected from downgradient monitoring well MW8 or the surface water sample collected just downstream of Outfall 001 (SW-WD-7). Thus, these low concentrations do not extend off-Site, presumably as a result of the rapid aeration, biodegradation and dilution expected to be caused by the discharge of both ground water and surface water to the southwest pond. Therefore, collection of soil and ground water samples for the proposed well location for MW11 is neither feasible, nor warranted by the data collection.

10. Page 9 2nd full par. Please identify the monitoring wells that were pumped dry, referenced in the second to last sentence.

This addition has been made where referenced.

11. Page 9 Footnote 3. The field duplicate sample for the PCB fraction of TCL organics was also not analyzed. Field parameters measured during purging should be included in the text, perhaps as an appendix for proper reference.

The field duplicate sample for the PCB fraction of TCL organics was analyzed. As stated in Footnote 4, the field duplicate sample for the VOC fraction of TCL Organics was not analyzed by the laboratory. Monitoring well purging/sampling details have been included as Appendix B.

12. Page 9 Section C par 1. Outfalls 1 and 2 should be included on all figures and identified with the correct terminology (001, 002?). IEPA's permit should also be referenced here.

Labels indicating the locations of the storm water outfall have been added to each figure and a reference to the storm water discharge permit has been included as Footnote 5.

13. Page 10 Section C, 2nd full par, 2nd sentence. The number of surface water sample locations listed as being analyzed for TCL organics and PCBs do not correlate with the number of sample locations listed in Tables IV-2B, IV-2C, and IV-2D.

A correction to the number of surface water sample locations has been made to the referenced section of the text.

14. Page 11 Section E, 2nd sentence. Soil pH samples were not collected at a depth of one foot below the depth at which undisturbed native soil was encountered in borings for MW-6, MW-8 and MW-9.

This correction has been made through further discussion of the pH soil sample depths in the referenced section of the text.

15. Page 12 par 1. Please provide any updated information to the physical characteristics discovered during Phase 2 sampling.

A sentence indicating that there have been no significant changes to the physical characteristics of the site since the Phase 1 field activities has been added to the referenced section.

16. Page 13 Section F. Please provide the updated 2000 census data here.

Updated 2000 census data have been included in this section.

17. Page 15 Section A.1. Discussion should be added addressing the radial groundwater flow from the groundwater divide. Also, discussion of flow to the north from the groundwater divide should also be added.

These additional discussions have been added to Section IV.A.1.

18. Page 15 Section 2. Please provide applicable updates to TACO standards.

A review of the TACO ground water screening levels used for comparisions of the Phase 2 data was conducted, resulting in revisions to the screening levels shown in the tables and figures. However, no additional PCOCs or PAOCs resulted from these corrections.

19. Page 17 Section 3. Please rename section to Discussion, instead of Conclusions. Please delete the first and third bullets. As will be discussed in our October risk assessment call, it is recommended that dissolved metals results be used for identifying PCOCs and PAOCs. Thallium should be added as a groundwater PCOC.

These edits have been made as recommended. As noted, dissolved metals were used in identifying PCOCs and PAOCs.

20. Page 18 par 1. Please revise this sentence to read "As shown on Figure IV-3, an area including the SW portion of the Site and off-Site areas west of the western site boundary (wooded area on an industrial property) and south of the SW Site boundary are designated as a PAOC for groundwater.

As shown on the June 23, 2003 contour map presented as Figure IV-2, the ground water elevation at temporary well TW-5 was significantly (approximately 7 feet) higher than that measured at G-107. The elevations measured at MW7 and MW11 further support this flow pattern. The steep northwest-sloping hydraulic gradient closely reflects the steep northward and northwestward slope of the land surface between these two locations. This ground water flow pattern, coupled with the existence of a small stream located very close to the southern Site boundary, precludes any potential for southward migration of metals in ground water. Therefore, the southern Site boundary is a reasonable estimate of the southern extent of the ground water PAOC and no additional changes to the text are proposed.

21. Page 18 Section B.1a. The Secondary Contact and Indigenous Aquatic Life standard for cadmium should be checked again (either 0.15 ppm or 0.05 ppm(as listed). There is a discrepancy between the total cadmium result listed for SW-WD-10 in Table IV-2A (o.oo58 ppm) and the result on Figure IV-4 (0.058 ppm). If the figure is correct, then SW-WD-10 should be added as a location above the screening criteria.

The surface water screening value for cadmium is 0.15 mg/L. Table IV-2A and Figure IV-4 have been corrected accordingly. The cadmium value shown in Table IV-2A (0.0058 mg/L) is correct and is below the screening level. The value shown on Figure IV-4 has been corrected.

22. Page 19 B.1b and 1c. It would be helpful for the results for sulfate and VOC detections (even though they are below screening criteria) be discussed here.

This discussion has been added to the referenced section.

23. Page 19 Section C par 1. Please insert "the RCRA hazardous waste threshold value of" after in excess of in the 1st sentence.

Edit made as requested.

24. Page 19 Section C par 2. Is this statement in addition to those piles identified in Phase 1 as TCLP exceedances?

As clarified in Section II.D, only those residue piles/groups of piles with TCLP exceedances in Phase 1 were subjected to supplementary sampling during the Phase 2 investigation.

25. Page 21 Section V, PCOC Table. Thallium should be added as a PCOC based on detections in MW-7.

Thallium was added to this table as indicated.

26. Page 22 Potential Exposure Routes. Employee should be added to the on-site groundwater column. Construction worker, employee, trespasser, future resident should be added to the surface water column. Residue leaching to groundwater should be added to the residues column.

The noted changes to this table were made.

27. Table IV-1C. Recommend revising the listed standards using the latest version of TACO as there appear to be some discrepancies in the table.

As noted above, a review of the TACO screening levels used for comparisions of the Phase 2 data was conducted, resulting in revisions to the screening levels shown in the tables and figures.

28. Table IV-1D. Illinois TACO Class 1 and 2 groundwater standards appear to be listed incorrectly here-please see comment 27.

A review of Illinois TACO ground water standards indicated that the standards for some organic constituents were listed incorrectly. Appropriate revisions were made to the tables and figures. As noted above, these corrections did not result in the addition or subtraction of any COCs.

29. Table IV-2AC. Recommend using USEPA National Ambient Water Quality Criteria standards as screening criteria for analytes that do not have Illinois water quality standards.

USEPA National Ambient Water Quality Criteria are now shown as screening levels for all detected surface water constituents without Illinois Subpart B or D water quality standards. However, as the specific surface water exposure pathways have yet to be defined, and the applicability to criteria that assume human consumption of organisms in the drainageways is unclear, these criteria were not used in the data comparisons. Comparisons of the data to ecological screening benchmarks will be a component of the Ecological Risk Screening Evaluation.

30. Appendices. It is recommended that references be summarized in an attached appendix.

As the technical memorandum is not a highly referenced report, references to sources for the Screening Levels were added at the locations in the text and tables where they are first cited.

If you have any questions regarding these responses or the attached revisions, please do not hesitate to contact me.

Sincerely,

ENVIRON International Corporation

F. Ross Jones / AB

F. Ross Jones, P.G.
Manager

FRJ:alb

Attachments

cc: Thomas Krueger, Esq. – USEPA Region 5
Rick Lanham – IEPA Bureau of Land (2 Copies of Attachments)
Chris English – CH2M Hill
John Ix, Esq. – Dechert
Paul Harper – Eagle-Picher
Doug Ucci – QMG; representing Eagle-Picher
Gordon Kuntz – Sherwin-Williams
Roy Ball – ENVIRON

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TECHNICAL MEMORANDUM

REMEDIAL INVESTIGATION
PHASE 2: MIGRATION PATHWAY ASSESSMENT

Remedial Investigation/Feasibility Study
Eagle Zinc Company Site,
Hillsboro, Illinois

Submitted To:

U.S. Environmental Protection Agency, Region V
and
Illinois Environmental Protection Agency

Submitted By:

ENVIRON International Corporation
Deerfield, Illinois

On behalf of

Eagle Zinc Parties

September 2003

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Figure IV-1: Ground Water Contour Map – March 17, 2003
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Appendix A: Piezometer and Monitoring Well Boring/Construction Logs
Appendix B: Monitoring Well Sampling Details

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I. INTRODUCTION

A. Purpose of Report

This Technical Memorandum summarizes and evaluates the results of the Phase 2 Remedial Investigation (RI) conducted at the Eagle Zinc Company site (the "Site"), located in Hillsboro, Illinois. ENVIRON International Corporation (ENVIRON) has prepared this Technical Memorandum on behalf of the Eagle Zinc Parties (the "Parties") as part of the Remedial Investigation/Feasibility Study (RI/FS) for the Site. The RI/FS is being completed pursuant to the Statement of Work (SOW) presented in the December 31, 2001 Administrative Order on Consent (AOC) between the Parties and the U.S. Environmental Protection Agency (USEPA). All Phase 2 investigations were conducted in accordance with the following USEPA-approved documents: the AOC; the SOW; the July 2002 *Remedial Investigation/Feasibility Study Work Plan* (the "RI/FS Work Plan"); the March 2003 *Technical Memorandum, Remedial Investigation, Phase 1: Source Characterization* (the "Phase 1 Technical Memorandum"); and a May 30, 2003 letter proposal for supplementary sampling, which was conditionally approved by USEPA in a letter dated June 9, 2003.

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As stated in the SOW and RI/FS Work Plan, the overall purpose of the RI is to investigate the Site's physical characteristics, identify sources of contamination, and determine the nature and extent of contamination at the Site. Consistent with the AOC governing the RI/FS, the RI has been designed to complement the prior investigations conducted at, and in the vicinity of the Site. The primary focus of the RI is to characterize the nature and extent of contamination at the site, to assess potential migration pathways by which the contaminants could impact human or ecological receptors, and to evaluate potential risks to those receptors. The RI includes two phases of investigation: Phase 1 (Source Characterization), and Phase 2 (Migration Pathway Assessment). The Phase 1 Technical Memorandum was submitted to USEPA and IEPA in March 2003. The results of both phases of the RI will be interpreted as a basis for performing a baseline risk assessment to establish the need for future remedial response activities for the Site.

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The purpose of this Technical Memorandum is to summarize results obtained from the Phase 2 investigation, which involved the assessment of potential migration pathways, including ground water and surface water.

B. Report Organization

Section I describes the purpose and organization of this report. Section II of this report provides a summary of the work conducted as part of the Phase 2 RI. Section III describes the physical characteristics of the areas investigated during both Phases of the RI. Section IV presents the results of the Phase 2 RI. Section V presents an updated Site Conceptual Model. A detailed discussion of Site background information, including a description of the Site, the history of the Site, and a summary of previous investigations, was included in the RI/FS Work Plan and the March 2002 *Preliminary Site Evaluation Report* ("the PSE Report").

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II. PHASE 2 – MIGRATION PATHWAY ASSESSMENT

The Phase 2 field activities were conducted at the Site between March 10, 2003 and March 19, 2003. In addition, supplementary sampling activities were conducted between June 19, 2003 and June 23, 2003. All field activities were conducted and/or supervised by ENVIRON. All piezometer installation, monitoring well installation, temporary well installation, well development, and residue pile test excavation activities were conducted by Philip Services, Inc. (Philip). All laboratory analyses were conducted by EnChem, Inc. (EnChem) of Green Bay, Wisconsin. Site surveying work was conducted by Hurst-Rosche Engineers, Inc. (Hurst-Rosche) of Hillsboro, Illinois. Tables II-1 through II-4 provides a summary of all investigative samples collected as part of Phase 2 of the RI.

A. Site Surveying

As discussed below, Hurst-Rosche surveyed the locations and elevations of the piezometers, monitoring wells, temporary monitoring wells, and a staff gage installed in the southwest pond. Based on field conditions (e.g., marshy conditions, steep terrain, etc.), some piezometer and monitoring well locations were adjusted from the proposed locations the minimum distance necessary to allow drill rig access (see Section B.1 below).

B. Ground Water Investigation

In accordance with the RI/FS Work Plan and certain augmentations to the Phase 2 program approved by the USEPA, the scope of the ground water investigation included:

- Installation of six (6) permanent piezometers and four (4) temporary piezometers at the approximate locations depicted on Figure VI-2 of the Phase 1 Technical Memorandum, with ground water elevations determined as discussed in the RI/FS Work Plan. All piezometers were installed between March 10, 2003 and March 12, 2003

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- Installation of eleven (11) additional permanent monitoring wells at the approximate locations depicted on Figure VI-2 of the Phase 1 Technical Memorandum. Monitoring wells MW1 through MW10 were installed between March 12, 2003 and March 15, 2003. Monitoring well MW11 was installed on June 19, 2003.

- Installation of three (3) temporary monitoring wells on off-Site properties, not owned by Eagle Zinc, located west of the southwest portion of the Site. These temporary wells were installed on June 19 and 20, 2003.

- Sampling of the newly installed and existing monitoring wells and off-Site temporary monitoring wells as discussed in the RI/FS Work Plan. With the exception of MW11, which was installed in June 2003, all on-Site permanent monitoring wells were sampled on March 18, 2003 and March 19, 2003. The three off-Site temporary monitoring wells and MW11 were sampled on June 20, 2003.

- Installation and surveying of a staff gauge in the southwest pond to determine the elevation of the pond surface water relative to ground water. The staff gauge was installed on March 10, 2003.

1. Piezometer Installation

Six (6) permanent and four (4) temporary piezometers were installed at the Site to provide a preliminary confirmation of the pattern of groundwater flow and to confirm locations for additional permanent monitoring wells. The piezometers were installed as close as possible to their proposed locations; however, physical limitations, such as steep terrain, marshy conditions and excessive vegetation, warranted deviations from five of the proposed locations:

- Permanent piezometer P-1 was installed approximately 90 feet south of its proposed location.

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- Permanent piezometer P-2 was installed approximately 170 feet west of its proposed location.
- Permanent piezometer P-3 was installed approximately 90 feet south of its proposed location.
- Temporary piezometer P-9 was installed approximately 90 feet south of its proposed location.
- Temporary piezometer P-10 was installed approximately 280 feet southwest of its proposed location.

The surveyed locations of the piezometers are shown on Figure II-1.

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The piezometers were designated P1 through P10, with the permanent piezometers numbered P1 through P6 and the temporary piezometers numbered P7 through P10. All of the piezometers were installed using a truck-mounted direct-push drilling apparatus (i.e., Geoprobe). Two-inch outside diameter macro-core soil samples were collected continuously to an appropriate depth below the top of the saturated zone and soil boring logs were prepared by an ENVIRON geologist. All soil cores were screened for organic vapors at 6-inch intervals using a photoionization detector (PID). To construct each piezometer, a one-inch diameter section of PVC screen and riser pipe was placed in the core hole and a clean sand filter pack was placed around the PVC, generally to a depth of one to two feet above the top of the screen. The screen was placed so as to straddle the water table. A seal of granular bentonite was then placed in the annular space above the sand pack. The permanent piezometers were completed with stick-up type protective casings with locking caps. The temporary piezometers were completed with non-locking PVC caps. Piezometer drilling and construction logs are provided in Appendix A.

Water level measurements were collected from all piezometers, as well as pre-existing monitoring wells G101 through G109 and converted to water level elevations using surveyed benchmarks at the top of the piezometer casings. Preliminary ground water elevations determined from the piezometers and pre-existing monitoring wells confirmed that the locations selected for the additional monitoring wells were appropriate for monitoring ground water quality

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downgradient of potential areas of concern for soils identified during the Phase 1 investigation.

Following the complete round of synoptic water level measurement conducted in March 2003 immediately prior to ground water sampling, the four temporary piezometers (P7 through P10) were abandoned by removing the PVC, returning the soil cores to the borehole, and sealing the remainder of the borehole with granular bentonite.

2. Monitoring Well Installation

Eleven (11) monitoring wells (MW1 through MW11) were installed at the Site using the hollow-stem auger drilling method. The surveyed locations of the monitoring wells are shown on Figure II-1. The following adjustments were made to the array of Site monitoring wells in the field:

- At the onset of the Phase 2 fieldwork, pre-existing monitoring well G108 was found to have been damaged and partially filled with rocks. This well was properly abandoned by Philip Services by removing the entire well, including the screen and riser, and sealing the remaining hole with bentonite.

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- The location of the proposed monitoring well depicted on Figure VI-2 of the Phase 1 Technical Memorandum in the southwest corner of the Site was inaccessible, as the location depicted on this figure was within the steep ravine located between the southwest pond embankment and higher ground to the south of the Site. Therefore, this monitoring well (MW8) was installed on the pond embankment itself, as close as feasible to the proposed location (approximately 60 feet north of the proposed location). The selected location for MW8 is directly downgradient of the southwest pond and upper portions of the Western Drainageway. As MW8 was installed close to G108 and is actually in a better position as a downgradient monitoring well than G108, well G108 was not replaced with a new monitoring well.

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- The location initially proposed for a new monitoring well near the on-Site drainageway leading into the pond at the southwest corner of the Site was inaccessible in both March 2003 and June 2003, as a broad area of standing water covered the proposed location. Therefore, this monitoring well (MW11) was installed in June 2003 at the closest accessible location, which was approximately 200 feet east of the proposed location.

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Split-spoon samples were collected at five-foot intervals from the ground surface to the completion depth of the monitoring well and the samples were logged by the ENVIRON geologist.[1] Following the completion of a 6-inch diameter borehole, 2-inch inside diameter sections of schedule-40 PVC screen and riser pipe were placed in the borehole and a clean sand filter pack was placed around the screened interval. The well screen was installed such that it straddled the water table. A bentonite seal was then placed in the well annulus and the monitoring well was completed with a stick-up type protective casing with a locking cap. Drilling and well construction logs for the monitoring wells are presented in Appendix A.

Each newly installed monitoring well was developed no sooner than 12 hours following well installation. In addition, to ensure adequate flow of ground water into the wells, pre-existing wells G101 through G109 were redeveloped. Well development consisted of the removal of a minimum of three times the measured casing volume of water plus three times the saturated volume of the monitoring well sand pack using dedicated polyethylene bailers. Well development was deemed complete when this volumetric criterion and a reasonably clear discharge was achieved.[2]

3. Temporary Monitoring Well Installation

As proposed in ENVIRON's May 30, 2003 letter to the USEPA and approved by the USEPA in a letter dated June 9, 2003, three (3) temporary monitoring wells

[1] Prior to installation with the hollow-stem auger drilling rig, soils at monitoring wells MW01 and MW02 were first logged using a Geoprobe drilling apparatus (i.e., by collecting 4-foot long macro-core samplers).
[2] While noted in the RI/FS Work Plan, field parameters were not measured during well development.

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were installed on off-Site properties on June 19 and 20, 2003 to provide supplementary ground water data in the area west of the southwest portion of the Site.

The temporary wells were designated TW5 through TW7 and were installed using a truck-mounted direct-push drilling apparatus (i.e., Geoprobe). Two-inch outside diameter macro-core soil samples were collected continuously to an appropriate depth below the top of the saturated zone and soil boring logs were prepared by an ENVIRON geologist. All soil cores were screened for organic vapors at 6-inch intervals using a photoionization detector (PID). To construct each temporary well, a one-inch diameter section of PVC screen and riser pipe was placed in the core hole and a clean sand filter pack was placed around the PVC, generally to a depth of one to two feet above the top of the screen. The screen was placed so as to straddle the water table. A seal of granular bentonite was then placed in the annular space above the sand pack. The temporary wells were completed with non-locking PVC caps. Drilling and construction logs for the temporary wells are provided in Appendix A. The temporary wells were developed using the procedures described above for the permanent monitoring wells. Field parameters were not measured during development of the temporary wells.

Following surveying and a complete round of synoptic water level measurement conducted on June 23, 2003, the temporary wells were abandoned by removing the PVC, returning the soil cores to the borehole, and sealing the remainder of the borehole with granular bentonite.

4. Water Level Measurement

On March 17, 2003, prior to initiation of ground water sampling, an electronic water level meter was used to measure the depth to ground water in each monitoring well and piezometer. The measurements were made to the nearest one hundredth (0.01) of a foot relative to a surveyed and marked location at the top of the well casing. In addition, the elevation of the southwest pond was determined using a surveyed staff gage. The calculated piezometer, monitoring well, staff gage, and water level elevations are summarized in Table II-5. The piezometric

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data were used to construct a Site-wide ground water contour map. A second complete set of water level measurements was made on June 23, 2003, which included MW11 and the off-Site temporary wells. These data are also presented in Table II-5. Shallow ground water contour maps for the two measurement dates are presented as Figures IV-1 and IV-2, respectively.

5. Ground Water Sampling

Following the completion and development of the newly installed permanent and temporary monitoring wells, all pre-existing and newly installed wells were sampled for TAL metals and sulfate.[3] In addition, four of the ground water samples (MW1, MW4, MW8, and G107) were analyzed for TCL organic compounds and PCBs. The metals analyses were conducted using both field-filtered and unfiltered samples to determine dissolved and total metals concentrations, respectively.

For the ground water sampling program conducted in March 2003, field duplicate samples were collected at locations where the full list of analyses (i.e., TAL Metals, sulfate, and TCL Organics) were performed and submitted to the laboratory for analysis of the same parameters at a rate of 1 out of 20.[4] A minimum of 1 out of 20 samples were designated as a Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample. Based on the number of ground water samples (19), during the ground water sampling program conducted in March 2003, one field duplicate sample was collected at MW1 and one MS/MSD was collected at MW1.

All three temporary wells and on-Site monitoring well MW11 were sampled on June 20, 2003. The sample collected from MW11 was designated as the MS/MSD and a field duplicate sample was collected from MW11.

A peristaltic pump was used to purge and sample all permanent and temporary monitoring wells. During well purging, measurements for field parameters (pH, specific conductance, temperature, and dissolved oxygen) were made. While

[3] As proposed in ENVIRON's May 30, 2003 letter to USEPA, MW11 was sampled for TAL Metals only. In addition, monitoring wells MW-A, MW-B, MW-D and MW-E, which were installed and sampled pursuant to a UST compliance program under the oversight of IEPA, were not sampled. As proposed in ENVIRON's May 30, 2003 letter to USEPA, the three off-Site temporary wells were sampled for TAL Metals (dissolved and total). Additionally, monitoring well G-108 was found to be damaged and was subsequently abandoned.

[4] The field duplicate sample for the VOC fraction of TCL Organics was inadvertently not analyzed by the laboratory. However, as discussed in Section IV.A.2.c, no VOCs were detected in any of the ground water samples.

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purging, field parameters were monitored continuously using a flow-through sampling cell. Monitoring well purging was considered complete when a minimum of three times the measured casing volume had been removed, and the field-measured parameters of pH, specific conductance, and temperature had stabilized. Monitoring wells G-101, G-105, G-107, MW8, MW9 and MW10 and temporary wells TW5 and TW7 pumped dry before the volumetric criterion was reached. Following one or more pumping episodes in which these wells went dry, these wells were sampled once a sufficient amount of water had recharged in the well. Only wells G-107, TW5 and TW7 did not meet the volumetric purge criteria. Monitoring well sampling details are included in Appendix B.

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Filtered and unfiltered ground water samples were collected for the TAL Metals analyses. Field filtering was conducted using dedicated 0.45-micron filters.

C. Surface Water Investigation

As described in the RI/FS Work Plan, each surface water sample was co-located with a Phase 1 sediment sample that was either: (1) located on, or downstream of the Site and exhibited elevated metals concentrations; or (2) represented an upstream location not expected to have been impacted by Site operations. Surface water samples were collected in both of the Site's two major surface water drainageways (i.e., upstream and downstream of storm water Outfalls 1 and 2[5]). As proposed in the Phase 1 Technical Memorandum, in March 2003, surface water samples were collected at a total of ten (10) locations: three (3) within the eastern drainageway; and seven (7) within the western drainageway (includes two samples from the southwest pond). Surface water samples were collected in both drainageways on March 10, 2003 and March 19, 2003. As proposed in ENVIRON's May 30, 2003 letter to USEPA and approved by USEPA in a letter dated June 9, 2003, three additional surface water samples were collected in the Western Drainageway on June 13, 2003.

On both sampling dates, sufficient surface water was present at each proposed location to allow for the collection of a surface water sample. The surface water samples were collected as grab samples by submerging the sample container with the open end

[5] Outfall designations associated with the site's National Pollutant Discharge Elimination System (NPDES) storm water discharge permit (Permit No. IL0074519), which was terminated by IEPA on July 10, 2003 in response to the cessation of operations at the site.

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facing upstream. For samples containing a preservative or fixing agent, the samples were collected using a laboratory-cleaned glass sample jar and immediately transferred to the proper sample container. Sample collection was performed in such a way that disturbance of bottom sediments was minimized during sample collection. In both drainageways, the sampling activities proceeded from downstream to upstream so that any disturbed sediment did not impact subsequent sampling.

All surface water samples collected in March 2003 were analyzed for TAL Metals and sulfate. In addition, as shown on Figure II-2, six (6) of the samples (SW-WD-7, SW-WD-9, SW-WD-10, SW-WD-PN, SW-ED-11, and SW-ED-13) were analyzed for TCL organic compounds and PCBs. Field duplicate samples were collected at locations where the full list of analyses were performed and submitted for laboratory analysis of the same parameters at a rate of 1 out of 20. A minimum of 1 out of 20 samples were designated as a Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample. Based on the number of surface water samples (10), one field duplicate sample was collected at SW-WD-7 and one MS/MSD was collected at SW-WD-9.[6]

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The three additional surface water samples collected on June 13, 2003 (SW-WD-6-061303, SW-WD-11, and SW-WD-12) were analyzed for TAL Metals. The sample collected on this date at SW-WD-6 was designated the MS/MSD and a field duplicate was collected at this location. The additional surface water samples were approved by USEPA a letter dated June 9, 2003.

D. Supplementary Residue Sampling

During Phase 1 of the RI, three of the 15 residue pipes/groups of piles (RR1-3, RR2-11 and MP1-21) had a Toxicity Characteristic Leaching Procedure (TCLP) lead concentration that exceeded the RCRA hazardous waste threshold of 5.0 mg/L. As proposed in the Phase 1 Technical Memorandum, these three residue piles/pile groups were further characterized by subdividing each pile/group into imaginary sections and collecting one gross composite sample from each section for laboratory analysis of TCLP lead. The purpose of the supplementary sampling was to better define sections of the piles that exceed the TCLP RCRA hazardous waste threshold value for lead of 5.0 mg/L.

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[6] The MSD sample for PCBs analysis was not analyzed as the bottle broke during shipment to the laboratory. However, as noted in Section IV.B.1.d, no PCBs were detected in any of the surface water samples.

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The locations of the residue piles sampled and the pile sections represented by the composite samples are shown on Figure II-3.

Based on volumetric estimates and pile layout, each pile was divided into a number of equal sections. Eight (8) samples were collected from pile RR2-11, two (2) samples were collected from pile RR1-3, and three (3) samples were collected from the MP1-21 piles. Each sample was collected as a composite of three sample increments, and was collected either as depth composites or area composites.[7] The sample compositing methodology was as discussed in the RI/FS Work Plan.

Each composite sample was analyzed for lead using the TCLP. A field duplicate was collected for sample R-RR1-3-S1D (rate of 1 out of every 20 samples). Sample R-MP1-21-S3 was designated the MS/MSD.

E. Soil pH Sampling

To determine the general range of Site-wide soil pH conditions, one soil sample was collected for laboratory soil pH analysis from each of the 20 soil borings completed for installation of the monitoring wells and piezometers. The majority of the soil pH samples were collected one foot below the depth at which undisturbed native soil was encountered.[8]

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[7] Similar to the sampling procedure employed during the Phase 1 residue sampling program, the depth composites were collected at three equally spaced depths within the pile by completing test trenches. Area composites, consisting of sample increments spaced evenly across the section to be sampled, were collected for lower, horizontally extensive piles.

[8] At several locations, a slightly deeper interval was selected for collection of the pH sample, as the pH samples were collected from split-spoon samples that, in accordance with the RI/FS Work Plan, were taken from the monitoring well boreholes at 5-foot intervals. However, all pH samples are believed to be representative of the uppermost native soils encountered in the borings, which ranged in texture from silty clay to silty sand.

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III. PHYSICAL CHARACTERISTICS OF THE STUDY AREA

The physical characteristics of the areas of the Site were discussed in detail in the March 2002 Preliminary Site Evaluation (PSE) Report, as well as the July 2002 RI/FS Work Plan. This information was assembled through inquiries made during completion of the PSE and from previous environmental reports concerning the Site. Information relevant to both phases of the RI is discussed below. No significant differences in the physical characteristics of the Site were observed during the Phase 2 investigations, as compared with previous investigation phases and Site inspections.[9]

A. Surface Features

The Site's surface topography, storm water drainage, water bodies, and physiographic setting are described in detail in Section II.A.3.b of the RI/FS Work Plan. The historic plant residues are discussed in Section II.A.4 of the RI/FS Work Plan. A topographic survey map of the Site was included in Appendix A of the Phase 1 Technical Memorandum. All plant operations, including residue processing operations, ceased in late 2002 and early 2003. The thickness of surface residues encountered at each well/piezometer location is depicted on each soil boring log presented in Appendix A.

B. Local Meteorology

Meteorological data for the Site area are provided in Section II.A.3.a of the RI/FS Work Plan. In addition to the meteorological information presented in the RI/FS Work Plan, the Phase 1 Technical Memorandum included a wind rose diagram for the Springfield, Illinois airport, which is located approximately 30 miles north of the site, but is expected to display similar average wind directions. The wind rose diagram, which displays the dominant average wind directions and ranges of wind speed for the year 1987, indicates that the dominant wind direction is towards the north and north-northeast, with moderate frequency in other eastward directions, and the lowest frequencies in the

[9] Surface water flow in the drainageways was greater during the Phase 2 investigations than previously observed, as the Site area had experienced significant rainfall during the winter and spring of 2003. The volumetric flow in the drainageways appears to vary significantly on a seasonal and perennial basis.

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westward directions. The prevailing northward wind direction is consistent with the generalized meteorological information provided in the RI/FS Work Plan.

C. Surface Water Hydrology

The surface water hydrology of the Site and surrounding area is described in detail in Section II.A.3.b of the RI/FS Work Plan. Additional information concerning surface water quality in the Site's drainage systems and the interaction between the southwestern pond and ground water was collected as part of the surface water and ground water investigations conducted during Phase 2 and is discussed further below.

D. Site Geology

Information concerning the soils, overburden units (glacial deposits) and bedrock units that underlie the Site was presented in Section II.A.3.d of the RI/FS Work Plan. Field observations made during completion of the Phase 1 and Phase 2 soil borings indicate that the overburden unit within the depth intervals investigated generally consists of a sequence of interlayered brown to gray clay, silty clay, and sandy clay, and silty or clayey sand.

E. Site Hydrogeology

Information concerning the Site hydrogeology was presented in Section II.A.3.e of the RI/FS Work Plan. Ground water was measured in the monitoring wells at depths ranging from approximately 2 to 17 feet below ground surface (bgs).

F. Demography and Land Use

According to the 2000 census, approximately 2,800 people lived within a 1-mile radius of the Site and approximately 9,300 people lived within a 5-mile radius of the Site. Land use characteristics of the Site and surrounding area are described in Section II.A.2 of the RI/FS Work Plan.

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G. Ecology

As discussed in the Phase 1 Technical Memorandum, an Ecological Risk Screening Evaluation is a component of the Baseline Risk Assessment task. As part of this evaluation, a preliminary site visit was conducted by Limno-Tech, Inc. (LTI) during implementation of the Phase 1 field activities. The objectives of the site visit were to: 1) identify on-site or relevant off-site habitats, ecological receptors, contaminant source(s) and contaminant(s) migration routes; and 2) assess to the extent possible whether a potential for present or future ecological impacts exists based on contaminants, receptor, and potential migration pathways. No additional activities associated with the Ecological Risk Screening Evaluation were conducted during Phase 2 of the RI and no conclusions concerning the ecology of the Site or adjacent areas have been made by LTI.

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IV. NATURE AND EXTENT OF CONTAMINATION

A. Ground Water Investigation

1. Ground Water Flow

Using ground water levels measured in the monitoring wells and piezometers on March 17, 2003, a ground water contour map (Figure IV-1) was constructed, which shows the inferred pattern of shallow ground water flow across the Site. The shallow ground water flow pattern is consistent with the previous interpretation presented on Figure II-3 of the RI/FS Work Plan, in that it shows an inferred southward/southwestward ground water flow direction in the western and southwestern portions of the Site and an eastward/southeastward flow direction in eastern portions of the Site. These flow regimes are separated by a roughly north-south trending ground water divide. Based on the existence of the divide, ground water in the northwesternmost portion of the Site may locally exhibit a northward or northwestward flow component. However, based on the local topography, most if not all of the Site's ground water is believed to ultimately flow either southwestward (towards and parallel with the Western Drainageway) or eastward/southeastward (towards and parallel with the Eastern Drainageway). In all areas of the Site, the shallow ground water flow pattern generally reflects the surface topography.

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A second ground water contour map was constructed using water level elevation data collected on June 23, 2003 and is included as Figure IV-2. Water level elevations determined from the temporary off-site monitoring wells were used to estimate the shallow ground water flow pattern in the area immediately west of the southwest portion of the Site. This contour map exhibits an inferred ground water flow pattern similar to that depicted on Figure IV-1, with continued westward flow in the area west of the southwest portion of the Site.

2. Ground Water Analytical Results

The analytical results for the ground water samples are summarized in Tables IV-1A through IV-1D. Since applicable or relevant and appropriate requirements

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(ARARs) have not been established, in accordance with USEPA RI/FS guidance, the data were compared with Screening Levels to confirm/refine the Potential Areas of Concern (PAOCs) identified based on review of historical Site data during completion of the PSE. For the purpose of this evaluation, the Illinois Tiered Approach to Corrective Action Objectives (TACO; 35 IAC 742) ground water remediation objectives were used as Screening Levels.[10] The Screening Levels are listed in Tables IV-1A through IV-1D. The Phase 2 laboratory data and data validation reports are submitted under separate cover. Ground water constituent concentrations that exceed the Screening Levels are summarized on Figure IV-3.

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a. Metals

As shown on Figure IV-3, no total or dissolved metals concentrations exceeded the Screening Levels in monitoring wells G101, G103, G105, G106 and MW2, and only manganese exceeded the Screening Levels in wells G102 and MW5.[11] A low concentration of total thallium exceeding the Screening Level was detected in MW1; however, thallium was not detected in a duplicate sample collected concurrently from MW1. Concentrations of a broader list of metals exceeded Screening Levels in dissolved and/or total metals samples in wells located in the southwest portion of the Site and in the temporary monitoring wells located west of the southwest portion of the Site.

b. Sulfate

Sulfate concentrations exceeded the Screening Level of 400 mg/L in six of the monitoring wells: G107 (920 mg/L); MW1 (530 mg/L); MW3 (730 mg/L); MW6 (900 mg/L); MW7 (720 mg/L); and MW9 (1,700 mg/L).

[10] The Illinois TACO ground water remediation objectives for both Class I and Class II ground water (35 IAC 742; Appendix B, Table 1) are presented for screening purposes, with concentrations exceeding the more stringent standards (Class I) shown in bold type.
[11] It is noted that the manganese concentrations detected in upgradient wells G102 and MW5 likely represent natural background conditions in the ground water.

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c. VOCs and SVOCs

No VOCs were detected in any of the ground water samples. With only one exception, no SVOCs were detected in any of the ground water samples. The SVOC caprolactam was detected in G107 at an estimated concentration of 0.00295 mg/L and in MW4 at a concentration of 0.1 mg/L. According to USEPA's Integrated Risk Information System (IRIS), caprolactam is used in the manufacture of synthetic fibers, especially nylon, and is therefore not believed to have been used on-site for the historical manufacture/processing of zinc/zinc compounds or for any other purpose. Caprolactam does not have an Illinois TACO ground water remediation objective. However, as the USEPA Region 9 Preliminary Remediation Goal (PRG) for this compound in "tap water" is 18 mg/L, its occurrence at the Site does not appear to pose an unacceptable risk; this compound therefore has not been designated as a PCOC for ground water.

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d. PCBs

No PCBs were detected in any of the ground water samples.

3. Discussion

Based on the ground water sampling results for dissolved metals samples, zinc, cadmium, iron, lead, manganese and thallium are designated as PCOCs for ground water. The highest dissolved metals concentrations in ground water were detected in MW7. MW7 was installed at a location immediately downgradient (west) of a predicted area of concern (AOC) for soils. This potential source area is depicted on Figures IV-3 and VI-2 of the Phase 1 Technical Memorandum.

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As shown on Figure IV-3, an area including the southwestern portion of the Site and a small off-Site area west of the western Site boundary (wooded area on an industrial property) is designated as a PAOC for ground water.[12]

B. Surface Water Investigation

1. Surface Water Analytical Results

The analytical results for the surface water samples are summarized in Tables IV-2A through IV-2D. Again, since ARARs have not been established, in accordance with USEPA RI/FS guidance, the data were compared with Screening Levels to confirm/refine the PAOCs identified based on review of historical Site data during completion of the PSE. For the purpose of this evaluation, the Illinois Water Quality Standards: 35 IAC 302 Subpart B (General Water Quality Standards), and 35 IAC 302 Subpart D (Secondary Contact and Indigenous Aquatic Life Standards) were used as Screening Levels. The Screening Levels are listed in Tables IV-2A through IV-2D. The Phase 2 laboratory data and data validation reports are submitted under separate cover. Surface water constituent concentrations that exceed the Screening Levels are summarized on Figure IV-4.

a. Metals

With the exception of sample SW-ED-16, collected in the Eastern Drainageway near Lake Hillsboro, and samples SW-WD-11 and SW-WD-12 collected in the Western Drainageway, each surface water sample collected in both drainageways contained zinc concentrations that exceeded the Screening Level of 1 mg/L (ranged from 1.2 mg/L and 26 mg/L).[13] In addition, samples SW-WD-PS, SW-WD-PN, and SW-WD-9 contained cadmium concentrations that exceed the Screening Level of 0.05 mg/L (ranged from 0.069 mg/L to 0.23 mg/L). Finally, samples SW-WD-8 and SW-WD-10 contained iron

[12] The non-toxic inorganic constituents iron, manganese and sulfate were not considered in the estimation of the ground water PAOC.

[13] It is noted that the zinc concentration detected at SW-ED-11 (1.2 mg/L) likely represents background surface water conditions in the Eastern Drainageway. The Eastern Drainageway originates at or near this offsite location, which exclusively receives runoff from a sports playing field located north of the Site (i.e., no surface water drainage from the Site occurs to this portion of the Drainageway).

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concentrations that exceeded the Screening Level of 2 mg/L (3.2 mg/L and 15 mg/L, respectively).

b. Sulfate

None of the sulfate concentrations detected in the surface water samples exceeded the Screening Level of 500 mg/L. Sulfate concentrations ranged from 21 mg/L to 450 mg/L, with the highest concentrations detected in the Western Drainageway.

c. VOCs and SVOCs

No SVOCs were detected in any of the surface water samples. No VOCs were detected at concentrations exceeding their respective screening levels. The VOC cis-1,2-dichloroethene was detected in surface water samples SW-WD-9 and SW-WD-PN at concentrations of 0.002 mg.L and 0.022 mg/L, respectively. The VOC trichloroethene (TCE) was also detected in these two surface water samples at concentrations of 0.0063 mg/L and 0.0014 mg/L, respectively.

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d. PCBs

No PCBs were detected in any of the surface water samples.

2. Discussion

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Based on these results, cadmium, iron and zinc were identified as PCOCs for surface water in the Western Drainageway. Only zinc was identified as a PCOC for surface water in the Eastern Drainageway. With the exception of a portion of the Eastern Drainageway proximal to Lake Hillsboro, portions of both drainageways immediately downstream of the Site are considered PAOCs for surface water.

C. Supplementary Residue Sampling

The analytical results for the residue pile samples are summarized in Table IV-3. With the exception of one composite sample collected from residue Pile RR2-11, each

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composite sample had a TCLP lead concentration in excess of the RCRA hazardous waste threshold of 5.0 mg/L.[14] The TCLP lead concentrations in Pile RR2-11 ranged from 2.2 mg/L to 18 mg/L. The TCLP lead concentrations in Pile RR1-3 ranged from 23 mg/L to 28 mg/L. The TCLP lead concentrations in Pile MP1-21 ranged from 18 mg/L to 230 mg/L.

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Based on these results, TCLP lead continues to be considered a PCOC for the residues, and the piles designated RR1-3, RR2-11 and MP1-21 continue to be designated as PAOCs for residues.

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D. pH Soil Sampling

The pH soil sampling results are summarized in Table IV-4. The soil pH values ranged from 4.3 to 7.9 Standard Units. These data will be used to assess pH dependent soil remedial objectives for the migration to ground water pathways in the Baseline Risk Assessment.

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V. MODIFIED SITE CONCEPTUAL MODEL

Based on an evaluation of pre-existing site data presented in the PSE Report, affected environmental media, PCOCs, PAOCs, and potential exposure routes were identified as a preliminary Site Conceptual Model (SCM). Based on the Phase 2 sampling data for ground water and surface water, the SCM has been modified as follows:

POTENTIAL CONTAMINANTS OF CONCERN (PCOCs)					
On-Site Soil	**Sediment – Western Drainageway**	**Sediment – Eastern Drainageway**	**Residues**	**Ground Water**	**Surface Water**
Analytical Fractions					
TAL-Metals	**TAL-Metals**	**TAL-Metals**	**TCLP Metals**	**TAL-Metals**	**TAL-Metals**
Cadmium	Antimony	Antimony	TCLP-Lead	Cadmium	Cadmium
Lead	Arsenic	Arsenic		Lead	Chromium
Zinc	Beryllium	Beryllium		Manganese	Copper
	Cadmium	Cadmium		Thallium	Lead
	Lead	Lead		Zinc	Manganese
	Silver	Silver		Iron	Zinc
	Thallium	Thallium			Iron
	Zinc	Zinc			
	Organics	**Organics**		**Other Inorganics**	**Other Inorganics**
	Vinyl Chloride	Vinyl Chloride		Sulfate	Sulfate

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As compared with the PCOC summary included in the Phase 1 Technical Memorandum, cadmium was added as a PCOC for surface water. No specific modifications to the PCOC summary included in the RI/FS Work Plan were made for any other media.[15]

Based on exceedances of Screening Levels, the PAOCs for ground water and surface water are depicted on Figures IV-3 and IV-4, respectively, and are summarized as follows:

[15] Dissolved metals concentrations were used in determination of PCOCs for metals in ground water.

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POTENTIAL AREAS OF CONCERN (PAOCs)				
On-site Soil	**Sediment**	**Residues**	**Ground Water**	**Surface Water**
Area 1; Area 2; Area 3; Area 4 Western Area	Western Drainageway; Eastern Drainageway	RR1 Stockpiles ; RR2 Stockpiles ; MP Stockpiles	SW Part of Site and Off-Site Area Immediately Adjacent	Western Drainageway; Eastern Drainageway

This summary table is identical to the PAOC summary provided in the Phase 1 Technical Memorandum, with the exception of the addition of a small off-Site area to the PAOC for ground water.

Based on a qualitative evaluation, the following potential on-Site and off-Site exposure routes have been identified:

POTENTIAL EXPOSURE ROUTES							
	On-Site Soil	**Residues**	**On-Site Sediments**	**Off-Site Sediments**	**On-Site Ground Water**	**Off-Site Ground Water**	**Surface Water**
Potentially Affected Population	Construction Worker; Employee; Tresspasser; Future Resident[16]; Ecological Receptors	Construction Worker; Employee; Trespasser; Ecological Receptors	Construction Worker; Employee; Trespasser; Future Resident[16]; Ecological Receptors	Resident; Ecological Receptors	Construction Worker; Employee; Future Resident[16]	Resident	Construction Worker; Employee; Trespasser; Future Resident; Ecological Receptors
Exposure Route(s)	Ingestion/ Inhalation; Soil Leaching to Ground Water; Potential Ecological Impacts	Ingestion/ Inhalation; Residue Leaching to Ground Water	Ingestion/ Inhalation; Soil Leaching to Ground Water	Ingestion/ Inhalation; Soil Leaching to Ground Water; Potential Ecological Impacts	Ingestion	Incidental Residential Exposure	Secondary Residential Exposure; Potential Ecological Impacts

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No specific modifications were made to the Potential Exposure Routes summary presented in the Phase 1 Technical Memorandum based on the Phase 2 RI data. As discussed in the RI/FS Work Plan, the Site Conceptual Model will be modified and supplemented as necessary during the course of the RI/FS, as the data are evaluated.

[16] This scenario is hypothetical, as residential development of the Site is not permitted under current zoning ordinances.

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VI. REFERENCES

TABLES

Table II - 1: Groundwater Sampling Summary
Eagle Zinc Company Site, Hillsboro, Illinois

Well I.D.	Total Well Depth (ft. bgs)	Well Screen Interval (ft. bgs)	Lab Sample ID	Lab Analyses
MW1	15	5 - 15	MW1-030319	TAL Metals Sulfate TCL VOC/SVOC PCB
MW2	15	5 - 15	MW2-030318	TAL Metals Sulfate
MW3	16	6 - 16	MW3-030318	TAL Metals Sulfate
MW4	11	4 - 11	MW4-030318	TAL Metals Sulfate TCL VOC/SVOC PCB
MW5	16	6 - 16	MW5-030318	TAL Metals Sulfate
MW6	15	5 - 15	MW6-030318	TAL Metals Sulfate
MW7	16	6 - 16	MW7-030318	TAL Metals Sulfate
MW8	26	16 - 26	MW8-030319	TAL Metals Sulfate TCL VOC/SVOC PCB
MW9	21	11 - 21	MW9-030319	TAL Metals Sulfate
MW10	16	6-16	MW10-030318	TAL Metals Sulfate
MW11	12	6-12	MW11-030620	TAL Metals
G101	18	8 - 18	G101-030318	TAL Metals Sulfate
G102	17.5	7.5 - 17.5	G102-030318	TAL Metals Sulfate
G103	17	7 - 17	G103-030319	TAL Metals Sulfate
G104	17.5	7.5 - 17.5	G104-030318	TAL Metals Sulfate
G105	18	8 - 18	G105-030318	TAL Metals Sulfate
G106	18	8 - 18	G106-030319	TAL Metals Sulfate
G107	18	8 - 18	G107-030319	TAL Metals Sulfate TCL VOC/SVOC PCB
G109	16.5	6.5 - 16.5	G109-030318	TAL Metals Sulfate
TW5	14	5-14	TW5-030620	TAL Metals
TW6	30	24-30	TW6-030620	TAL Metals
TW7	20	11-20	TW7-030620	TAL Metals

Table II-2: Surface Water Sampling Summary
Eagle Zinc Company Site, Hillsboro, Illinois

Lab Sample ID	Drainageway	Background Sample	Lab Analyses
SW-WD-6-030313	Western	No	TAL Metals Sulfate
SW-WD-6-030613	Western	No	TAL Metals
SW-WD-6D	Western	No	TAL Metals
SW-WD-7	Western	No	TAL Metals Sulfate TCL VOC/SVOC PCB
SW-WD-7D	Western	No	TAL Metals Sulfate TCL VOC/SVOC PCB
SW-WD-8	Western	No	TAL Metals Sulfate
SW-WD-9	Western	No	TAL Metals Sulfate TCL VOC/SVOC PCB
SW-WD-10	Western	Yes	TAL Metals Sulfate TCL VOC/SVOC PCB
SW-WD-PN	Western	No	TAL Metals Sulfate TCL VOC/SVOC PCB
SW-WD-PS	Western	No	TAL Metals Sulfate
SW-WD-11	Western	No	TAL Metals
SW-WD-12	Western	No	TAL Metals
SW-ED-11	Eastern	Yes	TAL Metals Sulfate TCL VOC/SVOC PCB
SW-ED-13	Eastern	No	TAL Metals Sulfate
SW-ED-16	Eastern	No	TAL Metals Sulfate

Table II-3: Residue Sampling Summary
Eagle Zinc Company Site, Hillsboro, Illinois

Lab Sample ID	Residue Pile ID	Pile Increment Volume Estimate (cu. yds.)	Lab Analyses	Comments
RR2-11-S1	RR2-11	1,140	TCLP Lead	
RR2-11-S2	RR2-11	1,140	TCLP Lead	
RR2-11-S3	RR2-11	1,140	TCLP Lead	
RR2-11-S4	RR2-11	1,140	TCLP Lead	
RR2-11-S5	RR2-11	1,140	TCLP Lead	
RR2-11-S6	RR2-11	1,140	TCLP Lead	
RR2-11-S7	RR2-11	1,140	TCLP Lead	
RR1-3-S1	RR1-3	365	TCLP Lead	
RR1-3-S1D	RR1-3	365	TCLP Lead	Field Duplicate
RR1-3-S2	RR1-3	365	TCLP Lead	
MP1-21-S1	MP1-21	165	TCLP Lead	
MP1-21-S2	MP1-21	165	TCLP Lead	
MP1-21-S3	MP1-21	165	TCLP Lead	MS/MSD

Table II-4: Soil Sampling Summary
Eagle Zinc Company Site, Hillsboro, Illinois

Soil Boring	Sample Depth (ft. bgs)	Lab Sample ID	Lab Analysis
MW 1	2	MW1-030312	pH
MW 2	3	MW2-030312	pH
MW 3	3.5	MW3-030313	pH
MW 4	4	MW4-030313	pH
MW 5	2	MW5-030313	pH
MW 6	9	MW6-030314	pH
MW 7	5	MW7-030314	pH
MW 8	25	MW8-030314	pH
MW 9	10	MW9-030314	pH
MW 10	1	MW10-030315	pH
P1	1	P01-030310	pH
P2	1	P02-030310	pH
P3	1	P03-030311	pH
P4	1	P04-030311	pH
P5	1	P05-030311	pH
P6	1.5	P06-030311	pH
P7	2.5	P07-030311	pH
P8	2	P08-030311	pH
P9	1	P09-030311	pH
P10	1	P10-030312	pH

Table II-5
Monitoring Well, Piezometer and Water Level Survey Data
Eagle Zinc Company Site, Hillsboro, Illinois

				March 17, 2003		June 23, 2003	
Location	Northing	Easting	Top of Inside Casing	Depth to Water	Ground Water Elevation	Depth to Water	Ground Water Elevation
P01	909769.47	696429.67	624.86	6.23	618.63	6.92	617.94
P02	908922.35	696671.8	628.7	5.54	623.16	6.85	621.85
P03	910294.63	695668.46	631.01	3.37	627.64	4.27	626.74
P04	910737.09	696416.64	635.07	9.11	625.96	8.04	627.03
P05	910741.97	694854.52	633.47	8.38	625.09	7.88	625.59
P06	909073.39	696334.46	631.88	6.62	625.26	--[4]	--[4]
P07	909634.55	695797.08	634.03	5.83	628.20	--[2]	--[2]
P08	908438.42	695255.29	628.1	3.18	624.92	--[2]	--[2]
P09	908260.03	694859.46	621.95	8.59	613.36	--[2]	--[2]
P10	908367.28	694138.91	623.57	12.2	611.37	--[2]	--[2]
MW1	909111.31	696050.95	632.5	3.31	629.19	2.72	629.78
MW2	910179.63	695508.42	633.99	5.48	628.51	5.77	628.22
MW3	909213.9	695378.5	634.82	10.38	624.44	10.85	623.97
MW4	909502.43	695384.86	630.42	4.9	625.52	5.85	624.57
MW5	910118.49	695067.48	637.97	10.08	627.89	8.65	629.32
MW6	908645.67	695314.88	629.13	6.07	623.06	6.12	623.01
MW7	908075.51	695038.92	626.69	7.15	619.54	7.82	618.87
MW8	908047.37	694020.01	614.6	19.03	595.57	19.91	594.69
MW9	908186.26	694372.83	615.1	13.86	601.24	13.4	601.70
MW10	908466.61	693997.88	623.9	7.23	616.67	7.78	616.12
MW11	908485.95	694948.08	622.05	--[3]	--[3]	6.95	615.10
SW Pond	908163.9	694291.2	601.94	1.39	600.55	1.49	600.45
G101	910111.8	694808.8	638.91	11.6	627.31	9.52	629.39
G102	910800.6	695538.9	630.4	3.73	626.67	5.51	624.89
G103	910112	696047.1	631.34	5.85	625.49	5.85	625.49
G104	909435.6	696494.1	632.34	8.6	623.74	8.71	623.63
G105	908439.2	696592.7	627.97	3.82	624.15	5.13	622.84
G106	908209.9	695855.8	629.63	4.79	624.84	4.91	624.72
G107	907962.3	694538.9	607.7	4.47	603.23	5.42	602.28
G109	--	--	632.92	4.82	628.10	5.04	627.88
TW5	907552.08	694119.43	615.95	--[1]	--[1]	6.71	609.24
TW6	907911.71	693438.11	612.77	--[1]	--[1]	21.57	591.20
TW7	908212.54	692426.72	582.25	--[1]	--[1]	15.36	566.89

[1] Temporary wells installed in June 2003

[2] Temporary piezometers abandoned after the March 2003 sampling activities

[3] MW11 installed in June 2003

[4] Water level in piezometer P6 inadvertently not measured on June 23, 2003

Table IV-1A
Groundwater Sample Results, Metals and Sulfates
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganeese
Screening Levels mg/L																
Class I TACO Standard			--	0.006	0.05	2	0.004	0.005	--	0.1	1	0.65	5	0.0075	--	0.15
Class II TACO Standard			--	0.024	0.2	2	0.5	0.05	--	1	1	0.65	5	0.1	--	10
Eagle Zinc Company Site Data (mg/L)																
Field ID	Matrix	Collection Date														
G101	GW	3/18/2003	1.6	0.0025 U	0.0081 U	0.032	0.00097 U	0.00053 U	30 J	0.0035	0.00092 U	0.0018 J	2.1 J	0.0013 U	17	0.055
G101F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.024	0.00061 U	0.00053 U	27 J	0.0018 J	0.00092 U	0.0009 U	0.019 U	0.0013 U	16	0.0014 J
G102	GW	3/18/2003	0.082 J	0.0025 U	0.0081 U	0.073	0.00093 U	0.00053 U	99 J	0.00093 U	0.00092 U	0.0009 U	0.3 J	0.0013 U	44	0.29
G-102F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.076 U	0.00061 U	0.00053 U	100 J	0.00093 U	0.00092 U	0.0009 U	0.019 U	0.0013 U	47	0.29 J
G-103	GW	3/19/2003	0.17 J	0.0025 J	0.0081 U	0.038 U	0.00083 U	0.00053 U	150 J	0.00093 U	0.00092 U	0.0009 U	0.28 J	0.0013 U	68	0.016
G-103F	GW	3/19/2003	0.031 J	0.0025 U	0.0081 U	0.04	0.00061 U	0.00053 U	170 J	0.00093 U	0.00092 U	0.0009 U	0.019 U	0.0013 U	78	0.012 J
G-104	GW	3/18/2003	53	0.0056 J	0.0045	0.37	0.0036	0.00053 U	190 J	0.079	0.0028	0.087 J	110 J	0.079 J	93	2.2
G-104F	GW	3/18/2003	0.029 J	0.0025 U	0.0081 U	0.021	0.00061 U	0.00053 U	180 J	0.0011 J	0.00092 U	0.0009 U	0.019 U	0.0013 U	73	0.018 J
G-105	GW	3/18/2003	0.54	0.0025 U	0.0081 U	0.092	0.00093 J	0.00053 U	120 J	0.00093 U	0.00092 U	0.0009 U	0.81 J	0.0013 U	41	0.086
G-105F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.094	0.00061 U	0.00053 U	130 J	0.001 J	0.00092 U	0.0009 U	0.019 U	0.0013 U	48	0.086 J
G-106	GW	3/19/2003	0.34	0.0025 U	0.0081 U	0.019	0.001 U	0.00053 U	120 J	0.00093 U	0.00092 U	0.0009 U	0.48 J	0.0013 U	53	0.02
G-106F	GW	3/19/2003	0.027 U	0.0025 U	0.0081 U	0.017	0.00061 U	0.00053 U	120 J	0.00093 U	0.00092 U	0.0009 U	0.019 U	0.0013 U	57	0.0025 J
G-107	GW	3/19/2003	0.61	0.0025 U	0.0081 U	0.064	0.00061 U	0.061 J	320 J	0.0015 J	0.065	0.01 J	11 J	0.061 J	67	1.1
G-107F	GW	3/19/2003	0.03 J	0.0025 U	0.0081 U	0.063	0.00061 U	0.035 J	330 J	0.00093 U	0.056 U	0.0009 U	9.5 J	0.0068 J	70	1.2 J
G-109	GW	3/18/2003	110	0.0045 J	0.075	1.2	0.008	0.00053 U	42 J	0.17	0.079	0.22 U	210 J	0.15 J	34	8.1
G-109F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.015	0.00061 U	0.00053 U	17 J	0.0014 J	0.00092 U	0.0009 U	0.019 U	0.0013 U	8.4	0.016 J
MW-1	GW	3/19/2003	1.5	0.0025 U	0.0081 U	0.033	0.0011 J	0.00053 U	130	0.00093 U	0.00092 U	0.0037 J	1.7	0.0013	69	0.072
MW-1F	GW	3/19/2003	0.044 J	0.0028 J	0.0081 U	0.029	0.00061 U	0.00053 U	140	0.0015 J	0.00092 U	0.0009 U	0.029 J	0.0013	78	0.019
MW-1D	GW	3/19/2003	1.6	0.0025 U	0.0081 U	0.097	0.0011 J	0.00053 U	140	0.00093 U	0.00092 U	0.0012 J	2.1	0.0013 U	75	0.078
MW-1DF	GW	3/19/2003	0.03 J	0.0025 U	0.0081 U	0.029	0.00061 U	0.00053 U	140	0.0011 J	0.00092 U	0.0009 U	0.019 U	0.0013 U	80	0.017
MW-2	GW	3/18/2003	0.67	0.0025 U	0.0081 U	0.044	0.00094 U	0.0053 J	120 J	0.00093 U	0.0023 J	0.0099 J	1.1 J	0.0013 U	49	0.053
MW-2F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.048	0.00061 U	0.0054 J	120 J	0.0012 J	0.0025 J	0.0038 J	0.019 U	0.0013 U	53	0.056 J
MW-3	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.014 U	0.00098 U	0.00053 U	220 J	0.00093 U	0.0023 J	0.0009 U	0.04 J	0.0013 U	89	0.061
MW-3F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.015	0.00061 U	0.00053 U	240 J	0.00093 U	0.0023 J	0.0009 U	0.019 U	0.0013 U	96	0.058 J
MW-4	GW	3/18/2003	37	0.01 J	0.017 J	0.29	0.0039	0.082 J	25 J	0.09	0.039	0.95	49 J	0.93 J	13	1.4
MW-4F	GW	3/18/2003	0.027 J	0.0025 U	0.0081 U	0.042	0.00061 U	0.00071 J	54 J	0.013 J	0.002 J	0.0009 U	0.019 U	0.0015 J	22	0.78 J
MW-5	GW	3/18/2003	1.2	0.0025 U	0.0081 U	0.023	0.00093 U	0.00053 U	64 J	0.0016 J	0.0013 J	0.0009 U	1.1 J	0.0013 U	29	0.15
MW-5F	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.02	0.00061 U	0.00053 U	70 J	0.0013 J	0.0015 J	0.0009 U	0.019 U	0.0013 U	34	0.17 J
MW-6	GW	3/18/2003	0.3	0.0025 U	0.0081 U	0.013	0.00097 U	0.086 J	250 J	0.00093 U	0.0039	0.0021 J	0.57 J	0.0096 J	82	0.87
MW-6F	GW	3/18/2003	0.03 J	0.0025 U	0.0081 U	0.012	0.00061 U	0.079 J	270 J	0.00093 U	0.0034	0.0009 U	0.019 U	0.0013 U	93	0.94 J
MW-7	GW	3/18/2003	0.027 U	0.0025 U	0.0081 U	0.012	0.00079 J	0.39 J	160 J	0.0012 J	0.048	0.001 J	0.05 J	0.0013 U	43	12
MW-7F	GW	3/18/2003	0.034 J	0.0025 U	0.0081 U	0.014	0.00061 U	0.33 J	180 J	0.0018 J	0.044	0.0009 U	0.019 U	0.0013 U	48	13 J
MW-8	GW	3/19/2000	0.19 J	0.0025 U	0.0081 U	0.028	0.00011 U	0.031 J	130 J	0.00093 U	0.0011 J	0.0099 J	1.5 J	0.13 J	23	0.0044
MW-8F	GW	3/19/2000	0.028 J	0.0025 U	0.0081 U	0.021	0.00061 U	0.025 J	140 J	0.0014 J	0.002 J	0.002 J	0.045 J	0.018 J	25	0.0032 J
MW-9	GW	3/19/2000	0.033 J	0.0025 U	0.0081 U	0.022	0.00093 U	0.00073 J	320 J	0.00093 U	0.0029 J	0.0009 U	0.19 J	0.0034 J	290	0.92
MW-9F	GW	3/19/2000	0.028 J	0.0025 U	0.0081 U	0.025	0.00061 U	0.00091 J	360 J	0.00093 U	0.003 U	0.0009 U	0.019 U	0.0013 U	340	1 J
MW-10	GW	3/18/2003	69	0.0028 J	0.058	0.36	0.0066	0.00053 U	81 J	0.16	0.058	0.13	130 J	0.08 J	46	2.8 J
MW-10F	GW	3/18/2003	0.23	0.0025 U	0.0081 U	0.011	0.00061 U	0.00053 U	9.6 J	0.0028 J	0.00092 U	0.0009 U	0.28 J	0.0013 U	3.9	0.014
MW-11	GW	6/20/2003	0.0047	0.00043 J	0.00071 J	0.032	0.0001 U	0.00095 J	98	0.00056 U	0.0033	0.0017 U	0.34	0.00082 U	56 J	0.34
MW-11F	GW	6/20/2003	0.0029	0.00032 J	0.00069 J	0.031	0.00007 J	0.00085 J	110	0.0008 J	0.0037	0.0012 J	0.25 J	0.0011 J	52 J	0.42
MW-11D	GW	6/20/2003	1.8 J	0.00032 J	0.0021 J	0.09	0.00013 J	0.002 J	100 J	0.0046	0.0047	0.019	4.6	0.11	48 J	0.44
MW-11DF	GW	6/20/2003	0.014 J	0.00033 J	0.00054 J	0.033	0.00005 U	0.00098 J	110	0.00092 J	0.006	0.0013 J	0.37 J	0.00076 J	43 J	0.42
TW-5	GW	6/20/2003	12 J	0.00035 J	0.0051	0.11	0.00067 J	0.00035 J	200 J	0.025	0.01	0.025	17	0.017	100 J	1.3
TW-5F	GW	6/20/2003	0.15 U	0.0005 J	0.00071 J	0.019	0.00009 J	0.00019 J	210	0.0011 J	0.0054	0.002 J	0.62	0.00027 J	83 J	1
TW-6	GW	6/20/2003	33 J	0.0015 J	0.04	0.39	0.0035	0.0031 J	71 J	0.087	0.059	0.11	81	0.092	27 J	4.5
TW-6F	GW	6/20/2003	0.15 U	0.00053 J	0.0021 J	0.061	0.00011 J	0.00023 J	110	0.0014 J	0.011	0.00098 J	1.2 J	0.00022 J	28 J	2.8
TW-7	GW	6/20/2003	17 J	0.00039 J	0.0047	0.36	0.00086 J	0.00057 J	120 J	0.023	0.0096	0.019	22	0.019	16 J	1.5
TW-7F	GW	6/20/2003	0.021 J	0.00037 J	0.00055 J	0.2	0.00008 J	0.00022 J	150	0.0014 J	0.0037	0.00084 J	0.51 J	0.00019 J	14 J	1.4

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater
Detection Limit above Screening Level

A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and the reporting limit
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not sampled
F = Filtered Sample

Table IV-1A
Groundwater Sample Results, Metals and Sulfates
Eagle Zinc Company Site, Hillsboro, IL

		Parameter	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Sulfate	Thallium	Vanadium	Zinc
Screening Levels mg/L												
Class I TACO Standard			0.002	0.1	--	0.05	0.05	--	400	0.002	0.049	5
Class II TACO Standard			0.01	2	--	0.05	--	--	400	0.02	- -	10
Eagle Zinc Company Site Data (mg/L)												
Field ID	Matrix	Collection Date										
G101	GW	3/18/2003	0.000028 U	0.0032 J	0.68	0.0048 U	0.0011 U	110	38	0.0043 U	0.0036 J	0.082
G101F	GW	3/18/2003	0.000028 U	0.0012 U	0.33	0.0048 U	0.0011 U	110	NS	0.0043 U	0.00088 J	0.026 U
G102	GW	3/18/2003	0.000028 U	0.0029 J	0.93	0.0048 U	0.0011 U	85	280	0.0043 U	0.00084 U	0.004 U
G-102F	GW	3/18/2003	0.000028 U	0.0022 J	1.1	0.0048 U	0.0011 U	87	NS	0.0043 U	0.00084 U	0.005 U
G-103	GW	3/19/2003	0.000028 U	0.0013 J	0.19	0.0048 U	0.0011 U	85	320	0.0043 U	0.00084 U	0.011 U
G-103F	GW	3/19/2003	0.000043 J	0.0012 U	0.14	0.0048 U	0.0011 U	89	NS	0.0043 U	0.00084 U	0.009 U
G-104	GW	3/18/2003	0.00024	0.076	6	0.0077 J	0.0011 U	120	270	0.0043 U	0.11	1.5 U
G-104F	GW	3/18/2003	0.000028 U	0.0012 U	1.4	0.0048 U	0.0011 U	130	NS	0.0043 U	0.00084 U	0.11 U
G-105	GW	3/18/2003	0.000028 U	0.0014 J	0.49	0.0048 U	0.0011 U	27	250	0.0043 U	0.0018 J	0.001 U
G-105F	GW	3/18/2003	0.000028 U	0.0012 U	0.61	0.0048 U	0.0011 U	29	NS	0.0043 U	0.00084 U	0.009 U
G-106	GW	3/19/2003	0.000028 U	0.0016 J	0.38	0.0048 U	0.0011 U	98	380	0.0043 U	0.00086 J	0.07 U
G-106F	GW	3/19/2003	0.000028 U	0.0012 U	0.32	0.0048 U	0.0011 U	100	NS	0.0043 U	0.00084 U	0.026 U
G-107	GW	3/19/2003	0.000086 J	0.017 J	6.8	0.0048 U	0.0011 U	48	920	0.0043 U	0.0011 J	19
G-107F	GW	3/19/2003	0.000028 U	0.016 U	7.3	0.0048 U	0.0011 U	43	NS	0.0043 U	0.00084 U	17
G-109	GW	3/18/2003	0.00045	0.23	8.3	0.011 J	0.0011 U	36	53	0.0043 U	0.2	0.92
G-109F	GW	3/18/2003	0.000028 U	0.0012 U	0.31	0.0048 U	0.0011 U	44	NS	0.0043 U	0.00084 U	0.005 U
MW-1	GW	3/19/2003	0.000028 U	0.005 J	0.67	0.0048 U	0.0011 U	69	530	0.0043 J	0.0023 J	0.94
MW-1F	GW	3/19/2003	0.000028 U	0.0022 J	0.34	0.0048 U	0.0011 U	79	NS	0.0043 U	0.00084 U	0.97
MW-1D	GW	3/19/2003	0.000028 U	0.0043 J	0.7	0.0096 U	0.0011 U	80	530	0.0043 U	0.0029 J	0.99
MW-1DF	GW	3/19/2003	0.000028 U	0.0027 J	0.36	0.0048 U	0.0011 U	80	NS	0.0043 U	0.00084 U	1.1
MW-2	GW	3/18/2003	0.000028 U	0.0044 J	0.79	0.0048 U	0.0011 U	83	350	0.0043 U	0.0014 J	4.1
MW-2F	GW	3/18/2003	0.000028 U	0.004 J	0.93	0.0048 U	0.0011 U	83	NS	0.0043 U	0.00084 U	4.5
MW-3	GW	3/18/2003	0.000028 U	0.0058 J	0.66	0.0048 U	0.0011 U	65	730	0.0043 U	0.00084 UA	0.86
MW-3F	GW	3/18/2003	0.000028 U	0.0059 J	0.69	0.0048 U	0.0011 U	64	NS	0.0043 U	0.00084 U	0.89
MW-4	GW	3/18/2003	0.0004	0.15	3.5	0.0096 U	0.0019 J	21	240	0.0043 U	0.096	210
MW-4F	GW	3/18/2003	0.000028 U	0.0026 J	4.5	0.0048 U	0.0011 U	30	NS	0.0043 U	0.00084 U	2.3 U
MW-5	GW	3/18/2003	0.000028 U	0.0055 J	0.35	0.0048 U	0.0011 U	57	200	0.0043 U	0.0029 J	0.3
MW-5F	GW	3/18/2003	0.000028 U	0.0049 J	0.34	0.0048 U	0.0011 U	59	NS	0.0043 U	0.0011 J	0.31
MW-6	GW	3/18/2003	0.000028 U	0.0071 J	8.8	0.0048 U	0.0011 U	120	900	0.0043 U	0.00084 U	7.1
MW-6F	GW	3/18/2003	0.000028 U	0.0062 J	10	0.0048 U	0.0011 U	130	NS	0.0043 U	0.00084 U	6.4
MW-7	GW	3/18/2003	0.000028 U	0.089	1	0.0048 U	0.0011 U	21	720	0.0043 U	0.00084 U	120
MW-7F	GW	3/18/2003	0.000028 U	0.091	1.2	0.0048 U	0.0011 U	17	NS	0.0074 J	0.00084 U	120
MW-8	GW	3/19/2000	0.000028 U	0.014	5.4	0.0096 U	0.0011 U	84	350	0.0043 U	0.001 J	13
MW-8F	GW	3/19/2000	0.000028 U	0.012	6	0.0048 U	0.0011 U	84	NS	0.0043 U	0.00084 U	13
MW-9	GW	3/19/2000	0.000028 U	0.012	15	0.0096 U	0.0011 U	110	1700	0.0043 U	0.00092 J	0.24
MW-9F	GW	3/19/2000	0.000028 U	0.013	18	0.0048 U	0.0011 U	120	NS	0.0043 U	0.00084 U	0.2
MW-10	GW	3/18/2003	0.00031	0.14	7.9	0.0096 U	0.0011 U	7	23	0.0043 U	0.19	0.59
MW-10F	GW	3/18/2003	0.000028 U	0.0025 J	0.26	0.0048 U	0.0011 U	8.2	NS	0.0043 U	0.00084 U	0.011 U
MW-11	GW	6/20/2003	0.0002 U	0.0054 J	4.6 J	0.0032 J	0.003 J	46 J	NS	0.003 U	0.00025 J	0.46 J
MW-11F	GW	6/20/2003	0.0002 U	0.0056	4.7	0.0029 J	0.003 J	39	NS	0.00008 J	0.00098 J	0.39
MW-11D	GW	6/20/2003	0.00003 U	0.0078 J	4.5 J	0.0031 J	0.00007 J	38 J	NS	0.00008 J	0.0056	1.1 J
MW-11DF	GW	6/20/2003	0.00003 U	0.0063	4.7	0.0024 J	0.000035	43	NS	0.000047 U	0.00095 J	0.49
TW-5	GW	6/20/2003	0.0002 U	0.026 J	2.6 J	0.005 J	0.00009 J	24 J	NS	0.00027 J	0.03	0.41 J
TW-5F	GW	6/20/2003	0.0002 U	0.0075	0.86	0.0023 J	0.00045 J	24	NS	0.0001 J	0.0018 J	0.047
TW-6	GW	6/20/2003	0.0002 J	0.14 J	4.5 J	0.0044 J	0.00007 J	16 J	NS	0.00084 J	0.12	0.59 J
TW-6F	GW	6/20/2003	0.0002 U	0.011	0.71	0.0015 J	0.0003 J	29	NS	0.00005 J	0.0023 J	0.029 J
TW-7	GW	6/20/2003	0.000032 J	0.024 J	5.5 J	0.0039 J	0.00009 J	17 J	NS	0.00029 J	0.032	0.11 J
TW-7F	GW	6/20/2003	0.0002 U	0.0057	3.2	0.0026 J	0.00017 J	22	NS	0.003 U	0.0021 J	0.01 J

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater
Detection Limit above Screening Level

A = Analyte was detected in the method blank
B = Analyte was detected between the method det·
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not sampled
F = Filtered Sample

Table IV-1B
Groundwater Sample Results
PCBs
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Screening Levels mg/L									
Class I TACO Standard			0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Class II TACO Standard			0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
Eagle Zinc Company Site Data (mg/L)									
Field ID	Matrix	Collection Date							
G-107	GW	3/19/2013	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
MW-1	GW	3/19/2003	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
MW-1D	GW	3/19/2003	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
MW-4	GW	3/18/2003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
MW-8	GW	3/19/2003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater

Detection Limit above Screening Level

A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and the reporting limi
C = Elevated detection limit due to matrix

J = Estimated Value
U = Indicates undetected at concentration
NS = Not
F = Filtered Sample

Table IV-1C
Groundwater Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1,2-Trichlorotri-fluoroethane	1,1-Dichloro-ethane	1,1-Dichloroethene	1,2,4-Trichloro-benzene	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane
Screening Levels mg/L														
Class I TACO Standard			0.2	--	0.005	--	0.7	0.007	0.07	0.0002	--	0.6	0.005	0.005
Class II TACO Standard			1	--	0.05	--	3.5	0.035	0.7	0.0002	--	1.5	0.025	0.25
Eagle Zinc Company Site Data (mg/L)														
FieldID	**Matrix**	**Collection Date**												
G107	GW	3/19/2013	0.00065 U	0.00077 U	0.0005 U	0.00093 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00066 U	0.00071 U	0.00055 U	0.00039 U
MW 1	GW	3/19/2003	0.00065 U	0.00077 U	0.0005 U	0.00093 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00066 U	0.00071 U	0.00055 U	0.00039 U
MW 4	GW	3/18/2003	0.00065 U	0.00077 U	0.0005 U	0.00093 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00066 U	0.00071 U	0.00055 U	0.00039 U
MW 8	GW	3/19/2003	0.00065 U	0.00077 U	0.0005 U	0.00093 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00066 U	0.00071 U	0.00055 U	0.00039 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater

Detection Limit above Screening Level

A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and the reporting limit
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration
NS = Not sampled
F = Filtered Sample
R = Non detected result rejected

Table IV-1C
Groundwater Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			1,3-Dichloro-benzene	1,4-Dichloro-benzene	2-Butanone	2-Hexanone	4-Methyl-2-pentanone	Acetone	Benzene	Bromo-dichloro-methane	Bromoform	Bromo-methane	Carbon disulfide	Carbon tetra-chloride	Chloro-benzene
Screening Levels mg/L															
Class I TACO Standard			--	0.025	--	--	--	0.7	0.005	0.00002	0.0002	--	0.7	0.005	0.1
Class II TACO Standard			--	0.375	--	--	--	0.7	0.025	0.00002	0.0002	--	3.5	0.025	0.5
Eagle Zinc Company Site Data (mg/L)															
FieldID	Matrix	Collection Date													
G107	GW	3/19/2013	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
MW 1	GW	3/19/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
MW 4	GW	3/18/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
MW 8	GW	3/19/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater

Detection Limit above Screening Level

A= Analyte was detected in the method bl
B= Analyte was detected between the metl
C= Elevated detection limit due to matrix effect
J= Estimated Value
U= Indicates undetected at concentration
NS= Not sampled
F= Filtered Sample
R= Non detected result rejected

Table IV-1C
Groundwater Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	cis-1,2-Dichloro-ethene	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Cyclo-hexane	Dichloro-difluoro-methane	Ethyl-benzene	Fluorotri-chloro-methane	Isopropyl-benzene	Methyl Acetate
Screening Levels mg/L															
Class I TACO Standard			0.14	--	0.00002	--	0.07	0.001	0.001	--	--	0.7	--	--	--
Class II TACO Standard			0.14	--	0.0001	--	0.2	0.005	0.005	--	--	1.0	--	--	--
Eagle Zinc Company Site Data (mg/L)															
FieldID	**Matrix**	**Collection Date**													
G107	GW	3/19/2013	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U	0.0019 U
MW 1	GW	3/19/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U	0.0019 U
MW 4	GW	3/18/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U	0.0019 U
MW 8	GW	3/19/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U	0.0019 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater

Detection Limit above Screening Level

A = Analyte was detected in the method bl
B = Analyte was detected between the metl
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration
NS = Not sampled
F = Filtered Sample
R = Non detected result rejected

Table IV-1C
Groundwater Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Methyl-tert-butyl ether	Methyl-cyclo-hexane	Methyl-ene chloride	Styrene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloro-ethene	Vinyl chloride	Xylene, -o	Xylenes, -m, -p*
Screening Levels mg/L													
Class I TACO Standard			0.07	--	0.005	0.1	0.005	1.0	0.1	0.005	0.002	10	10
Class II TACO Standard			0.07	--	0.05	0.5	0.25	2.5	0.5	0.025	0.01	10	10
Eagle Zinc Company Site Data (mg/L)													
FieldID	**Matrix**	**Collection Date**											
G107	GW	3/19/2013	0.00087 U	0.00073 U	0.00047 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
MW 1	GW	3/19/2003	0.00087 U	0.00073 U	0.00047 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
MW 4	GW	3/18/2003	0.00087 U	0.00073 U	0.00047 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
MW 8	GW	3/19/2003	0.00087 U	0.00073 U	0.00047 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater

Detection Limit above Screening Level

A = Analyte was detected in the method bl
B = Analyte was detected between the metl
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration
NS = Not sampled
F = Filtered Sample
R = Non detected result rejected

Table IV-1D
Groundwater Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			1,2,4-Trichloro-benzene	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2,2'-oxy-bis-(1-Chloro-propane)	2,4,5-Trichloro-phenol	2,4,6-Trichloro-phenol	2,4-Dichloro-phenol	2,4-Di-methyl-phenol	2,4-Dinitrophenol	2,4-Dinitro-toluene	2,6-Dinitro-toluene	2-Chloro-naphthalene	2-Chloro-phenol	2-Methyl-naphthalene	2-Methyl-phenol	2-Nitro-aniline	2-Nitro-phenol
Screening Levels mg/L																				
Class I TACO Standard			0.07	0.6	--	0.075	--	--	--	--	0.14	--	0.00002	0.0001	--	0.035	--	0.35	--	--
Class II TACO Standar			0.7	1.5	--	0.375	--	--	--	--	0.14	--	0.00002	0.0001	--	0.175	--	0.35	--	--
Eagle Zinc Company Site Data in mg/L																				
Field ID	**Matrix**	**Collection Date**																		
G-107	GW	3/19/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
M-W 1	GW	3/19/2003	0.003 U	0.0025 U	0.0023 UJ	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
MW-1D	GW	3/19/2003	0.0031 U	0.0026 U	0.0024 U	0.0024 U	0.0037 U	0.0048 U	0.0041 U	0.0038 U	0.003 U	0.0031 U	0.0018 U	0.0038 U	0.0044 U	0.0011 U	0.004 U	0.0024 U	0.0044 U	0.0038 U
MW-4	GW	3/18/2003	0.0033 U	0.0027 U	0.0025 U	0.0025 U	0.004 U	0.0051 U	0.0044 U	0.0041 U	0.0032 U	0.0033 U	0.0019 U	0.0041 U	0.0046 U	0.0012 U	0.0043 U	0.0025 U	0.0046 U	0.0041 U
MW-8	GW	3/19/2003	0.0037 U	0.0031 U	0.0028 U	0.0028 U	0.0044 U	0.0057 U	0.0049 U	0.0046 U	0.0036 U	0.0037 U	0.0021 U	0.0046 U	0.0052 U	0.0014 U	0.0048 U	0.0028 U	0.0052 U	0.0046 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater
Detection Limit above Screening Level
A = Analyte was detected in the method blar
B = Analyte was detected between the method detection limit and the reporting lir
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed

NS = Not samplec
F = Filtered Sample

Table IV-1D
Groundwater Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			3,3-Dichloro-benzidine	3-Nitro-aniline	4,6-Dinitro-2-methyl-phenol	4-Bromo-phenyl phenyl ether	4-Chloro-aniline	4-Chlorophenyl phenyl ether	4-Methyl-phenol	4-Nitro-phenol	Acena-phthene	Acena-phthylene	Acetophenone	Anthra-cene	Atrazine	Benz-alde-hyde	Benzo(a)anthra-cene	Benzo(a)-pyrene	Benzo(b)fluor-anthene	Benzo(g,h,i)-perylene	Benzo-(k)-fluor-anthene	bis-(2-Chloro-ethoxy)-methane
Screening Levels mg/L																						
Class I TACO Standard			0.02	--	--	--	0.028	--	--	--	0.042	--	--	2.1	0.003	--	0.00013	0.0002	0.00018	--	0.00017	--
Class II TACO Standar			0.1	--	--	--	0.028	--	--	--	2.1	--	--	10.5	0.015	--	0.00065	0.002	0.0009	--	0.00085	--
Eagle Zinc Company Site Data in mg/L																						
Field ID	**Matrix**	**Collection Date**																				
G-107	GW	3/19/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022 U	0.0082 U	0.0017 U	0.0015 U	0.0022 U	0.0021 U	0.0024 U	0.0045 U
M-W 1	GW	3/19/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0042 U	0.0047 U	0.002 U	0.0018 UJ	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022 U	0.0082 U	0.0017 U	0.0015 U	0.0022 U	0.0021 U	0.0024 U	0.0045 U
MW-1D	GW	3/19/2003	0.0029 U	0.0029 U	0.0018 U	0.0037 U	0.0044 U	0.0049 U	0.0021 U	0.0019 U	0.0048 U	0.0049 U	0.0047 U	0.0029 U	0.0023 U	0.0085 U	0.0018 U	0.0016 U	0.0023 U	0.0022 U	0.0025 U	0.0047 U
MW-4	GW	3/18/2003	0.0031 U	0.0031 U	0.0019 U	0.004 U	0.0046 U	0.0052 U	0.0022 U	0.002 U	0.0051 U	0.0052 U	0.0049 U	0.0031 U	0.0024 U	0.009 U	0.0019 U	0.0016 U	0.0024 U	0.0023 U	0.0026 U	0.0049 U
MW-8	GW	3/19/2003	0.0035 U	0.0035 U	0.0021 U	0.0044 U	0.0052 U	0.0058 U	0.0025 U	0.0022 U	0.0057 U	0.0058 U	0.0056 U	0.0035 U	0.0027 U	0.01 U	0.0021 U	0.0019 U	0.0027 U	0.0026 U	0.003 U	0.0056 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater
Detection Limit above Screening Level
A = Analyte was detected in the method blar
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed

NS = Not samplec
F = Filtered Sample

Table IV-1D
Groundwater Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			bis-(2-Chloro-ethyl)-ether	bis(2-Ethylhexyl)phthalate	Butyl-benzyl-phthalate	Caprolactam	Carb-azole	Chrysene	Di-n-butyl-phthalate	Di-n-octyl-phthalate	Dibenzo-(a,h)anthracene	Dibenzofuran	Diethyl-phthalate	Di-methyl-phthalate	Fluoran-thene	Fluorene	Hexa-chloro-benzene	Hexa-chloro-butadiene	Hexa-chloro-cyclopenta-diene	Hexa-chloro-ethane	Indeno-(1,2,3-cd)-pyrene	Isophorone
Screening Levels mg/L																						
Class I TACO Standard			0.01	0.006	1.4	--	--	0.0015	0.7	0.14	0.0003	--	5.6	--	0.28	0.28	0.00006	--	0.05	0.007	0.00043	1.4
Class II TACO Standar			0.01	0.06	2.0	--	--	0.0075	3.5	0.7	0.0015	--	5.6	--	1.4	1.4	0.0003	--	0.5	0.035	0.00215	1.4
Eagle Zinc Company Site Data in mg/L																						
Field ID	**Matrix**	**Collection Date**																				
G-107	GW	3/19/2003	0.00087 U	0.0014 U	0.0018 U	0.0029 J	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
M-W 1	GW	3/19/2003	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
MW-1D	GW	3/19/2003	0.0009 U	0.0015 U	0.0019 U	0.0013 U	0.0015 U	0.0019 U	0.0015 U	0.0013 U	0.0025 U	0.0049 U	0.0028 U	0.0036 U	0.0017 U	0.0049 U	0.0015 U	0.003 U	0.0015 U	0.0024 U	0.0017 U	0.0047 U
MW-4	GW	3/18/2003	0.00096 U	0.0015 U	0.002 U	0.1 0	0.0015 U	0.002 U	0.0015 U	0.0014 U	0.0026 U	0.0052 U	0.003 U	0.0038 U	0.0018 U	0.0052 U	0.0015 U	0.0032 U	0.0015 U	0.0025 U	0.0018 U	0.0049 U
MW-8	GW	3/19/2003	0.0011 U	0.0017 U	0.0022 U	0.0016 U	0.0017 U	0.0022 U	0.0017 U	0.0016 U	0.003 U	0.0058 U	0.0033 U	0.0043 U	0.002 U	0.0058 U	0.0017 U	0.0036 U	0.0017 U	0.0028 U	0.002 U	0.0056 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater
Detection Limit above Screening Level
A = Analyte was detected in the method blar
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed

NS = Not samplec
F = Filtered Sample

Table IV-1D
Groundwater Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine	Naphthalene	Nitro-benzene	Penta-chloro-phenol	Phenanthrene	Phenol	Pyrene
Screening Levels mg/L										
Class I TACO Standard			0.01	0.01	0.025	0.0035	0.001	--	0.1	0.21
Class II TACO Standard			0.05	0.01	0.035	0.0035	0.005	--	0.1	1.05
Eagle Zinc Company Site Data in mg/L										
Field ID	**Matrix**	**Collection Date**								
G-107	GW	3/19/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
M-W 1	GW	3/19/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
MW-1D	GW	3/19/2003	0.0045 U	0.0023 U	0.0039 U	0.0036 U	0.00081 U	0.0022 U	0.001 U	0.0019 U
MW-4	GW	3/18/2003	0.0047 U	0.0024 U	0.0042 U	0.0038 U	0.00086 U	0.0023 U	0.0011 U	0.002 U
MW-8	GW	3/19/2003	0.0053 U	0.0027 U	0.0047 U	0.0043 U	0.00096 U	0.0026 U	0.0012 U	0.0022 U

Notes:

Exceeds Illinois TACO Standards for Class I Groundwater
Detection Limit above Screening Level
A = Analyte was detected in the method blar
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed

NS = Not samplec
F = Filtered Sample

Table IV-2A
Surface Water Sample Results
Metals and Sulfates
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Screening Levels mg/L															
Illinois General Water Quality Standards			--	--	0.36	5	--	0.05	--	0.016	--	0.07	2	0.1	--
EPA National Recommended Water Quality Criteria (2002) [1]			--	0.0056	0.000018	1.0 [2]	0.004 [3]	0.00025 [3]	--	0.1 [3]	1	1.3	0.3 [2]	--	--
Eagle Zinc Company Site Data (mg/L)															
Field ID	**Matrix**	**Collection Date**													
SW-ED-11	SW	3/10/2003	0.17	0.0025 U	0.0081 U	0.14	0.00061 U	0.00053 U	88	0.001	0.0009 U	0.0044	0.28	0.0013 U	12
SW-ED-13	SW	3/10/2003	0.031	0.0025 U	0.0081 U	0.071	0.00061 U	0.0071	80	0.00093 U	0.0009 U	0.004	0.28	0.0013 U	27
SW-ED-16	SW	3/10/2003	0.13	0.0025 U	0.0081 U	0.05	0.00061 U	0.00053 U	42	0.0011	0.0009 U	0.002	0.23	0.0013 U	14
SW-WD-10	SW	3/10/2003	0.21	0.0025 U	0.0081 U	0.05	0.00061 U	0.0058	100	0.00093 U	0.0044	0.0059	15	0.0013 U	26
SW-WD-6-031003	SW	3/10/2003	0.047	0.0025 U	0.0081 U	0.036	0.00061 U	0.019	150	0.00093 U	0.0016	0.0016	0.39	0.0013 U	36
SW-WD-7	SW	3/10/2003	0.027 U	0.0025 U	0.0081 U	0.021	0.00061 U	0.034	140	0.00093 U	0.0009 U	0.0049	0.44	0.0023	31
SW-WD-7D	SW	3/10/2003	0.027 U	0.0025 U	0.0081 U	0.021	0.00061 U	0.034	140	0.00093 U	0.0009 U	0.0048	0.46	0.0022	31
SW-WD-8	SW	3/10/2003	0.027 U	0.0025 U	0.0081 U	0.041	0.00061 U	0.0023	130	0.00093 U	0.00092	0.0011	3.2	0.0013 U	27
SW-WD-9	SW	3/10/2003	0.027 U	0.0025 U	0.0081 U	0.024	0.00061 U	0.23	120	0.00093 U	0.0009 U	0.0026	0.056	0.0013 U	38
SW-WD-PN	SW	3/10/2003	0.037	0.0025 U	0.0081 U	0.041	0.00061 U	0.087	120	0.00093 U	0.0024	0.0023	0.17	0.0032	38
SW-WD-PS	SW	3/10/2003	0.027 U	0.0025 U	0.0081 U	0.04	0.00061 U	0.069	110	0.00093 U	0.0019	0.0017	0.15	0.0022	33
SW-WD-6-061303	SW	6/13/2003	0.076 U	**0.0003** J	**0.0012** J	0.047	0.0001 U	0.0058	90	**0.00061** J	**0.00088** J	**0.0033** J	0.56	0.0028	25
SW-WD-6-061303D	SW	6/13/2003	0.055 U	**0.00026** J	**0.0012** J	0.05	0.00011 U	0.0059	86	**0.00062** J	**0.00084** J	**0.0032** J	0.53	0.0028	23
SW-WD-11	SW	6/13/2003	1.1	**0.0003** J	**0.0023** J	0.087	**0.00021** J	**0.00019** J	38	**0.0016** J	**0.00081** J	**0.0037** J	1.4	0.0038	11
SW-WD-12	SW	6/13/2003	1.4	**0.00032** J	**0.0022** J	0.089	**0.00018** J	0.0012	51	**0.0018** J	**0.0009** J	**0.0041** J	1.6	0.0052	14

Notes:

Exceeds Most Stringent Illinois General Water Quality Standards
Detection Limit Above Screening Level
A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and the reporting limit
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not sampled
R = Non Detected Results Rejected
-- No Criterion

[1] Value is based on the more stringent of the human health-based priority or non-priority toxic pollutants. Criteria only listed for constituents without Illinois Surface Water Standards that were detected at least once in surface water.

Table IV-2A
Surface Water Sample Results
Metals and Sulfates
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Sulfate	Thallium	Vanadium	Zinc
Screening Levels mg/L													
Illinois General Water Quality Standards			1	0.0005	1	--	1	1.1	--	500	--	--	1
EPA National Recommended Water Quality Criteria (2002) [1]			0.05 [2]	--	0.61	--	0.17	--	--	--	0.017	--	7.4
Eagle Zinc Company Site Data (mg/L)													
Field ID	Matrix	Collection Date											
SW-ED-11	SW	3/10/2003	0.11	0.000028 U	0.0025	5.7	0.0048 U	0.0011 U	29	21	0.0043 U	0.0015	1.4
SW-ED-13	SW	3/10/2003	0.38	0.000028 U	0.012	3.6	0.0048 U	0.0011 U	41	130	0.0043 U	0.00084 U	11
SW-ED-16	SW	3/10/2003	0.1	0.000028 U	0.0018	5.2	0.0048 U	0.0011 U	15	160	0.0043 U	0.00087	0.84
SW-WD-10	SW	3/10/2003	0.49	0.000034	0.013	5.4	0.0048 U	0.0011 U	62	95	0.0043 U	0.00084 U	3.7
SW-WD-6-031003	SW	3/10/2003	0.62	0.000028 U	0.012	7.6	0.0048 U	0.0011 U	52	330	0.0043 U	0.00084 U	15
SW-WD-7	SW	3/10/2003	0.077	0.000028 U	0.019	9.2	0.0048 U	0.0011 U	60	260	0.0043 U	0.00084 U	25
SW-WD-7D	SW	3/10/2003	0.078	0.000028 U	0.017	9.2	0.0048 U	0.0011 U	60	270	0.0043 U	0.00084 U	26
SW-WD-8	SW	3/10/2003	0.4	0.000028 U	0.0029	5.1	0.0048 U	0.0011 U	41	210	0.0043 U	0.00084 U	1.2
SW-WD-9	SW	3/10/2003	0.01	0.000028 U	0.036	17	0.0048 U	0.0011 U	57	420	0.0043 U	0.00084 U	26
SW-WD-PN	SW	3/10/2003	0.3	0.000028 U	0.029	14	0.0048 U	0.0011 U	46	450	0.0043 U	0.00084 U	16
SW-WD-PS	SW	3/10/2003	0.27	0.000028 U	0.026	13	0.0048 U	0.0011 U	41	430	0.0043 U	0.00084 U	14
SW-WD-6-061303	SW	6/13/2003	0.35	0.0002 U	0.0073	5.8	**0.002** J	**0.00006** J	**32** J	NS	0.00015 U	**0.0007** J	4
SW-WD-6-061303D	SW	6/13/2003	0.34	**0.00003** J	0.0074	6	**0.0019** J	0.000049 U	29	NS	0.00013 U	**0.00065** J	3.6
SW-WD-11	SW	6/13/2003	0.25	0.0003 U	**0.0029** J	5	**0.0013** J	**0.00008** J	17	NS	0.00012 U	0.0047	0.072 U
SW-WD-12	SW	6/13/2003	0.27	0.00002 U	0.0041	5.5	**0.0014** J	**0.00006** J	24	NS	0.00012 U	0.0051	0.71

Notes:

Exceeds Most Stringent Illinois General Water Quality Standards
Detection Limit Above Screening Level
A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not sampled
R = Non Detected Results Rejected
-- No Criterion

[1] Value is based on the more stringent of the human health-based p
toxic pollutants. Criteria only listed for constituents without Illinois
Standards that were detected at least once in surface water.

Table IV-2B
Surface Water Sample Results
PCBs
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Screening Levels mg/L									
Illinois General Water Quality Standards			1	1	1	1	1	1	1
Eagle Zinc Company Site Data (mg/L)									
Field ID	Matrix	Collection Date							
SW-ED-11	SW	3/11/2003	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U
SW-ED-13	SW	3/11/2003	0.00098 U	0.00098 U	0.00098 U	0.00098 U	0.00098 U	0.00098 U	0.00098 U
SW-ED-16	SW	3/11/2003	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
SW-WD-10	SW	3/11/2003	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SW-WD-6	SW	3/11/2003	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SW-WD-7	SW	3/11/2003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
SW-WD-7D	SW	3/11/2003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
SW-WD-8	SW	3/11/2003	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
SW-WD-9	SW	3/11/2003	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SW-WD-PN	SW	3/11/2003	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U
SW-WD-PS	SW	3/11/2003	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U

Notes:
Exceeds Most Stringent Illinois General Water Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and the reporting limit
C = Elevated detection limit due to matrix effe
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not sampled
R = Non Detected Results Rejected

Table IV-2C
Surface Water Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloroethene	1,2,4-Trichloro-benzene	1,2-Dibromo-3-chloropropane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane
Screening Levels mg/L												
Illinois General Water Quality Standards			--	--	--	--	--	--	--	--	--	--
National Recommended Water Quality Criteria												
Eagle Zinc Company Site Data (mg/L)												
FieldID	Matrix	Collection Date										
SW-ED-11	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U
SW-ED-13	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U
SW-WD-10	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U
SW-WD-7	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U
SW-WD-7D	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U
SW-WD-9	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U
SW-WD-PN	SW	3/11/2003	0.00065 U	0.00077 U	0.0005 U	0.00087 U	0.00056 U	0.00057 U	0.00088 U	0.00071 U	0.00055 U	0.00039 U

Notes:

Exceeds Most Stringent Illinois General Water Quality Standards

Detection Limit above Screening Level

A = Analyte was detected in the method blank
B = Analyte was detected between the method detection limit and the reporting lim
C = Elevated detection limit due to matrix
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not sampled
R = Non Detected Results Rejected

Table IV-2C
Surface Water Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			1,3-Dichloro-benzene	1,4-Dichloro-benzene	2-Butanone	2-Hexanone	4-Methyl-2-pentanone	Acetone	Benzene	Bromo-dichloro-methane	Bromoform	Bromo-methane	Carbon disulfide	Carbon tetra-chloride	Chloro-benzene
Screening Levels mg/L															
Illinois General Water Quality Standards			--	--	--	--	--	--	0.86	--	--	--	--	--	--
National Recommended Water Quality Criteria															
Eagle Zinc Company Site Data (mg/L)															
FieldID	Matrix	Collection Date													
SW-ED-11	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
SW-ED-13	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
SW-WD-10	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
SW-WD-7	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
SW-WD-7D	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
SW-WD-9	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U
SW-WD-PN	SW	3/11/2003	0.00058 U	0.00063 U	0.004 R	0.0012 U	0.00091 U	0.0033 R	0.00025 U	0.00023 U	0.00045 U	0.00087 U	0.0005 U	0.00047 U	0.00058 U

Notes:

Exceeds Most Stringent Illinois General Wate
Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method bla
B = Analyte was detected between the meth
C = Elevated detection limit due to matrix
J = Estimated Value
U = Indicates undetected at concentration lis
NS = Not sampled
R = Non Detected Results Rejected

Table IV-2C
Surface Water Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	cis-1,2-Dichloro-ethene	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Cyclo-hexane	Dichloro-difluoro methane	Ethyl-benzene	Fluorotri-chloro-methane	Isopropyl-benzene
Screening Levels mg/L														
Illinois General Water Quality Standards			--	--	--	--	--	--	--	--	--	0.014	--	--
National Recommended Water Quality Criteria							--							
Eagle Zinc Company Site Data (mg/L)														
FieldID	Matrix	Collection Date												
SW-ED-11	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U
SW-ED-13	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U
SW-WD-10	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U
SW-WD-7	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U
SW-WD-7D	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.00081 U	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U
SW-WD-9	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.002	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U
SW-WD-PN	SW	3/11/2003	0.00084 U	0.00084 U	0.00045 U	0.00027 U	0.0022	0.00057 U	0.00064 U	0.0012 U	0.00057 U	0.00053 U	0.00085 U	0.00066 U

Notes:

Exceeds Most Stringent Illinois General Wate
Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method bla
B = Analyte was detected between the meth
C = Elevated detection limit due to matrix
J = Estimated Value
U = Indicates undetected at concentration lis
NS = Not sampled
R = Non Detected Results Rejected

Table IV-2C
Surface Water Sample Results
Volatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			Methyl-tert-butyl ether	Methyl-cyclo-hexane	Styrene	Tetra-chloroethene	Toluene	trans-1,2-Dichloroethene	Trichloro-ethene	Vinyl chloride	Xylene, -o	Xylenes, -m, -p
Screening Levels mg/L												
Illinois General Water Quality Standards			--	--	--	--	0.6	--	--	--	0.36	0.36
National Recommended Water Quality Criteria									0.0025			
Eagle Zinc Company Site Data (mg/L)												
FieldID	Matrix	Collection Date										
SW-ED-11	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
SW-ED-13	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
SW-WD-10	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
SW-WD-7	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
SW-WD-7D	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.00039 U	0.00011 U	0.00073 U	0.0011 U
SW-WD-9	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.0063	0.00011 U	0.00073 U	0.0011 U
SW-WD-PN	SW	3/11/2003	0.00087 U	0.00073 U	0.00062 U	0.00063 U	0.00084 U	0.0008 U	0.0014	0.00011 U	0.00073 U	0.0011 U

Notes:

Exceeds Most Stringent Illinois General Wate
Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method bla
B = Analyte was detected between the meth
C = Elevated detection limit due to matrix
J = Estimated Value
U = Indicates undetected at concentration lis
NS = Not sampled
R = Non Detected Results Rejected

Table IV-2D
Surface Water Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			1,2,4-Trichloro-benzene	1,2-Dichloro-benzene	1,3-Dichloro-benzene	1,4-Dichloro-benzene	2,2'-oxy-bis-(1-Chloro-propane)	2,4,5-Trichloro-phenol	2,4,6-Trichloro-phenol	2,4-Dichloro-phenol	2,4-Di-methyl-phenol	2,4-Dinitrophenol	2,4-Dinitro-toluene	2,6-Dinitro-toluene	2-Chloro-naphthalene	2-Chloro-phenol	2-Methyl-naphthalene	2-Methyl-phenol	2-Nitro-aniline	2-Nitro-phenol
Screening Levels mg/L																				
Illinois General Water Quality Standards			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eagle Zinc Company Site Data (mg/L)																				
Field ID	Matrix	Collection Date																		
SW-ED-11	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
SW-ED-13	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
SW-WD-10	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
SW-WD-7	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
SW-WD-7D	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
SW-WD-9	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U
SW-WD-PN	SW	3/11/2003	0.003 U	0.0025 U	0.0023 U	0.0023 U	0.0036 U	0.0046 U	0.004 U	0.0037 U	0.0029 U	0.003 U	0.0017 U	0.0037 U	0.0042 U	0.0011 U	0.0039 U	0.0023 U	0.0042 U	0.0037 U

Notes:

Exceeds Most Stringent Illinois General Water Quality Standards

Detection Limit above Screening Level

A = Analyte was detected in the method blank

B = Analyte was detected between the method detection limit and the reporting lim

C = Elevated detection limit due to matrix effect

J = Estimated Value

U = Indicates undetected at concentration listed

NS = Not samplec

R = Non Detected Results Rejected

Table IV-2D
Surface Water Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			3,3-Dichloro-benzidine	3-Nitro-aniline	4,6-Dinitro-2-methyl-phenol	4-Bromo-phenyl phenyl ether	4-Chloro-3-methyl-phenol	4-Chloro-aniline	4-Chlorophenyl phenyl ether	4-Methyl-phenol	4-Nitro-aniline	4-Nitro-phenol	Acena-phthene	Acena-phthylene	Acetophenone	Anthra-cene	Atrazine
Screening Levels mg/L																	
Illinois General Water Quality Standard			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eagle Zinc Company Site Data (mg/L)																	
Field ID	Matrix	Collection Date															
SW-ED-11	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022
SW-ED-13	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022
SW-WD-10	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022
SW-WD-7	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022
SW-WD-7D	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022
SW-WD-9	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022
SW-WD-PN	SW	3/11/2003	0.0028 U	0.0028 U	0.0017 U	0.0036 U	0.0041 U	0.0042 U	0.0047 U	0.002 U	0.0018 U	0.0018 U	0.0046 U	0.0047 U	0.0045 U	0.0028 U	0.0022

Notes:

Exceeds Most Stringent Illinois General Water Quality Standards

Detection Limit above Screening Level

A = Analyte was detected in the method blank
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not samplec
R = Non Detected Results Rejected

Table IV-2D
Surface Water Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter				Benz-alde-hyde		Benzo(a)anthra-cene		Benzo(a)-pyrene		Benzo(b)fluor-anthene		Benzo(g,h,i)-perylene		Benzo-(k)-fluor-anthene	
Screening Levels mg/L															
Illinois General Water Quality Standard				--		--		--		--		--		--	
Eagle Zinc Company Site Data (mg/L)															
Field ID	Matrix	Collection Date													
SW-ED-11	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U
SW-ED-13	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U
SW-WD-10	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U
SW-WD-7	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U
SW-WD-7D	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U
SW-WD-9	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U
SW-WD-PN	SW	3/11/2003	U	0.0082	U	0.0017	U	0.0015	U	0.0022	U	0.0021	U	0.0024	U

Notes:
Exceeds Most Stringent Illinois General Water Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method blank
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration listed
NS = Not samplec
R = Non Detected Results Rejected

Table IV-2D
Surface Water Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			bis-(2-Chloro-ethoxy)-methane	bis-(2-Chloro-ethyl)-ether	bis(2-Ethylhexyl)phthalate	Butyl-benzyl-phthalate	Caprolactam	Carb-azole	Chrysene	Di-n-butyl-phthalate	Di-n-octyl-phthalate	Dibenzo-(a,h)anthracene	Dibenzofuran	Diethyl-phthalate	Di-methyl-phthalate	Fluoran-thene	Fluorene	Hexa-chloro-benzene	Hexa-chloro-butadiene	Hexa-chloro-cyclopenta-diene	Hexa-chloro-ethane	Indeno-(1,2,3-cd)-pyrene	Isophorone
Screening Levels mg/L																							
Illinois General Water Quality Standards			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Eagle Zinc Company Site Data (mg/L)																							
Field ID	Matrix	Collection Date																					
SW-ED-11	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
SW-ED-13	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
SW-WD-10	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
SW-WD-7	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
SW-WD-7D	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
SW-WD-9	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U
SW-WD-PN	SW	3/11/2003	0.0045 U	0.00087 U	0.0014 U	0.0018 U	0.0013 U	0.0014 U	0.0018 U	0.0014 U	0.0013 U	0.0024 U	0.0047 U	0.0027 U	0.0035 U	0.0016 U	0.0047 U	0.0014 U	0.0029 U	0.0014 U	0.0023 U	0.0016 U	0.0045 U

Notes:
Exceeds Most Stringent Illinois General Water Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method blank
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration liste
NS = Not samplec
R = Non Detected Results Rejected

Table IV-2D
Surface Water Sample Results
Semivolatile Organic Compounds
Eagle Zinc Company Site, Hillsboro, IL

Parameter			N-Nitroso-di-n-propylamine	N-Nitrosodiphenylamine	Naphthalene	Nitro-benzene	Penta-chloro-phenol	Phenanthrene	Phenol	Pyrene
Screening Levels mg/L										
Illinois General Water Quality Standard			--	--	--	--	--	--	--	--
Eagle Zinc Company Site Data (mg/L)										
Field ID	Matrix	Collection Date								
SW-ED-11	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
SW-ED-13	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
SW-WD-10	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
SW-WD-7	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
SW-WD-7D	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
SW-WD-9	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U
SW-WD-PN	SW	3/11/2003	0.0043 U	0.0022 U	0.0038 U	0.0035 U	0.00078 U	0.0021 U	0.001 U	0.0018 U

Notes:
Exceeds Most Stringent Illinois General Water Quality Standards
Detection Limit above Screening Level
A = Analyte was detected in the method blank
B = Analyte was detected between the method det
C = Elevated detection limit due to matrix effect
J = Estimated Value
U = Indicates undetected at concentration liste
NS = Not samplec
R = Non Detected Results Rejected

Table IV-3
Residue Sample Results - TCLP Lead
Eagle Zinc Company Site, Hillsboro, IL

Field ID	TCLP - Lead mg/L	Collection Date	Matrix
RR2-11-S1	2.2	3/11/2003	Residue
RR2-11-S2	18.0	3/11/2003	Residue
RR2-11-S3	11.0	3/11/2003	Residue
RR2-11-S4	5.4	3/11/2003	Residue
RR2-11-S5	11.0	3/11/2003	Residue
RR2-11-S7	6.9	3/11/2003	Residue
RR2-11-S-6	9.0	3/11/2003	Residue
RR1-3-S2	24.0	3/11/2003	Residue
RR1-3-S1	28.0	3/11/2003	Residue
RR1-3-S1D	23.0	3/11/2003	Residue
MP1-21S1	18.0	3/11/2003	Residue
MP1-21-S2	230.0	3/11/2003	Residue
MP1-21-S3	190.0	3/11/2003	Residue

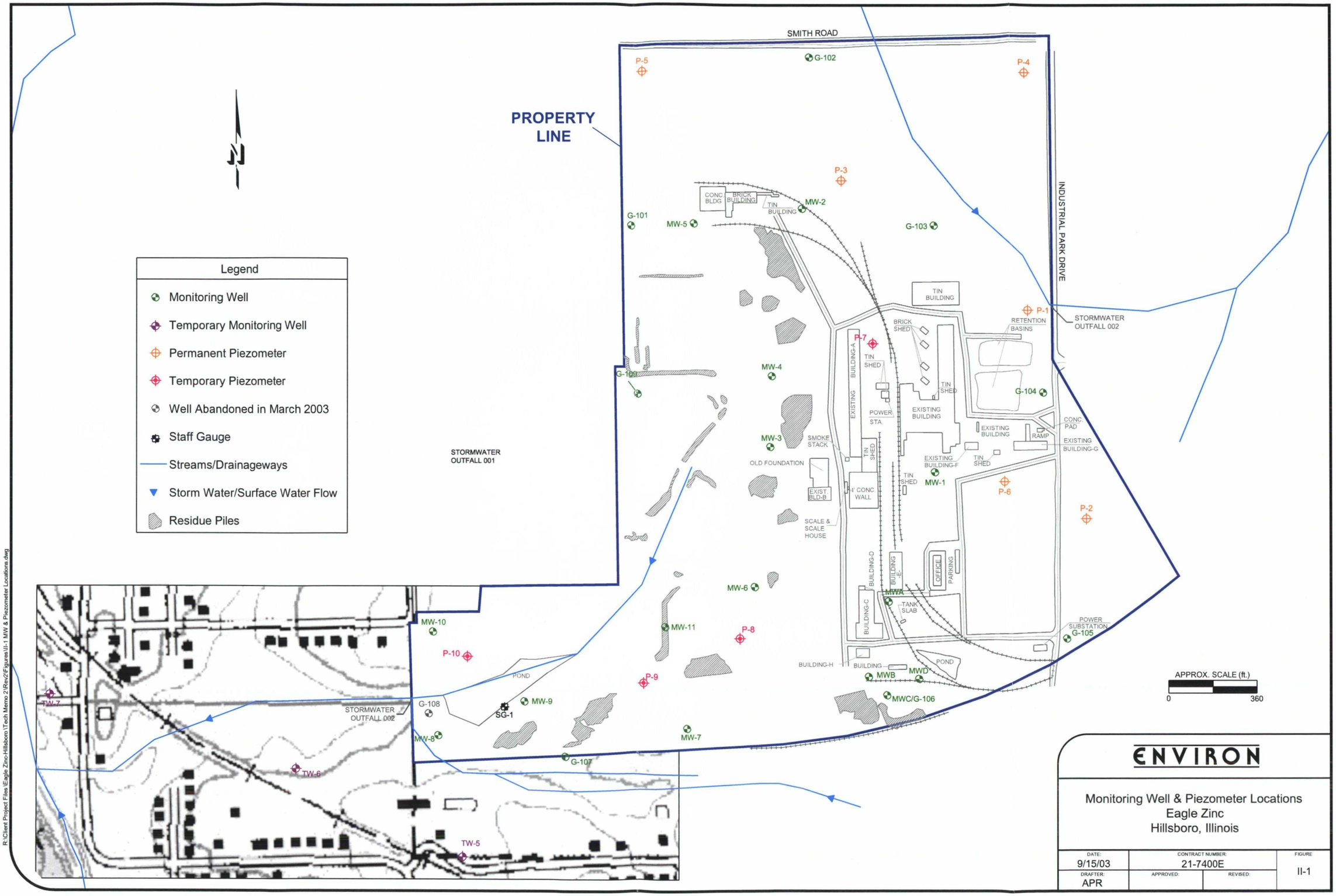
Notes:

Exceeds Screening Level of 5.0mg/L (RCRA hazardous waste threshold)

Table IV-4
Soil Sample Results - pH
Eagle Zinc Company Site, Hillsboro, IL

Field ID	pH Units: S.U.	Collection Date	Matrix
P01	6.6	3/11/2003	Soil
P02	7.5	3/11/2003	Soil
P03	5.2	3/12/2003	Soil
P04	5.9	3/12/2003	Soil
P05	5.0	3/12/2003	Soil
P06	4.8	3/12/2003	Soil
P07	6.2	3/12/2003	Soil
P08	4.8	3/12/2003	Soil
P09	4.3	3/12/2003	Soil
P10	5.4	3/13/2003	Soil
MW1	5.1	3/13/2003	Soil
MW2	6.3	3/13/2003	Soil
MW3	7.9	3/14/2003	Soil
MW4	7.7	3/14/2003	Soil
MW5	4.8	3/14/2003	Soil
MW6	7.2	3/15/2003	Soil
MW7	5.9	3/15/2003	Soil
MW8	6.8	3/15/2003	Soil
MW9	7.2	3/15/2003	Soil
MW10	6.0	3/16/2003	Soil

FIGURES

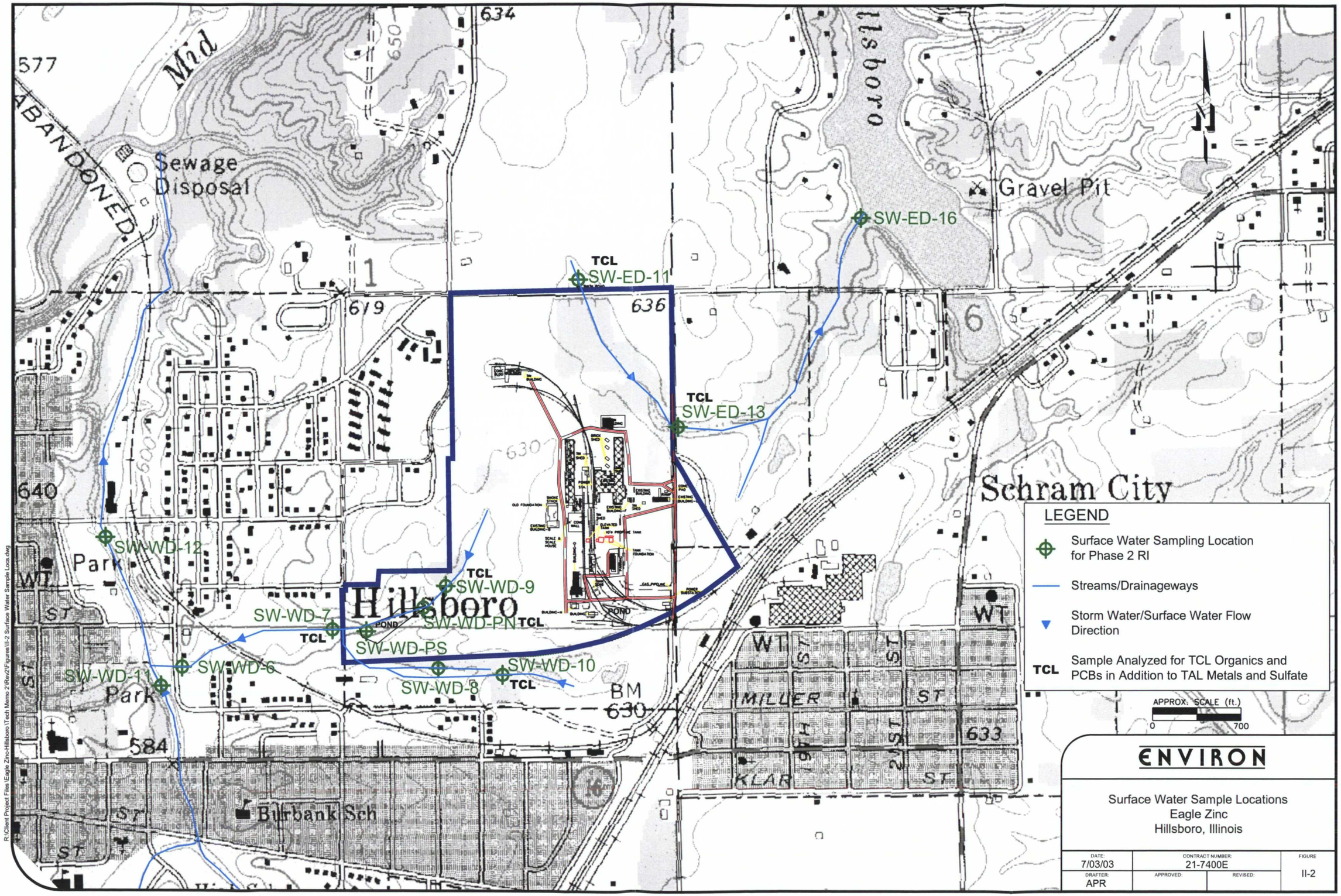


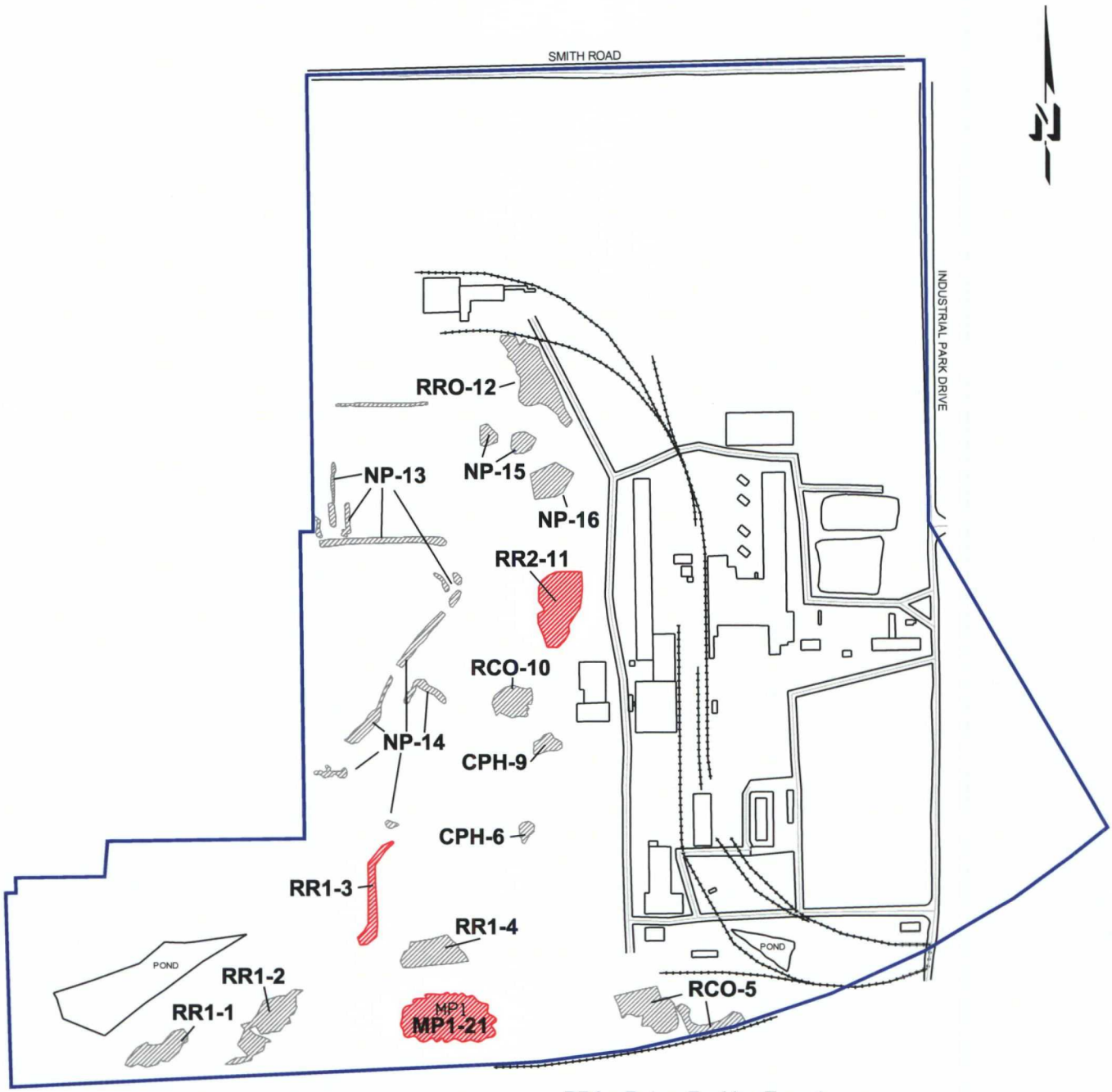
R:\Client Project Files\Eagle Zinc-Hillsboro\Tech Memo 2\Rev2\Figures\II-1 MW & Piezometer Locations.dwg

ENVIRON

Monitoring Well & Piezometer Locations
Eagle Zinc
Hillsboro, Illinois

DATE:	CONTRACT NUMBER:		FIGURE
9/15/03	21-7400E		II-1
DRAFTER: APR	APPROVED:	REVISED:	


Mid
ABANDONED
Sewage Disposal
Gravel Pit
Hillsboro
Schram City
Park
Burbank Sch
POND
BM 630
MILLER
KLAR
SW-ED-11
SW-ED-13
SW-ED-16
SW-WD-12
SW-WD-9
SW-WD-7
SW-WD-PN
SW-WD-PS
SW-WD-6
SW-WD-11
SW-WD-8
SW-WD-10
TCL
LEGEND
Surface Water Sampling Location for Phase 2 RI
Streams/Drainageways
Storm Water/Surface Water Flow Direction
TCL Sample Analyzed for TCL Organics and PCBs in Addition to TAL Metals and Sulfate
APPROX. SCALE (ft.)
0
700
ENVIRON
Surface Water Sample Locations
Eagle Zinc
Hillsboro, Illinois
DATE: 7/03/03
CONTRACT NUMBER: 21-7400E
FIGURE II-2
DRAFTER: APR
APPROVED:
REVISED:
R:\Client Project Files\Eagle Zinc-Hillsboro\Tech Memo 2\Rev2\Figures\II-2 Surface Water Sample Loca.dwg



Residue Piles Sampled in Phase 2

Residue Piles not Sampled in Phase 2

RR1 = Rotary Residue Type 1

RR2 = Rotary Residue Type 2

RCO = Rotary Clean Out

RRO = Rotary Residue Oversize

CPH = Carbon Plant Hutch

MP = Miscellaneous Piles (Approximate Area 1 Extent of Piles Shown)

NP = Newly Identified Piles

APPROX. SCALE (ft.)
0 450

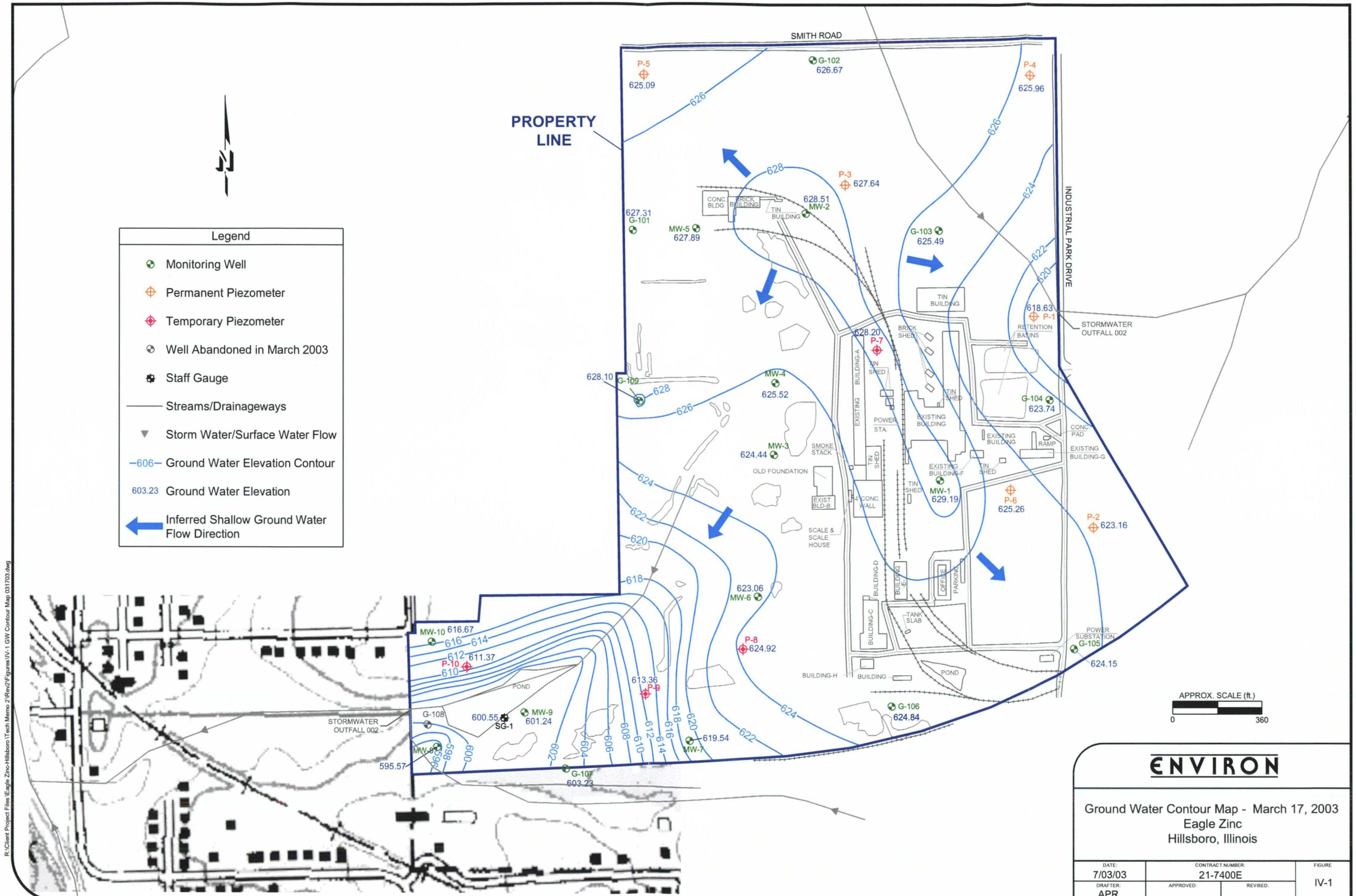
ENVIRON

Residue Pile Sample Locations (Phase 2)
Eagle Zinc
Hillsboro, Illinois

Figure
II-3

Drafter: APR Date: 5/07/03 Contract Number: 21-7400E Approved: Revised:

R:\Client Project Files\Eagle Zinc-Hillsboro\Tech Memo 2\Rev2\Figures\II-3 Residue Pile Sample Locations (Phase 2).dwg

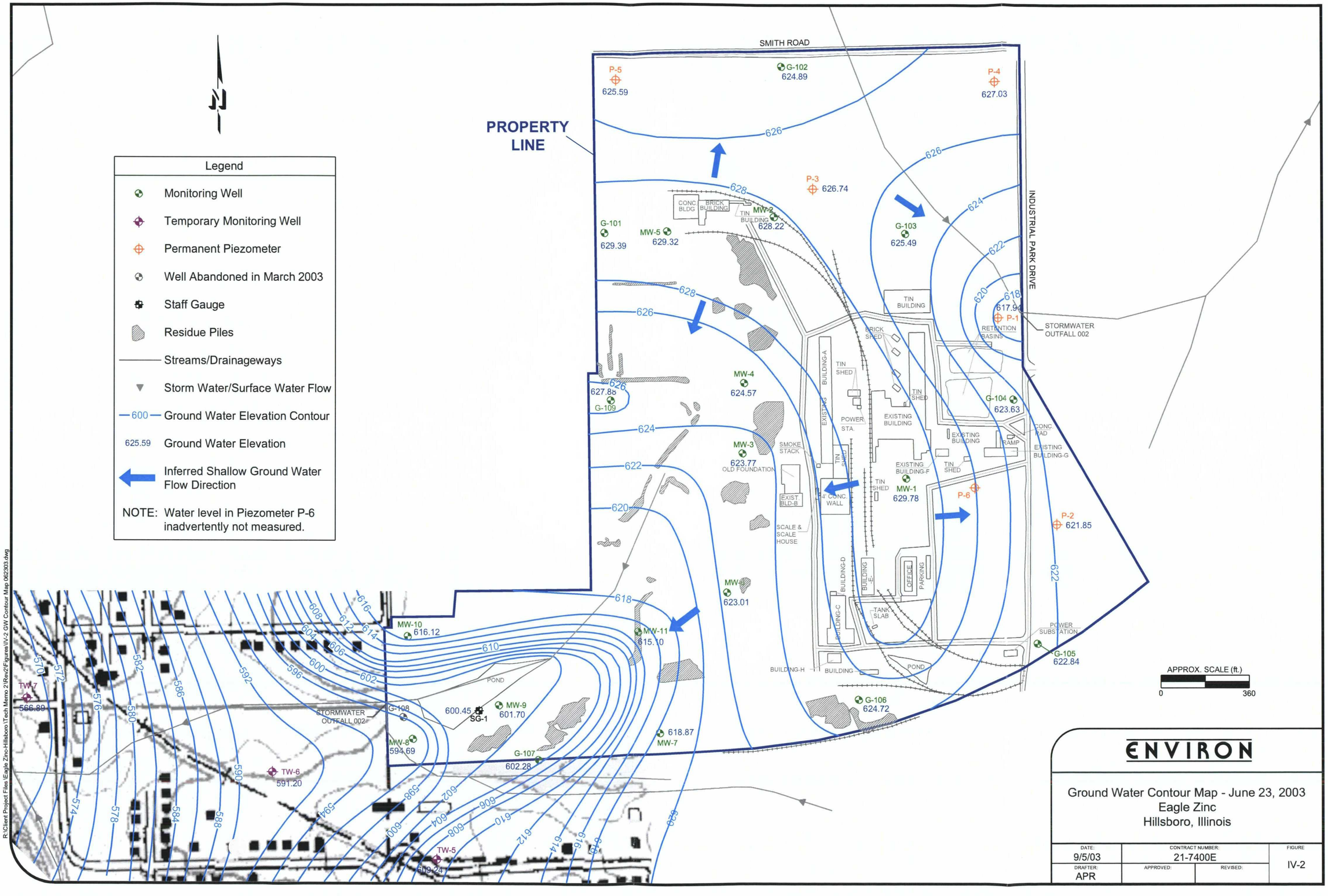


R:\Client Project Files\Eagle Zinc-Hillsboro\Tech Memo 2\Rev2\Figures\IV-1 GW Contour Map 031703.dwg

ENVIRON

Ground Water Contour Map - March 17, 2003
Eagle Zinc
Hillsboro, Illinois

DATE:	CONTRACT NUMBER:		FIGURE
7/03/03	21-7400E		IV-1
DRAFTER: APR	APPROVED:	REVISED:	


Legend
Monitoring Well
Temporary Monitoring Well
Permanent Piezometer
Well Abandoned in March 2003
Staff Gauge
Residue Piles
Streams/Drainageways
Storm Water/Surface Water Flow
600 Ground Water Elevation Contour
625.59 Ground Water Elevation
Inferred Shallow Ground Water Flow Direction
NOTE: Water level in Piezometer P-6 inadvertently not measured.
PROPERTY LINE
SMITH ROAD
INDUSTRIAL PARK DRIVE
STORMWATER OUTFALL 002
P-5 625.59
G-102 624.89
P-4 627.03
P-3 626.74
G-101 629.39
MW-5 629.32
MW-2 628.22
G-103 625.49
P-1 617.94
RETENTION BASINS
MW-4 624.57
G-109 627.88
MW-3 623.77
OLD FOUNDATION
MW-1 629.78
P-6
P-2 621.85
G-104 623.63
MW-6 623.01
MW-10 616.12
MW-11 615.10
G-105 622.84
G-106 624.72
618.87 MW-7
G-107 602.28
MW-8 594.69
G-108
600.45 SG-1
MW-9 601.70
TW-7 566.89
TW-6 591.20
TW-5 609.24
POND
APPROX. SCALE (ft.)
0
360
ENVIRON
Ground Water Contour Map - June 23, 2003
Eagle Zinc
Hillsboro, Illinois
DATE: 9/5/03
CONTRACT NUMBER: 21-7400E
FIGURE: IV-2
DRAFTER: APR
APPROVED:
REVISED:
R:\Client Project Files \Eagle Zinc-Hillsboro \Tech Memo 2\Rev2\Figures\IV-2 GW Contour Map 062303.dwg

MW-5	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Manganese	0.15	10	0.15	**0.17**

G-102	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Manganese	0.15	10	**0.29**	**0.29**

MW-1	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Sulfate	400	400	**530**	NA
Thallium	0.002	0.02	**0.0043J**	ND

G-109	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Iron	5	5	**210**	ND
Lead	0.0075	0.1	**0.15**	ND
Arsenic	0.05	0.2	**0.075**	ND
Beryllium	0.004	0.5	**0.008**	ND
Chromium	0.1	1	**0.17**	0.0014
Vanadium	0.049	- -	**0.2**	ND
Manganese	0.15	10	**8.1**	0.016
Nickel	0.1	2	**0.23**	ND

MW-4	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Antimony	0.006	0.024	**0.01**	ND
Iron	5	5	**49**	ND
Lead	0.0075	0.1	**0.93**	0.0015
Cadmium	0.005	0.05	**0.082**	0.00071
Copper	0.65	0.65	**0.95**	ND
Vanadium	0.049	- -	**0.096**	ND
Zinc	5	10	**210**	ND
Manganese	0.15	10	**1.4**	**0.78**
Nickel	0.1	2	**0.15**	0.0026

G-104	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Iron	5	5	**110**	ND
Lead	0.0075	0.1	**0.079**	ND
Vanadium	0.049	- -	**0.11**	ND
Manganese	0.15	10	**2.2**	0.018

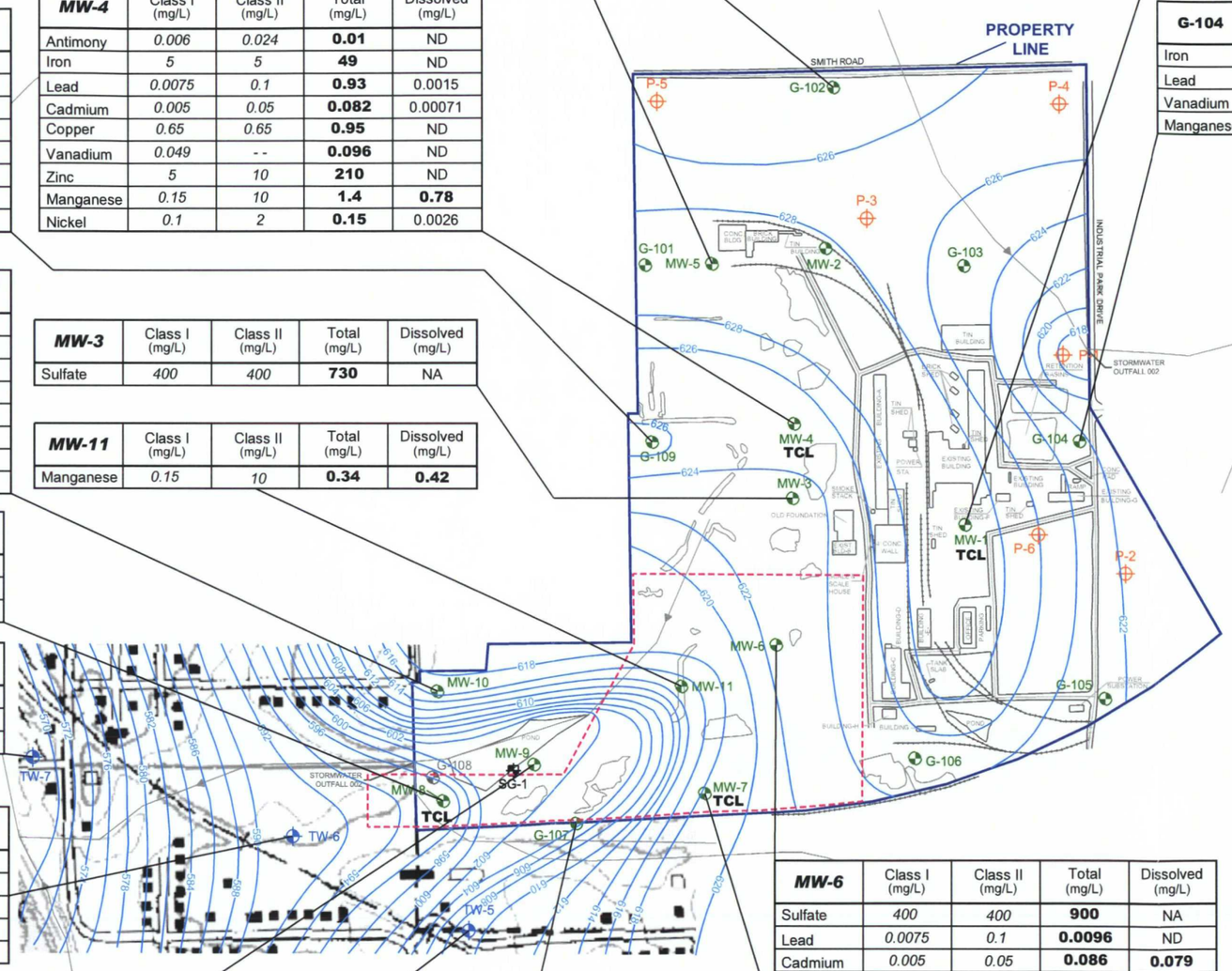
MW-10	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Iron	5	5	**130**	0.28
Lead	0.0075	0.1	**0.08**	ND
Arsenic	0.05	0.2	**0.058**	ND
Beryllium	0.004	0.5	**0.0066**	ND
Chromium	0.1	1	**0.16**	0.0028
Vanadium	0.049	- -	**0.19**	ND
Manganese	0.15	10	**2.8**	0.014
Nickel	0.1	2	**0.14**	0.0025

MW-3	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Sulfate	400	400	**730**	NA

MW-11	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Manganese	0.15	10	**0.34**	**0.42**

MW-8	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Lead	0.0075	0.1	**0.13**	**0.018**
Cadmium	0.005	0.05	**0.031**	**0.025**
Zinc	5	10	**13**	**13**

TW-7	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Iron	5	5	**22**	0.51
Lead	0.0075	0.1	**0.019**	0.00019
Manganese	0.15	10	**1.5**	**1.4**



TW-6	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Iron	5	5	**81**	1.2
Lead	0.0075	0.1	**0.092**	0.00022
Manganese	0.15	10	**4.5**	**2.8**
Nickel	0.1	2	**0.14**	0.011
Vanadium	0.049	- -	**0.12**	0.0023

MW-6	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Sulfate	400	400	**900**	NA
Lead	0.0075	0.1	**0.0096**	ND
Cadmium	0.005	0.05	**0.086**	**0.079**
Manganese	0.15	10	**0.87**	**0.94**

MW-9	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Sulfate	400	400	**1,700**	NA
Manganese	0.15	10	**0.92**	**1**

TW-5	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Iron	5	5	**17**	0.62
Lead	0.0075	0.1	**0.017**	0.00027
Manganese	0.15	10	**1.3**	**1.0**

G-107	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Sulfate	400	400	**920**	NA
Iron	5	5	**11**	**9.5**
Lead	0.0075	0.1	**0.061**	0.0068
Cadmium	0.005	0.05	**0.061**	**0.035**
Zinc	5	10	**19**	**17**
Manganese	0.15	10	**1.1**	**1.2**

MW-7	Class I (mg/L)	Class II (mg/L)	Total (mg/L)	Dissolved (mg/L)
Sulfate	400	400	**720**	NA
Thallium	0.002	0.02	ND	**0.0074**
Cadmium	0.005	0.05	**0.39**	**0.33**
Zinc	5	10	**120**	**120**
Manganese	0.15	10	**12**	**13**

Legend

- Monitoring Well
- TCL — Sample Analyzed for TCL Organics and PCBs in Addition to TAL Metals and Sulfates
- Temporary Monitoring Well
- Permanent Piezometer
- Well Abandoned in March 2003
- Staff Gauge
- Streams/Drainageways
- Storm Water/Surface Water Flow
- 600 — Ground Water Elevation Contour June 23, 2003
- Approximate Limits of Ground Water PAOC

Note: Concentrations above Screening Levels (Illinois Ground Water Protection Act Standards for Class I Ground Water) are shown in **bold** type.

NA = Not Applicable
ND = Not Detected
- - = No Standard

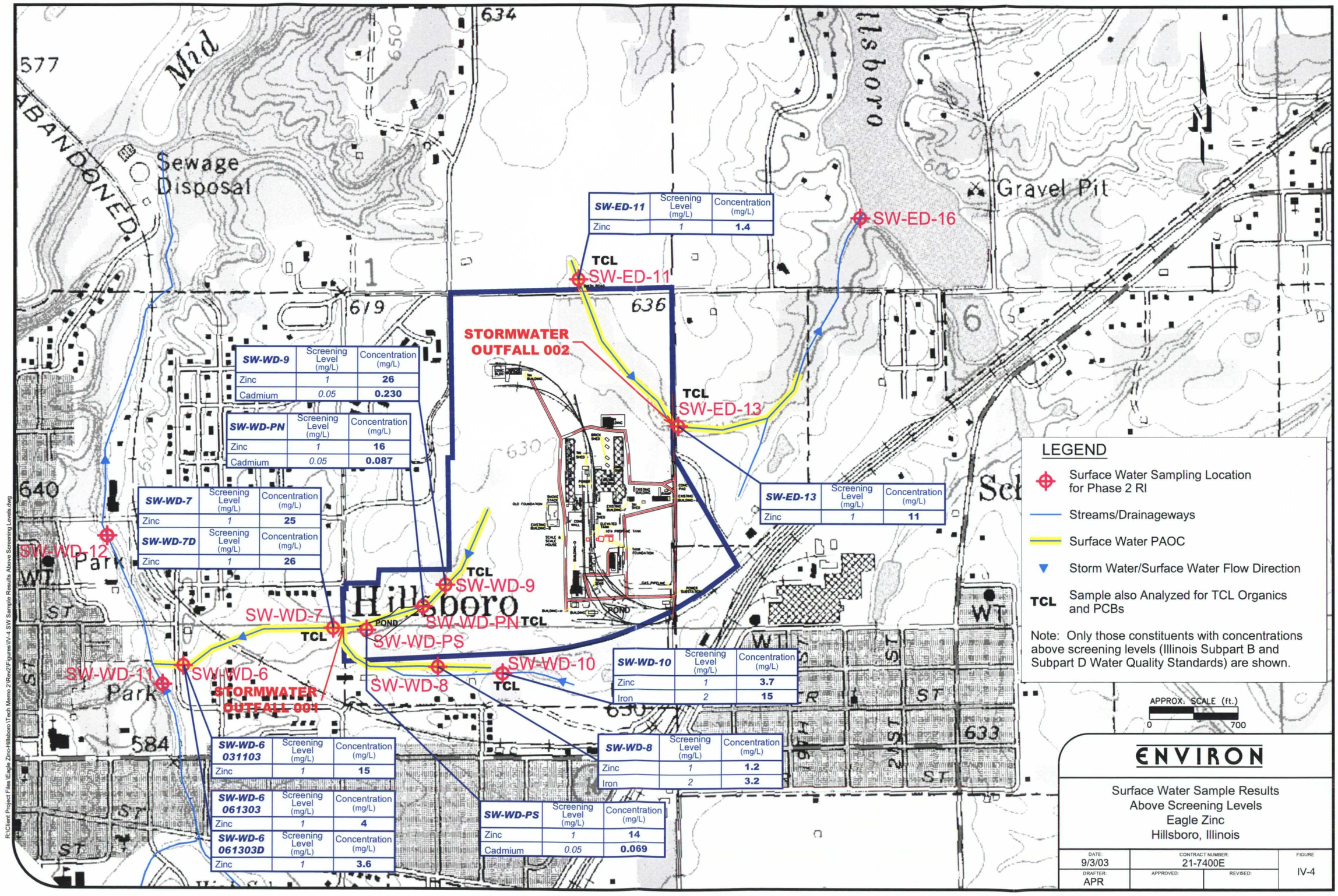
APPROX. SCALE (ft.)
0 550

ENVIRON

Ground Water Sample Results
Above Screening Levels
Eagle Zinc
Hillsboro, Illinois

DATE: 9/5/03	CONTRACT NUMBER: 21-7400E		FIGURE IV-3
DRAFTER: APR	APPROVED:	REVISED:	

R:\Client Project Files\Eagle Zinc-Hillsboro\Tech Memo 2\Rev2\Figures\IV-3 GW Sample Results Above Screening Levels.dwg



SW-ED-11	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	1.4

SW-WD-9	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	26
Cadmium	0.05	0.230

SW-WD-PN	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	16
Cadmium	0.05	0.087

SW-WD-7	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	25

SW-WD-7D	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	26

SW-ED-13	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	11

SW-WD-10	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	3.7
Iron	2	15

SW-WD-8	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	1.2
Iron	2	3.2

SW-WD-6 031103	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	15

SW-WD-6 061303	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	4

SW-WD-6 061303D	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	3.6

SW-WD-PS	Screening Level (mg/L)	Concentration (mg/L)
Zinc	1	14
Cadmium	0.05	0.069

APPENDIX A

Piezometer and Monitoring Well Boring/Construction Logs

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P01**

TOTAL DEPTH: **14ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/10/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
0-4	3.5	pH sample	3	0		CL	-4	SILTY CLAY: Silty clay, little fine sand, little organic debris, yellowish brown
4-7	2.8		0	-5		ML	-7	CLAYEY SILT: Clayey silt, little fine sand, little organic debris, yellowish brown, moist
						ML	-8.2	SILT: Silt, little clay, little fine sand, brownish gray, wet
7-10	2.9		0	-10		SM	-11.7	SILTY SAND: Silty sand, fine, trace gravel, light brown
10-13	3		0			CL		SILTY CLAY: Silty clay, little subrounded gravel, very stiff, gray
13-14	1.0		0					

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 01**

TOTAL DEPTH: **14 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/10/03**

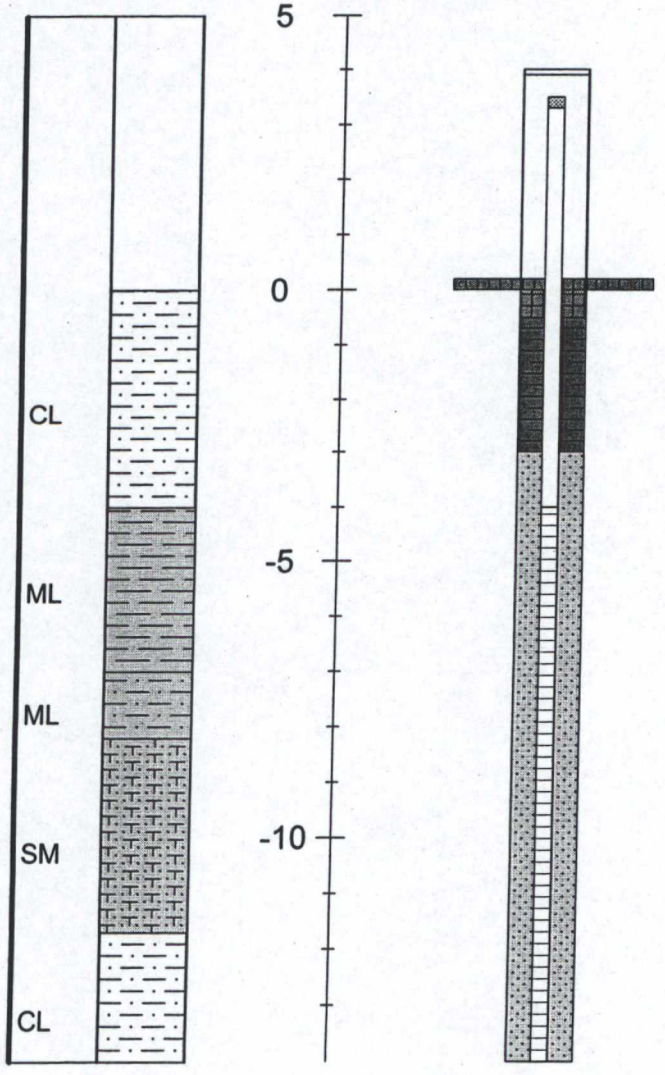
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

PVC Riser

Bentonite Seal

Water Level (-6.23ft.)

Sand Pack

PVC screen (-4ft. to -14ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P02**

TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/10/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				SILTY CLAY: Silty clay, little fine sand, light brown
0-4	4	pH sample	0			CL	-4	SILTY SAND: Silty sand, some clay, little subrounded gravel, light brown, wet at -9ft.
				-5				
4-7	3		0					
						SM		
7-10	3		0					
				-10				
10-13	3		0					
			0					
13-16	3			-15		ML	-14.5	SILT: Silt, some fine to medium sand, little subrounded gravel, gray

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 02**

TOTAL DEPTH: **14 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/10/03**

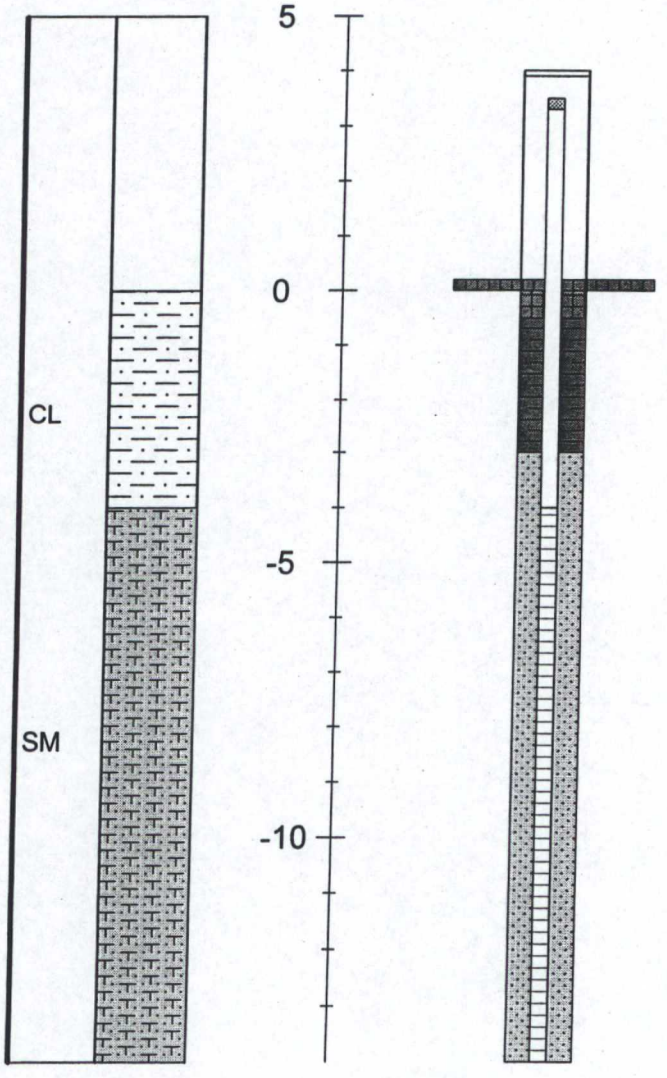
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

PVC Riser

Bentonite Seal

Water Level (-5.54ft.)

Sand Pack

PVC screen (-4ft. to -14ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P03**
TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	- -

SURVEY LOCATION: GROUND SURFACE ELEVATION:

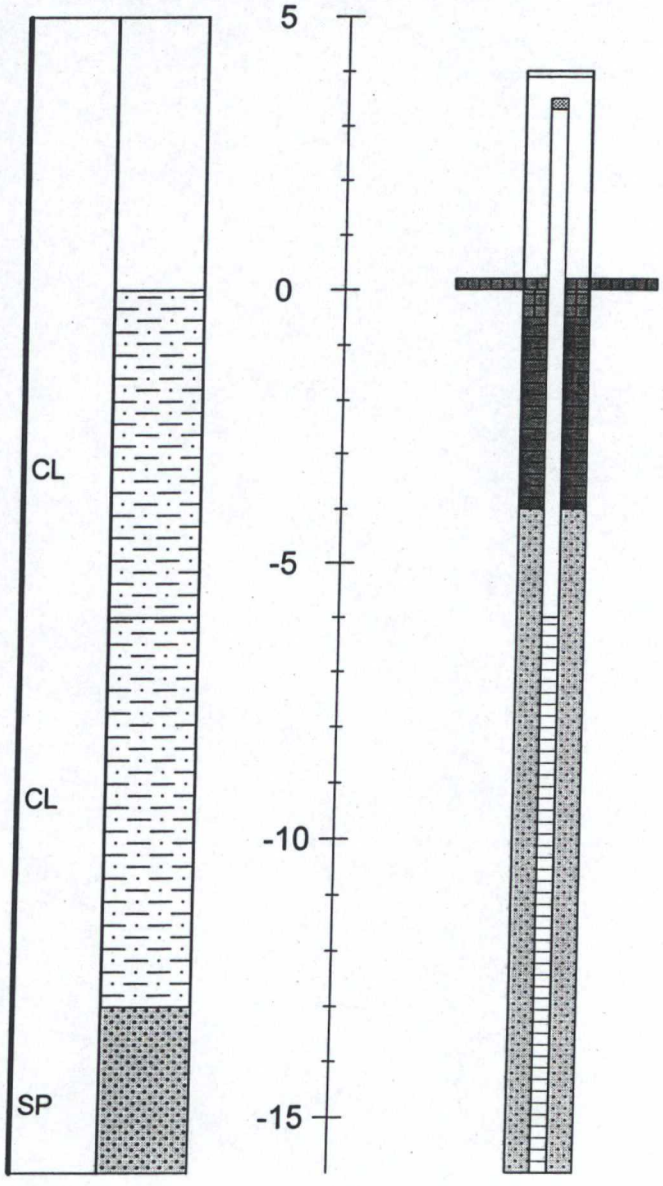
SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
		pH sample		0				SILTY CLAY: Silty clay, some orange mottling, little subrounded gravel, brown
0-4	4		0			CL		
				-5				
4-7	3		0				-6	SILTY CLAY: Silty clay, some fine sand, trace gravel, gray, wet
7-10	3		0			CL		
				-10				
10-13	1		0				-13	FINE SAND: Fine sand, some clay, some gravel, brownish gray
13-16	1		0	-15		SP		

ENVIRON 740 Waukegan Road, Suite 401 Deerfield, Illinois 60015	**WELL CONSTRUCTION LOG** MONITORING WELL NO.: **P 03** TOTAL DEPTH: **16 ft.**

PROJECT INFORMATION		DRILLING INFORMATION	
PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental**
SITE LOCATION:	**Hillsboro, IL**	DRILLER:	**Direct Push**
JOB NO.:	**21-7400E**	RIG TYPE:	**Geoprobe**
LOGGED BY:	**Dan Ryan**	METHOD OF DRILLING:	**Macrosampler**
DATE(S) DRILLED:	**03/11/03**	BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION: SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

PVC Riser

Bentonite Seal

Water Level (-3.37ft.)

Sand Pack

PVC screen (-6ft. to -16ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P04**
TOTAL DEPTH: **13ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				TOPSOIL: Topsoil, some silty clay, little organic debris, light gray
		pH sample					-1	SILTY CLAY: Silty clay, some orange mottling, brown
0-4	4		0			CL		
				-5			-4	SILTY SAND: Silty sand, fine, some clay, little orange mottling, little gravel, wet at -7ft.
4-7	3		0					
7-10	3		0			SM		
				-10				
10-13	3		0					

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 04**

TOTAL DEPTH: **13 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/11/03**

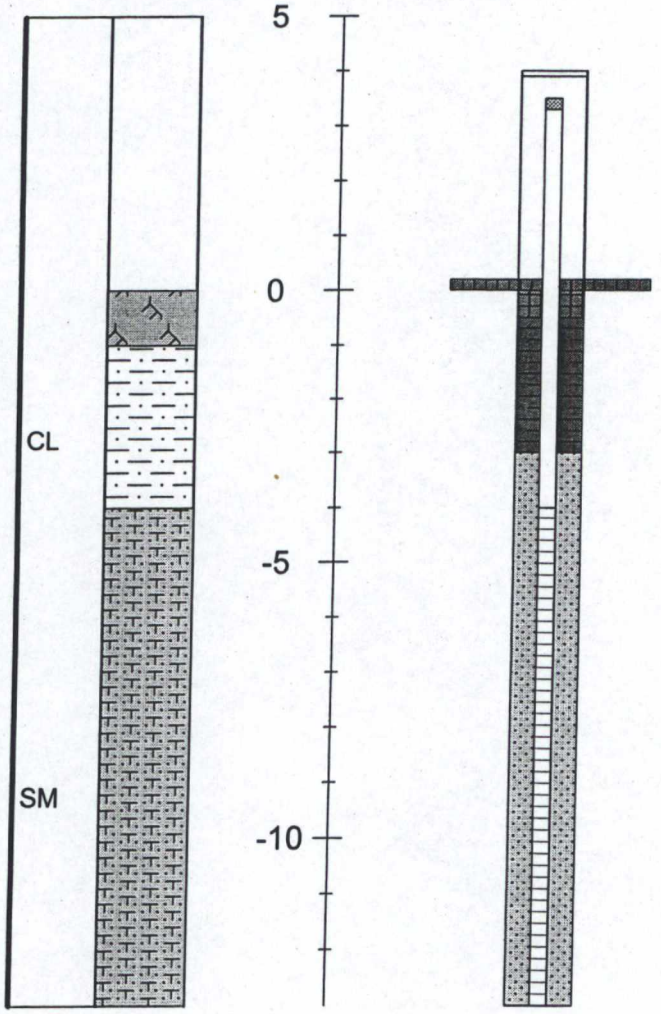
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

PVC Riser

Bentonite Seal

Sand Pack

Water Level (-9.11ft.)

PVC screen (-4ft. to -13ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P05**
TOTAL DEPTH: **15ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				
		pH sample					-1	TOPSOIL: Topsoil, some silty clay, little organic debris, dark gray
0-4	4		0			CL		SILTY CLAY: Silty clay, little sand, little organic debris, little orange mottling, brownish gray
				-5			-4	CLAYEY SAND: Clayey sand, some silt, little to some gravel, brownish gray, wet
4-7	3		0					
7-10	3		0			SP		
				-10				
10-13	1		0					
13-15	2		0					
				-15		SP	-14.8	FINE SAND: Fine sand, little clay, little gravel, brownish gray, wet

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 05**

TOTAL DEPTH: **15 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/11/03**

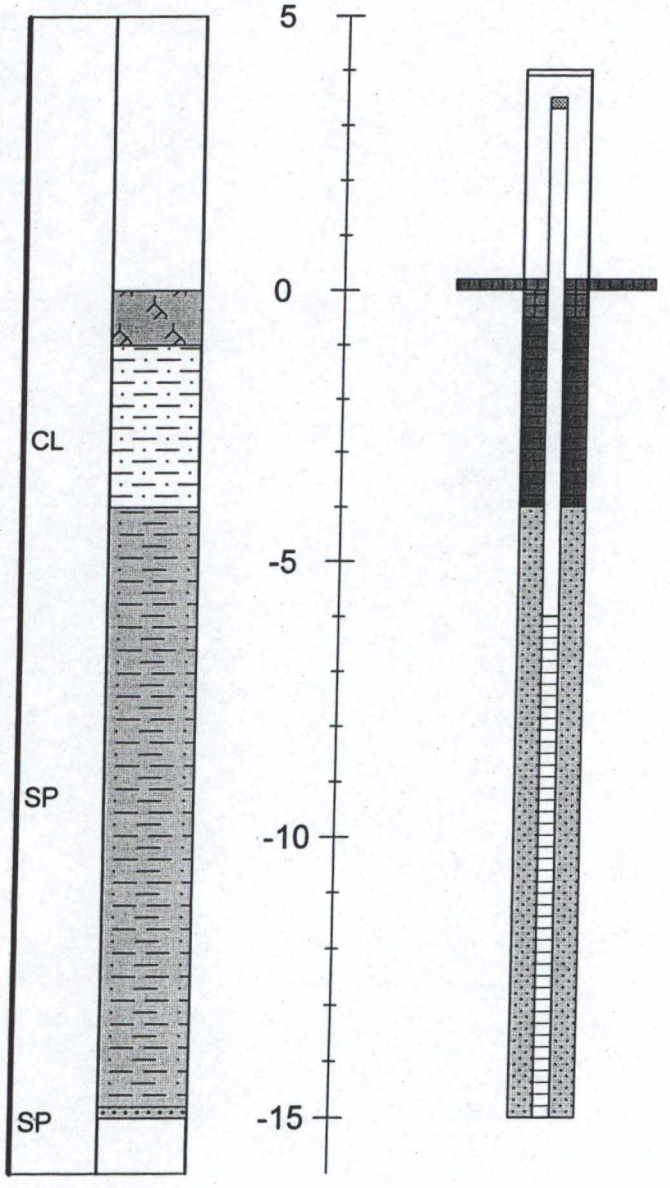
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

PVC Riser

Bentonite Seal

Sand Pack

Water Level (-8.38ft.)

PVC screen (-6ft. to -15ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P06**
TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0			-0.5	RESIDUE: Plant Residue
							-1	TOPSOIL: Topsoil, some silty clay, light gray
0-4	4	pH sample	0					SILTY CLAY: Silty clay, little sand, little gravel, little orange mottling, brownish gray
				-5				
4-7	2.5		0			CL		
7-10	1.6		0					
				-10				
							-11.3	
10-13	2.7		0					FINE SAND: Fine sand, some silt, little clay, brownish gray, wet
						SP		
13-16	2.3		0	-15				
						CL	-15.5	SANDY CLAY: Sandy clay, little gravel, light gray, wet

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 06**

TOTAL DEPTH: **16 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/11/03**

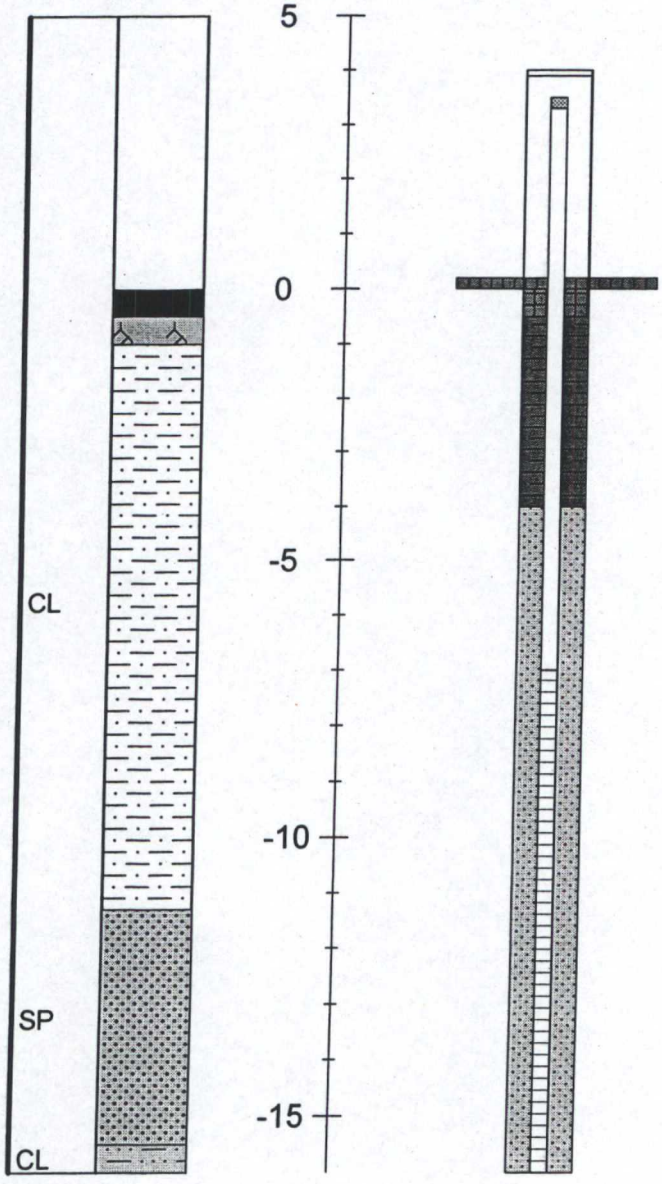
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

PVC Riser

Bentonite Seal

Sand Pack

Water Level (-6.62ft.)

PVC screen (-7ft. to -16ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P07**
TOTAL DEPTH: **15ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	- -

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Residue
							-1.6	SILTY SAND: Silty sand, fine, little rounded gravel, dark gray
0-4	2.6	pH sample	0			SM		
							-4	SILTY CLAY: Silty clay, little to some fine sand, brownish gray, wet at -8ft.
				-5				
4-7	3		0					
7-10	3		0					
				-10		CL		
10-13	3		0					
13-15	2		0					
				-15				

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 07**

TOTAL DEPTH: **15 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/11/03**

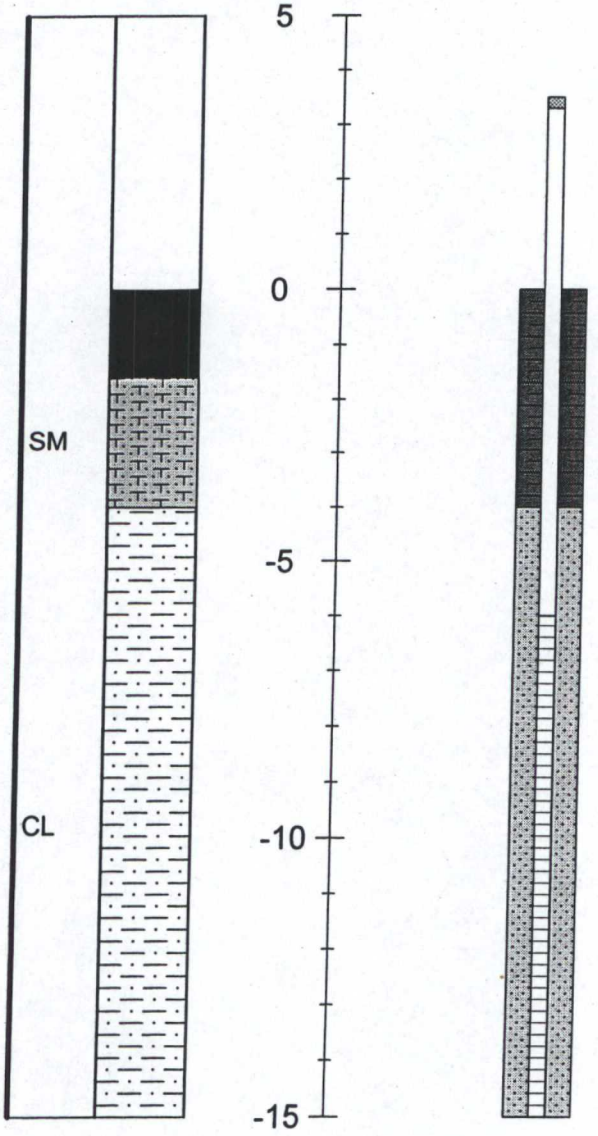
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

PVC Riser

Bentonite Seal

Water Level (-5.83ft.)

Sand Pack

PVC screen (-6ft. to -15ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P08**
TOTAL DEPTH: **15.5ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				
							-1	RESIDUE: Plant Residue
0-4	4	pH sample	0					SILTY CLAY: Silty clay, little fine sand, little orange organic mottling, trace gravel, brownish gray, moist
				-5		CL		
4-7	3		0					
7-10	3		0					
				-10			-9.5	FINE SAND: Fine sand, little gravel, little clay, brownish orange, wet
						SP		
10-13	3		0					
							-13.5	SANDY CLAY: Sandy clay, some gravel, brownish gray, wet
13-15.5	2.5		0	-15		CL		

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 08**

TOTAL DEPTH: **14 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/11/03**

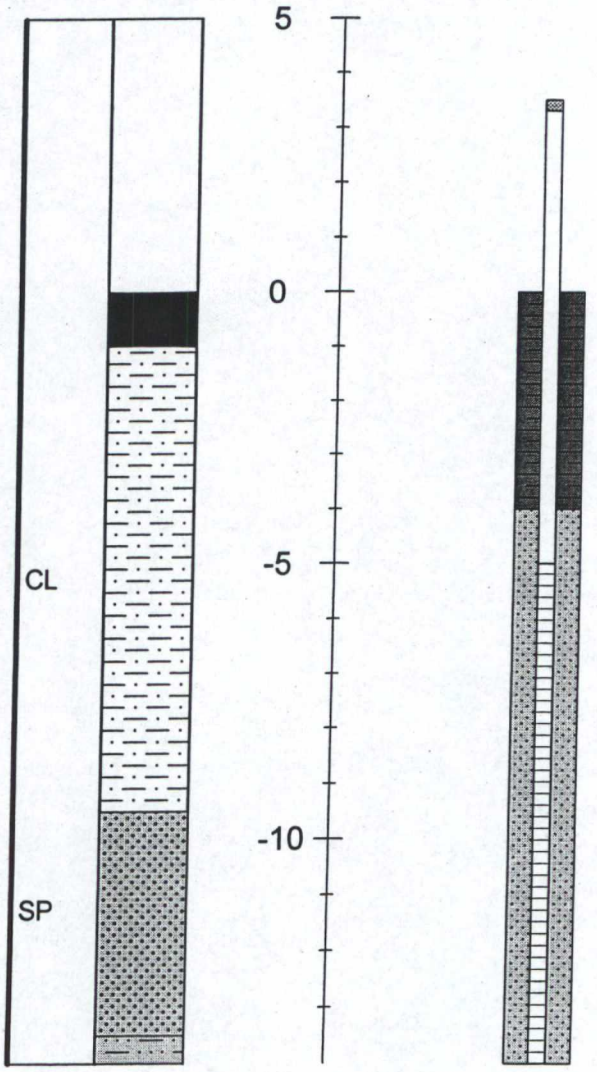
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

PVC Riser

Bentonite Seal

Water Level (-3.18ft.)

Sand Pack

PVC screen (-5ft. to -14ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P09**
TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/11/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
0-4	4	pH sample	0	0		CL	-4	SILTY CLAY: Silty clay, little fine sand, little orange mottling, brownish gray
4-7	3		0	-5				SANDY CLAY: Sandy clay, little subrounded gravel, little orange mottling, brownish gray, wet at -9ft.
7-10	3		0	-10		CL		
10-13	3		0					
13-16	3		0	-15		SP	-14	FINE SAND: Fine sand, little gravel, light brown, wet

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 09**

TOTAL DEPTH: **16 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/11/03**

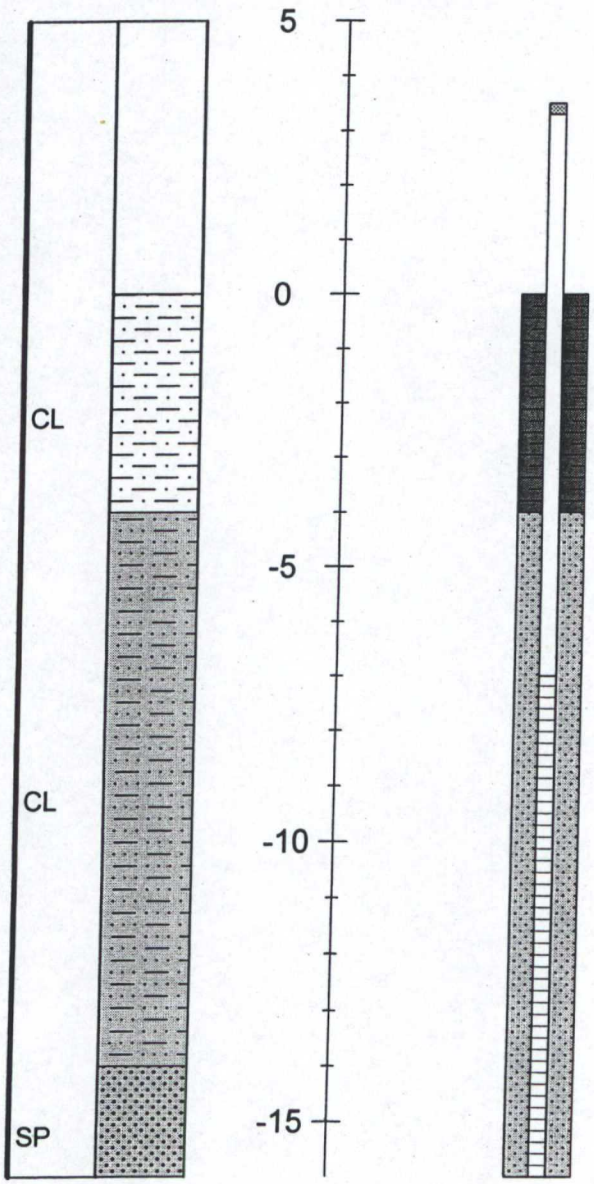
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

PVC Riser

Bentonite Seal

Sand Pack

Water Level (-8.59ft.)

PVC screen (-7ft. to -16ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **P10**
TOTAL DEPTH: **18ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/12/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0			-0.7	TOPSOIL: Topsoil, silty clay, some organic debris, dark gray
		pH sample						SANDY SILT: Sandy silt, little clay, trace gravel, light brown
0-4	4		0					
				-5		SM		
4-7	3		0					
7-10	3		0				-8.8	CLAYEY SAND: Clayey sand, fine, little subrounded gravel, light brown, wet at -13ft.
				-10		SP		
10-13	3		0					
13-16	3		0	-15			-14.9	SILT: Silt, some fine sand, little gravel, brown
						ML	-15.8	FINE SAND: Fine sand, little clay, trace gravel, light brown, wet
						SP	-16.5	SILTY CLAY: Silty clay, little gravel, very stiff, wet
16-18	2		0			CL		

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **P 10**

TOTAL DEPTH: **18 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/12/03**

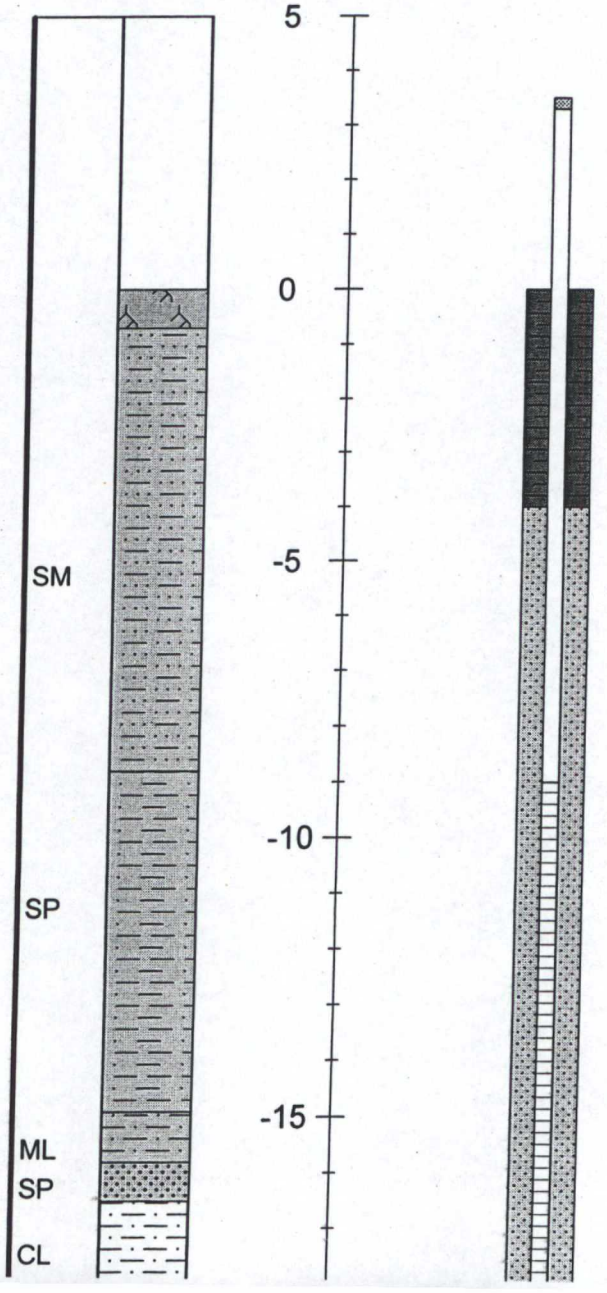
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Direct Push**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Macrosampler**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

PVC Riser

Bentonite Seal

Sand Pack

PVC screen (-9ft. to -18ft.)

Water Level (-12.20ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW1**
TOTAL DEPTH: **15ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/12/03**	HAMMER WT./DROP	- -

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				
							-0.7	RESIDUE: Plant Residue
						SM	-1.6	SILT: Silt, little fine sand, little clay, gray
0-4	4	pH sample	0					SILTY CLAY: Silty clay, little fine sand, little gravel, little orange mottling, brown
						CL		
				-5				
4-7	3		0					
							-7.5	SANDY CLAY: Sandy clay, little gravel, little silt, brown, wet
7-10	2		0			CL		
				-10				
							-11	FINE SAND: Fine sand, some clay, little gravel, light brown, wet
10-13	3		0					
						SP		
13-15	2		0					
				-15		CL	-14.5	SILTY CLAY: Silty clay, some fine sand, brown, wet

ENVIRON

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Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW1**

TOTAL DEPTH: **15ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/12/03**

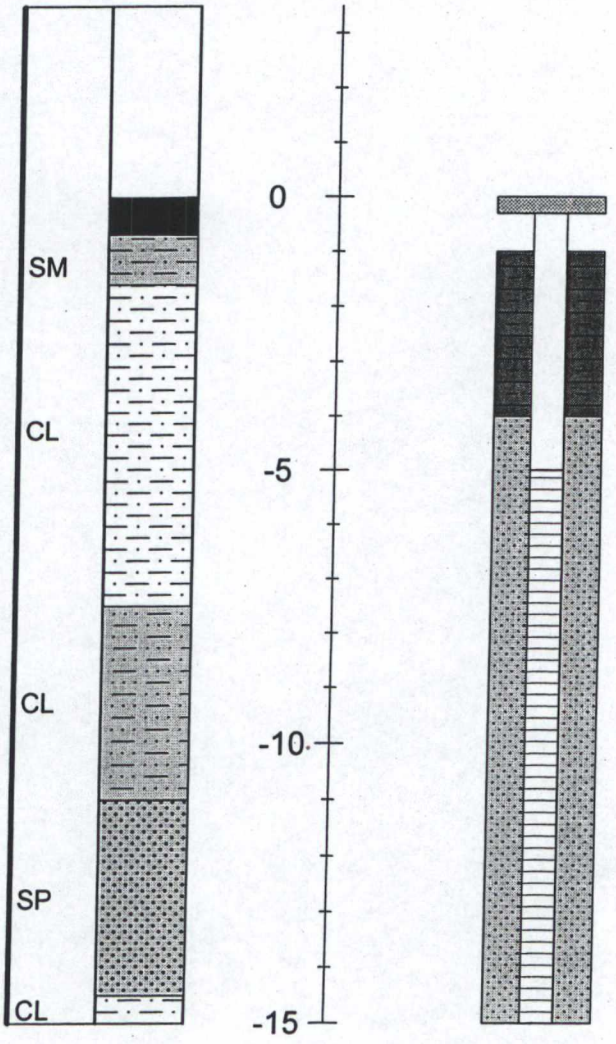
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Concrete Pad around Flushmount Cap

PVC Riser

Bentonite Seal

Water Level (-3.31ft.)

Sand Pack

PVC screen (--5ft. to -15ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW2**

TOTAL DEPTH: **15ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**03/12/03**	HAMMER WT./DROP	- -

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Plant Residue
							-1.8	
0-4	3	pH sample	0			SM	-2.3	SILT: Silt, little clay, trace gravel, gray
						CL		SILTY CLAY: Silty clay, little sand, little orange mottling, gray, wet
				-5				
4-7	1		0					
							-7	CLAYEY SAND: Clayey sand, fine, little gravel, little orange mottling, gray, wet
7-10	2		0					
				-10				
						SP		
10-13	0.5		0					
13-15	2		0	-15				

ENVIRON

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Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW2**

TOTAL DEPTH: **15ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/12/03**

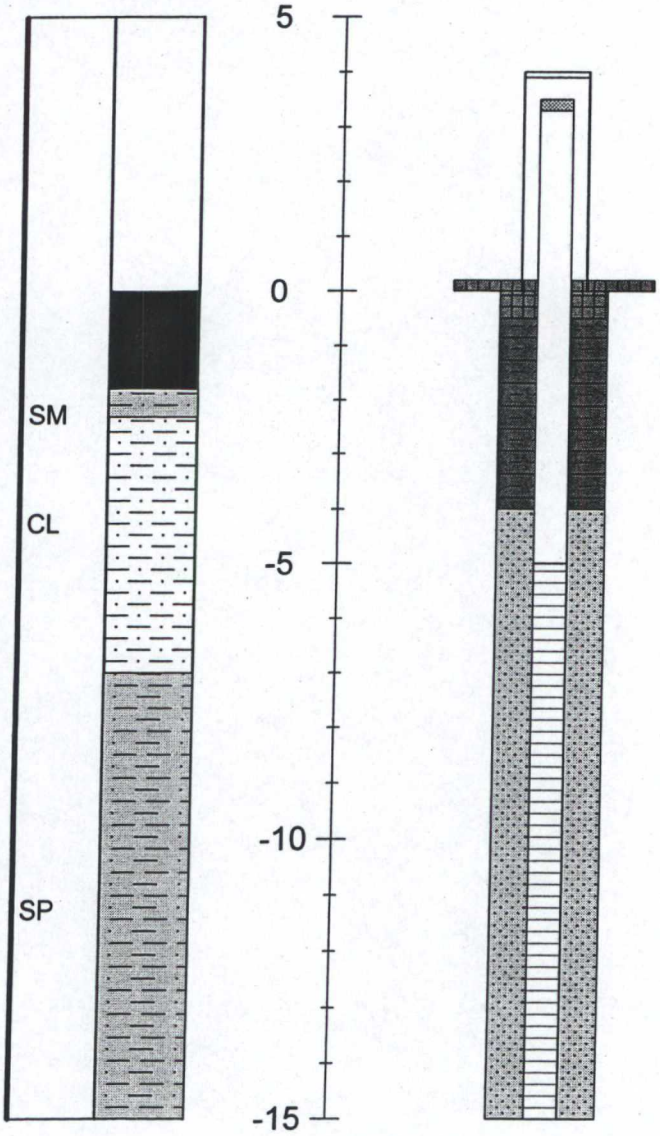
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Water Level (-5.48ft.)

Sand Pack

PVC screen (-5ft. to -15ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW3**

TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/13/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
0-2	0.9		0	0				RESIDUE: Plant Residue
2-4	1.5	pH sample	0				-2.5	CLAYEY SAND: Clayey sand, little gravel, brownish gray
4-6	0.5		0	-5		SP	-6	Augered Interval
9-11	2		0	-10		CL	-9	SILTY CLAY: Silty clay, some fine sand, little gravel, brownish gray, wet
							-11	Augered Interval
14-16	2		0	-15		CL	-14	SANDY CLAY: Sandy clay, little gravel, brownish gray, wet

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW3**

TOTAL DEPTH: **16ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/13/03**

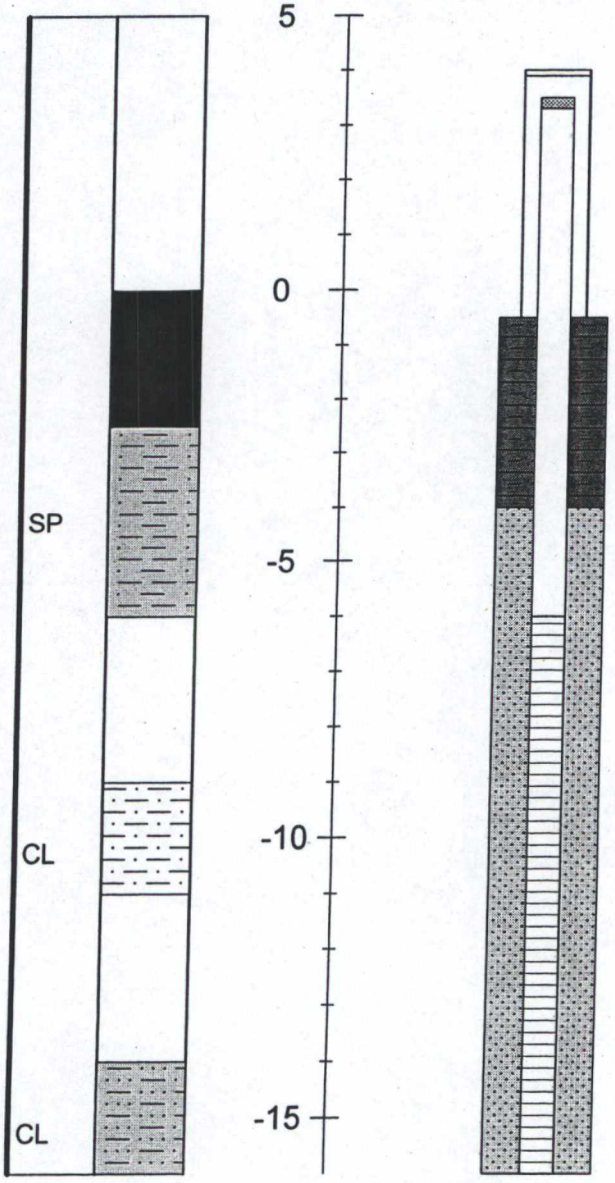
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental Servi**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Sand Pack

PVC screen (-16ft. to -6ft.)

Water Level (-10.38ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW4**

TOTAL DEPTH: **11ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/13/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
0-2	0.8		0	0				RESIDUE: Plant Residue
2-4	0.6	pH sample	0				-3	SILTY CLAY: Silty clay, some fine sand, little gravel, dark gray, wet
4-6	1.0		0	-5		CL	-6	Augered Interval
9-11	2		0	-10		CL	-9	SILTY CLAY: Silty clay, some fine sand, little gravel, dark gray, wet

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW4**

TOTAL DEPTH: **11ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/13/03**

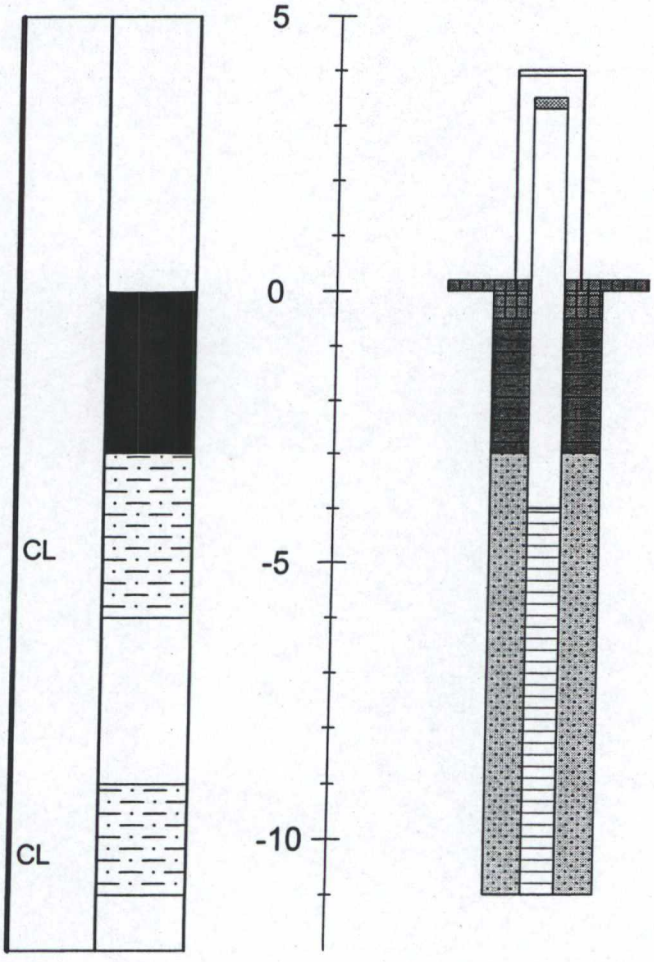
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Water Level (-4.90ft.)

Sand Pack

PVC screen (-4ft. to -11ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW5**

TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/13/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Plant Residue
0-2	2	pH sample	0			SM	-1	CLAYEY SILT: Clayey silt, little fine sand, trace gravel, little orange mottling, gray
2-4	1.2		0			CL	-2.4	SILTY CLAY: Silty clay, little fine sand, little organic debris, brownish gray, moist
				-5			-4	Augered Interval
9-11	1.0		0	-10		SP CL	-9 -10 -11	CLAYEY SAND: Clayey sand, fine, trace gravel, brownish gray, wet SILTY CLAY: Silty clay, little fine sand, brownish gray, wet Augered Interval
14-16	1.5		0	-15		SP	-14	FINE SAND: Fine sand, little gravel, brown, wet

ENVIRON

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Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW5**

TOTAL DEPTH: **16 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/13/03**

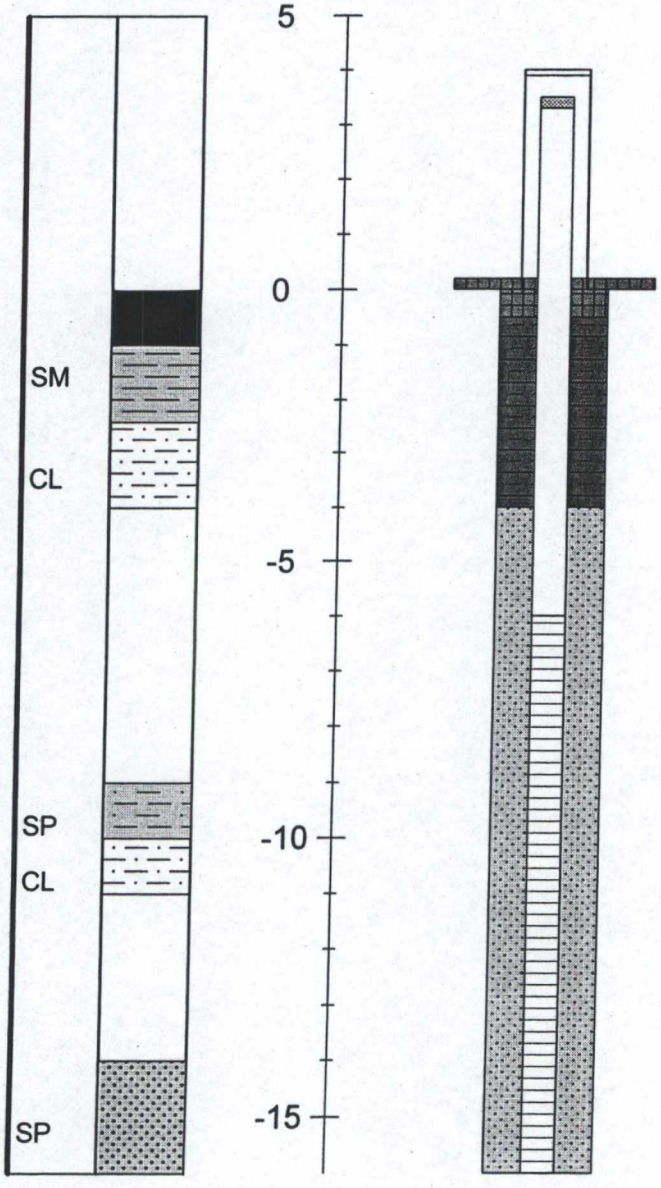
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Sand Pack

PVC screen (-6ft. to -16ft.)

Water Level (-10.08ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW6**

TOTAL DEPTH: **15ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/14/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Plant Residue
4-6	1		0	-5				
							-6	Augered Interval
6-8	0		0					
							-8	SANDY CLAY: Sandy clay, little gravel, gray, wet
8-10	1	pH sample	0	-10		CL	-10	Augered Interval
				-15				

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW6**

TOTAL DEPTH: **15 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/14/03**

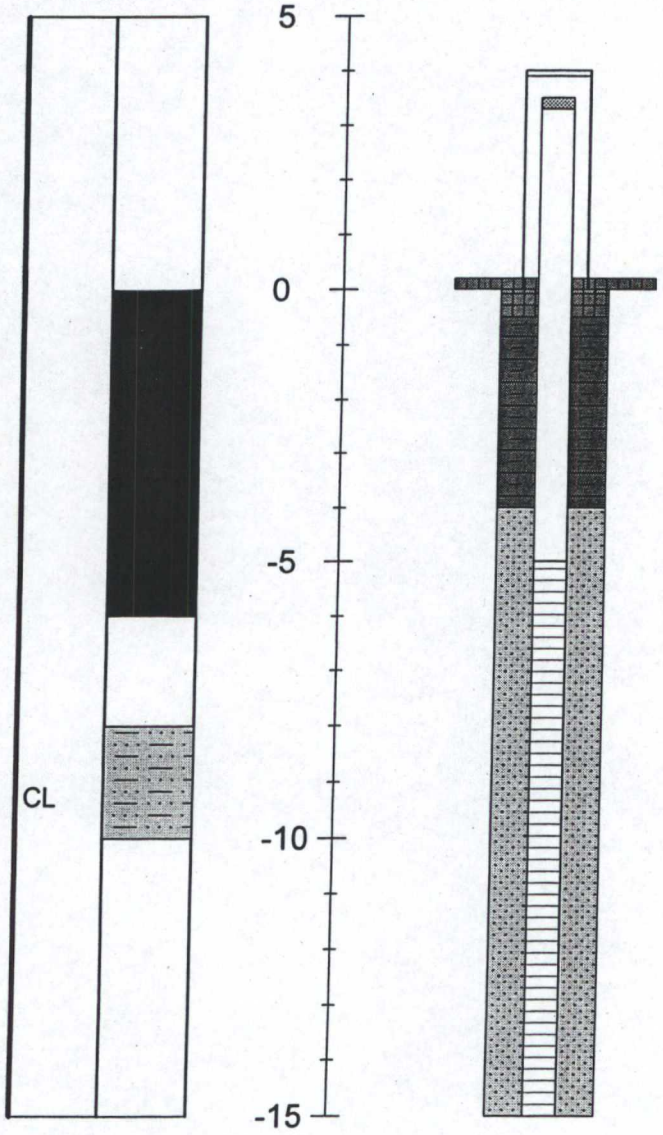
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Water Level (-6.07ft.)

Sand Pack

PVC screen (--5ft. to -15ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW7**

TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/14/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Plant Residue
							-4	
4-6	1.7	pH sample	0	-5		CL		SILTY CLAY: Silty clay, some fine sand, trace gravel, brownish gray, moist
							-6	Augered Interval
						SP	-9	FINE SAND: Fine sand, little medium, little gravel, brown, wet
							-9.3	
9-11	1.5		0	-10		CL	-10	SANDY CLAY: Sandy clay, little gravel, grayish brown, wet
						SM	-11	SILTY SAND: Silty sand, fine, little clay, little gravel, brown, wet
								Augered Interval
							-14	SILT: Silt, some fine sand, little gravel, brownish gray, wet
14-16	1.8		0	-15		ML		

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW 7**

TOTAL DEPTH: **16 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/14/03**

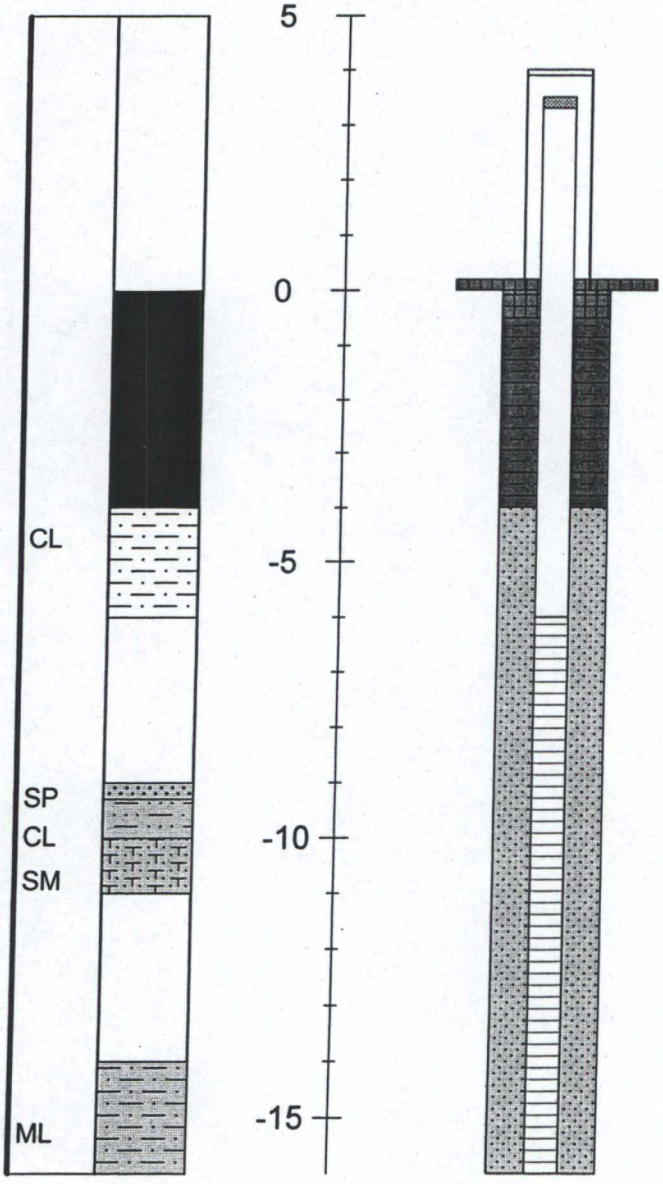
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Sand Pack

Water Level (-7.15ft.)

PVC screen (-6ft. to -16ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW8**
TOTAL DEPTH: **26 ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/14/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Plant Residue
4-6	0.7		0	-5				
9-11	1.2		0	-10				
14-16	1		0	-15				
19-21	1.1		0	-20			-21	Augered Interval
24-26	1.5	pH sample	0	-25		CL	-24	SILTY CLAY: Silty clay little gravel, little fine sand, gray, wet

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW8**

TOTAL DEPTH: **26 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/14/03**

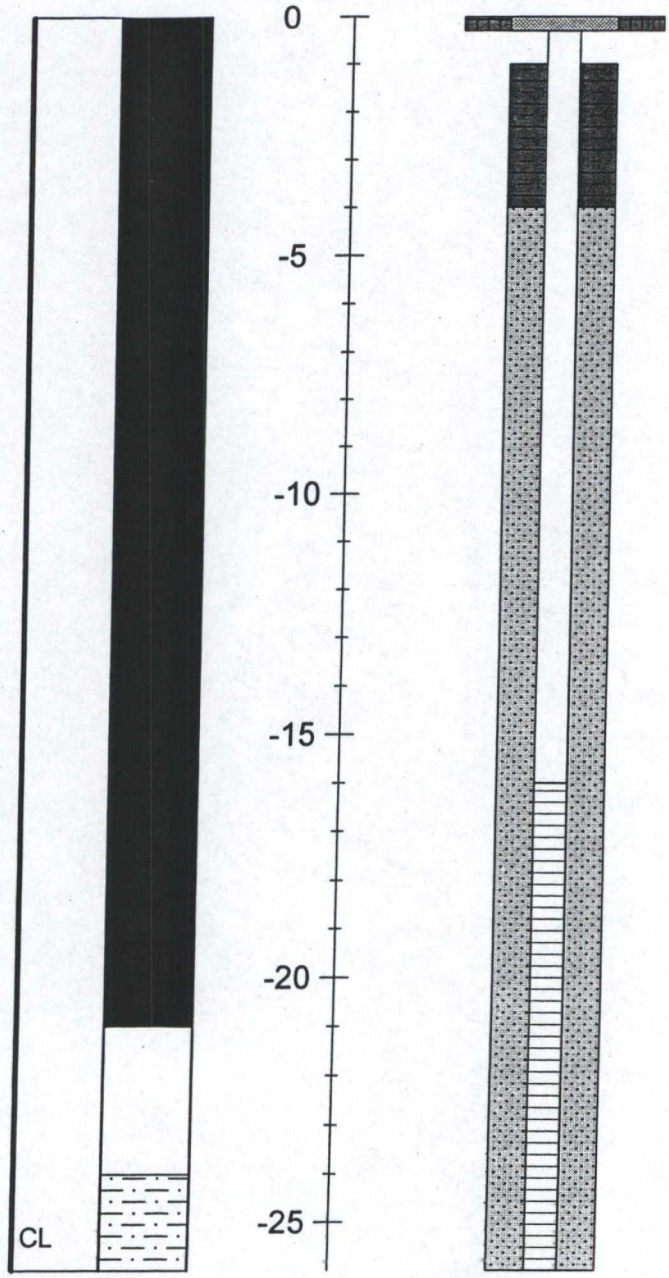
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Concrete Pad around Flushmount Cap

PVC Riser

Bentonite Seal

Sand Pack

Water Level (-19.03ft.)

PVC screen (--16ft. to -26ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW9**
TOTAL DEPTH: **21ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/14/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				RESIDUE: Plant Residue
4-6	0.2		0	-5			-6	Augered Interval
9-11	1.4	pH sample	0	-10	CL		-9	SILTY CLAY: Silty clay, little fine sand, gray, moist
							-11	Augered Interval
14-16	1.6		0	-15	ML		-14	SILT: Silt, some fine sand, little gravel, very stiff, brownish gray
							-16	Augered Interval
19-21	1.2		0	-20	ML		-19	SILT: Silt, some fine sand, little gravel, very stiff, brownish gray

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **MW 9**

TOTAL DEPTH: **21 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/14/03**

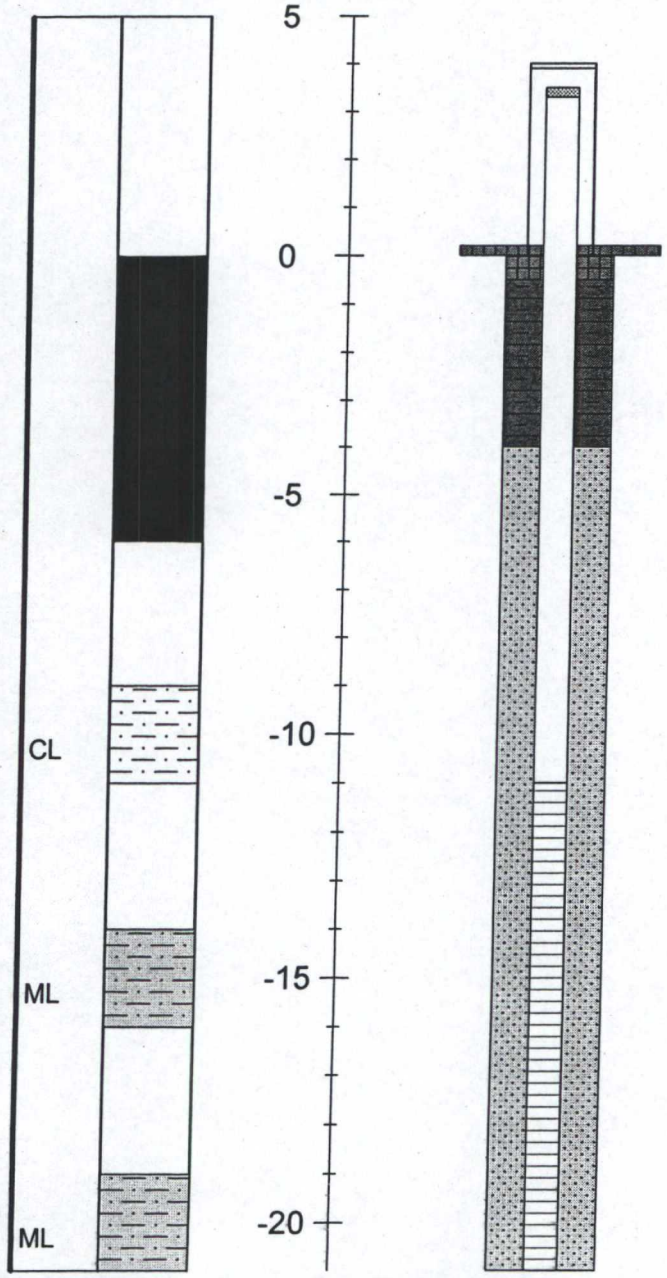
DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Protective Casing

Concrete Pad

Bentonite Seal

PVC Riser

Sand Pack

Water Level (-13.86ft.)

PVC screen (-11ft. to -21ft.)

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW10**

TOTAL DEPTH: **16ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental Services**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**D-75**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**03/15/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0			-0.4	TOPSOIL: Topsoil, silty clay, some organic debris, dark gray
0-2	1.6	pH sample	0			CL	-2	SILTY CLAY: Silty clay, little fine sand, light brown, moist
								Augered Interval
							-4	SILTY CLAY: Silty clay, some fine sand, little gravel, light brown, moist
4-6	1.7		0	-5		CL	-6	Augered Interval
							-9	CLAYEY SAND: Clayey sand, fine, little gravel, light brown, wet
9-11	1.7		0	-10		SP	-11	Augered Interval
							-14	SANDY SILT: Sandy silt, little gravel, brownish gray, wet
14-16	1.9		0	-15		SM		

ENVIRON

650 Dundee Road, Suite 150
Northbrook, Ilinois 60062

WELL CONSTRUCTION LOG

MONITORING WELL NO. **MW 10**

TOTAL DEPTH: **15 ft.**

PROJECT INFORMATION

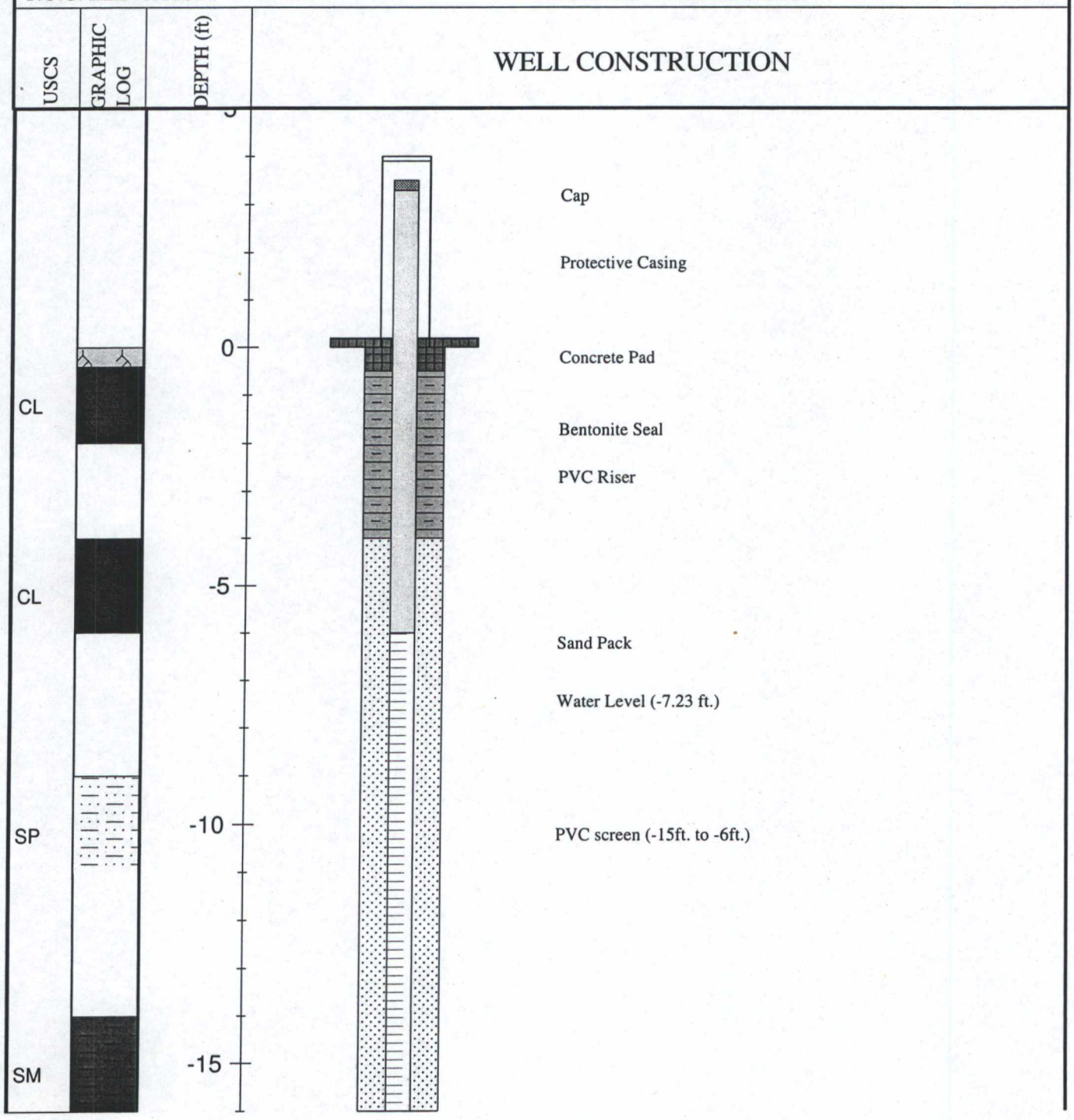
PROJECT:	**Eagle Zinc**
SITE LOCATION:	**Hillsboro, IL**
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**03/15/03**

DRILLING INFORMATION

DRILLING CO.:	**Philip Environmental**
DRILLER:	**Jerry**
RIG TYPE:	**D-75**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:



ENVIRON

650 Dundee Road, Suite 150
Northbrook, Ilinois 60062

WELL CONSTRUCTION LOG

MONITORING WELL NO. **MW-11**

TOTAL DEPTH: **12 ft.**

PROJECT INFORMATION

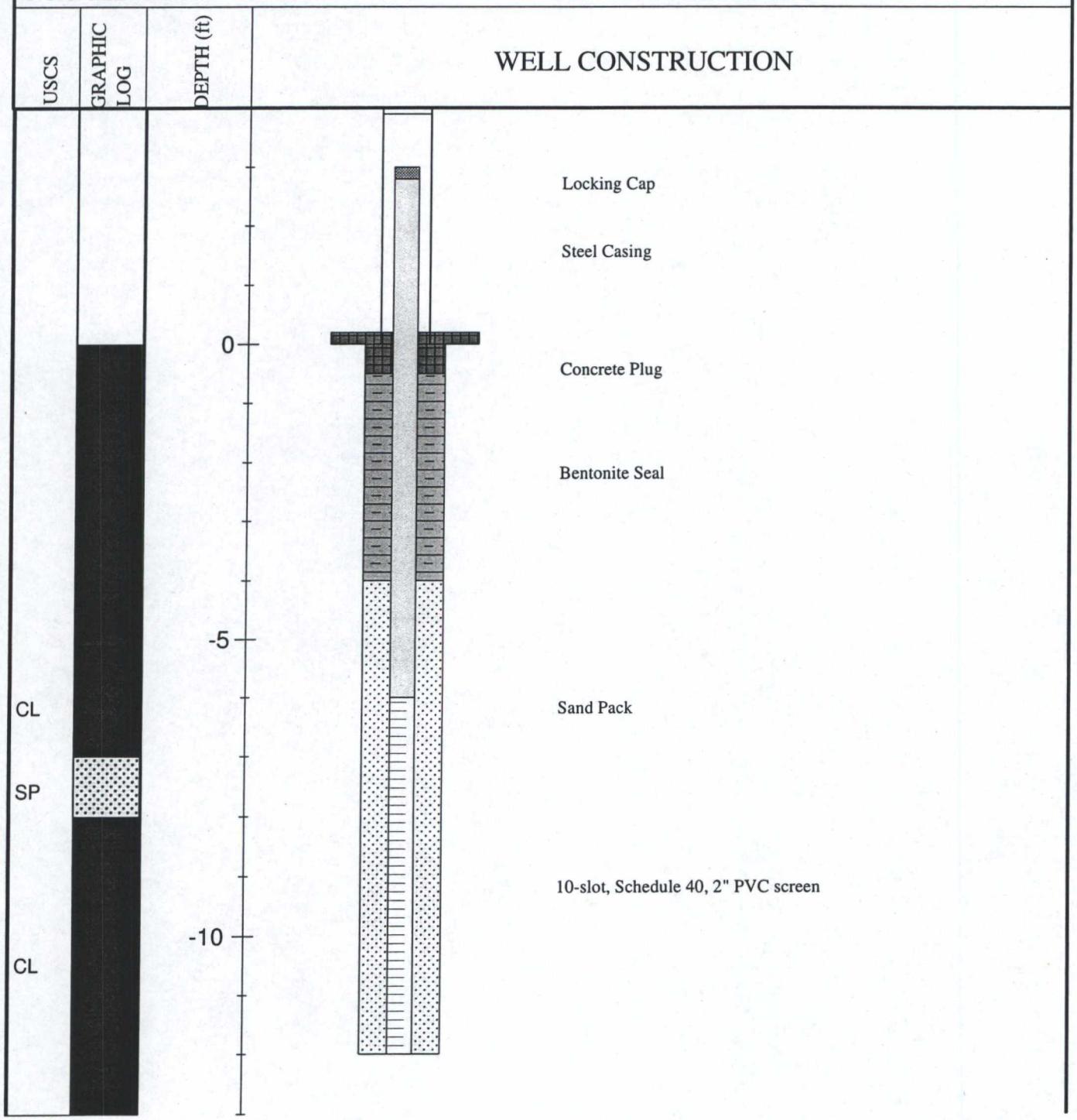
PROJECT:	**Eagle Zinc**
SITE LOCATION:	
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**6/19/03**

DRILLING INFORMATION

DRILLING CO.:	**Phillip Environmental**
DRILLER:	**Craig**
RIG TYPE:	**Auger**
METHOD OF DRILLING:	**Hollow Stem Auger**
BORE HOLE DIAMETER:	**6"**

T.O.C. ELEVATION:

SURVEY COORDINATES:



ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **MW-11**
TOTAL DEPTH: **12 ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Auger**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Hollow Stem Auger**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Split Spoon**
DATES DRILLED:	**6/19/03**	HAMMER WT./DROP	**150 lbs**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppm)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
0-5	5			0				RESIDUE: Residue.
				-5			-5	SILTY CLAY: Silty clay, little fine sand, little gravel, orange brown, moist.
			0			CL		
					▼		-7	
			0			SP		FINE SAND: Fine sand, little silt, little clay, little gravel, poorly sorted, wet.
5-10	5						-8	SILTY CLAY: Silty clay, little fine sand, little gravel, orange brown, wet.
				-10				
						CL		
10-13	3							

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **TW-5**

TOTAL DEPTH: **14 ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Direct Push**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**6/19/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION:

GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppm)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0			-0.8	TOPSOIL: Silty clay topsoil, black.
			0					SILTY CLAY: Silty clay, little gravel, little fine sand, orange brown, moist.
0-4	4		0					
			0					
			0	-5				
4-8	4		0			CL		
			0					
8-12	4			-10				
						SP	-11.8	FINE SAND: Fine sand, little subrounded gravel, wet.
							-12.2	SILTY CLAY: Silty clay, some fine sand, some subrounded gravel, wet.
12-14	2					CL		

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **TW-5**

TOTAL DEPTH: **14ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**6/19/03**

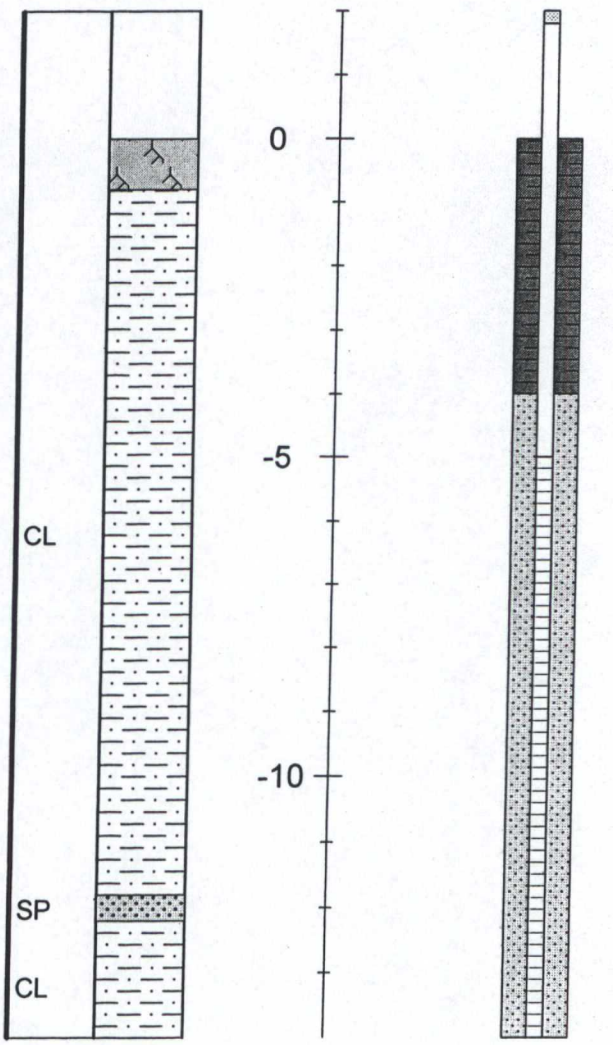
DRILLING INFORMATION

DRILLING CO.:	**Phillip Environmental**
DRILLER:	**Craig**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Direct Push**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Bentonite Seal

Sand Pack

10 slot 40 schedule 1" PVC screen

ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **TW-6**
TOTAL DEPTH: **30 ft.**

PROJECT: **Eagle Zinc**
SITE LOCATION: **Hillsboro, IL**
JOB NO.: **21-7400E**
LOGGED BY: **Dan Ryan**
DATES DRILLED: **6/19/03**

DRILLING CO.: **Philip Environmental**
RIG TYPE: **Geoprobe**
METHOD OF DRILLING: **Direct Push**
SAMPLING METHODS: **Macrosampler**
HAMMER WT./DROP **- -**

SURVEY LOCATION:

GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppm)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				FILL: Sandy fill with concrete debris.
				-5				
				-10				
				-15				
				-20		▼		
							-24	SILT: Silt, some fine to medium sand, wet.
				-25				
24-28	4					SM		

ENVIRON

650 Dundee Road, Suite 150
Northbrook, Ilinois 60062

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **TW-6**

TOTAL DEPTH: **30 ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**6/19/03**

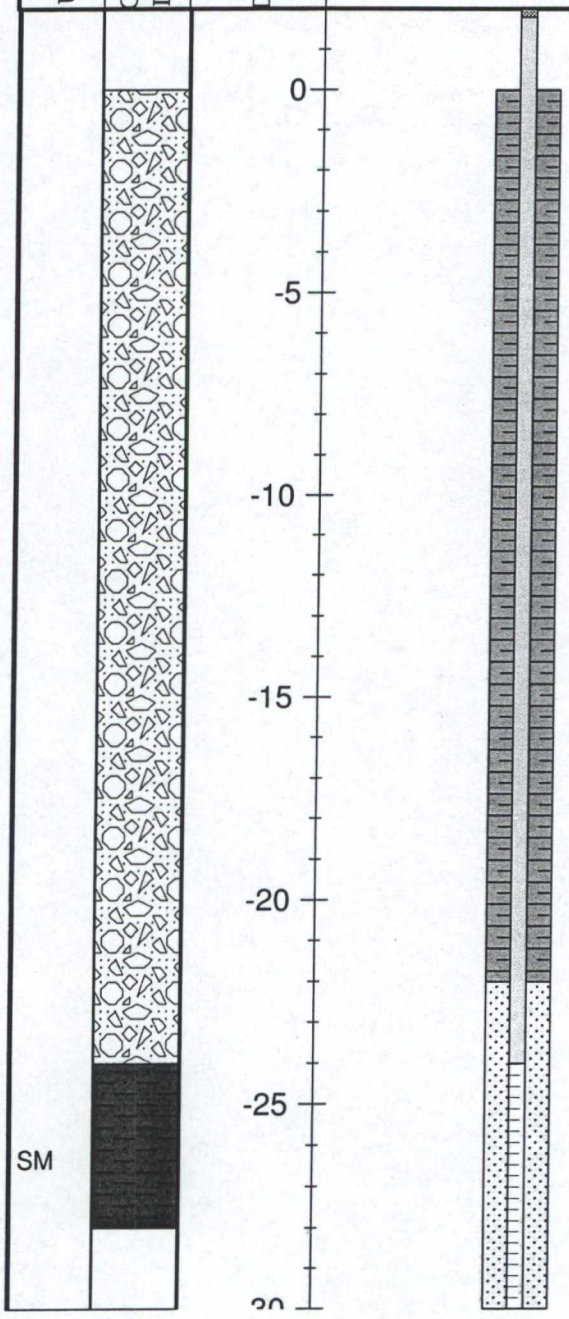
DRILLING INFORMATION

DRILLING CO.:	**Phillip Environmental**
DRILLER:	**Craig**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Direct Push**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION
		0	Cap
			Bentonite Seal
		-5	
		-10	
		-15	
		-20	
		-25	Sand Pack
SM			10 slot 40 schedule 1" PVC screen
		30	



ENVIRON

740 Waukegan Rd., Suite 401
Deerfield, Illinois 60015

GEOLOGIC DRILL LOG

BOREHOLE NO.: **TW-7**

TOTAL DEPTH: **20ft.**

PROJECT:	**Eagle Zinc**	DRILLING CO.:	**Philip Environmental**
SITE LOCATION:	**Hillsboro, IL**	RIG TYPE:	**Geoprobe**
JOB NO.:	**21-7400E**	METHOD OF DRILLING:	**Direct Push**
LOGGED BY:	**Dan Ryan**	SAMPLING METHODS:	**Macrosampler**
DATES DRILLED:	**6/19/03**	HAMMER WT./DROP	**- -**

SURVEY LOCATION: GROUND SURFACE ELEVATION:

SS INTERVAL (ft)	SS RECOVERY (ft)	SAMPLE ID	PID (ppmv)	DEPTH (ft)	GRAPHIC LOG	USCS	LAYER DEPTH (ft)	SOIL DESCRIPTION
				0				
			0			CL	-0.8	TOPSOIL: Silty clay topsoil, black.
0-4	2.5		0			SP	-1.8	SILTY CLAY: Silty clay, some fine sand, light brown, moist.
							-4	FINE SAND: Fine sand, some organic debris, dark brown to black.
				-5		CL		SILTY CLAY: Silty clay, little fine sand, little gravel, orange brown, moist.
			0			SP	-5.5	FINE SAND: Fine sand, little gravel, poorly sorted, moist.
4-8	2.5		0				-6	SILTY CLAY: Silty clay, some fine sand, brown, moist.
						CL		
8-12	4			-10				
						SP	-11.5	FINE SAND: Fine sand, little gravel, brown, moist.
						CL	-12	SILTY CLAY: Silty clay, little fine sand, moist.
						SP	-13.2	FINE SAND: Fine sand, some silt, some clay, brown, wet.
12-16	4						-13.8	CLAYEY SILT: Clayey silt, little fine sand, dark brown, wet.
				-15		ML		
						SP	-16	FINE SAND: Fine sand, little gravel, wet.
							-17	SILTY CLAY: Silty clay, little gravel, dark gray, wet.
16-20	4					CL		
				-20				

ENVIRON

740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

WELL CONSTRUCTION LOG

MONITORING WELL NO.: **TW-7**

TOTAL DEPTH: **20ft.**

PROJECT INFORMATION

PROJECT:	**Eagle Zinc**
SITE LOCATION:	
JOB NO.:	**21-7400E**
LOGGED BY:	**Dan Ryan**
DATE(S) DRILLED:	**6/19/03**

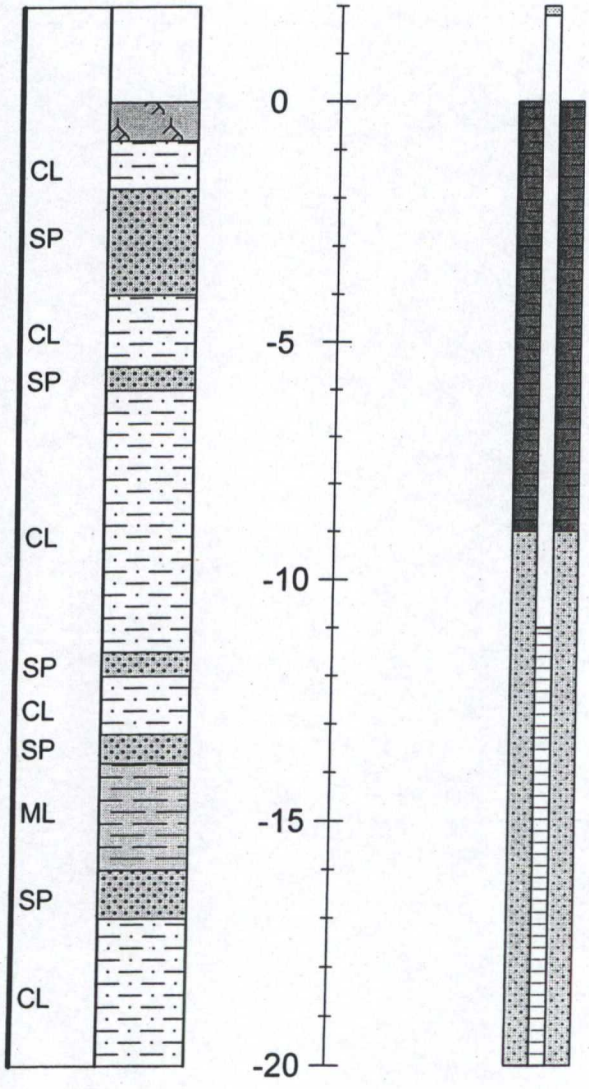
DRILLING INFORMATION

DRILLING CO.:	**Phillip Environmental**
DRILLER:	**Craig**
RIG TYPE:	**Geoprobe**
METHOD OF DRILLING:	**Direct Push**
BORE HOLE DIAMETER:	**2"**

T.O.C. ELEVATION:

SURVEY COORDINATES:

USCS	GRAPHIC LOG	DEPTH (ft)	WELL CONSTRUCTION



Cap

Bentonite Seal

Sand Pack

10 slot 40 schedule 1" PVC screen

APPENDIX B

Monitoring Well Sampling Details

Appendix B
Monitoring Well Sampling Details
Eagle Zinc Company Site, Hillsboro, Illinois

Well Number	Sampling Date	Purge Start/End	Calculated Volume to be Purged (gallons)	Volume Purged (gallons)	Purge Rate (gallons/minute)	pH (Standard Units)	Specific Conductance (umhos/cm)	Dissolved Oxygen (mg/L)	Water Temperature (degrees C)	Color
MW1	03/19/03	10:38 / 11:02	5.7	6	0.25	6.71	1.520	0.00	12.6	Clear
MW2	03/18/03	14:18 / 14:48	4.23	4.5	0.15	6.92	1.270	8.19	10.9	Clear
MW3	03/18/03	16:01 / 16:23	4.35	4.5	0.20	6.98	1.850	2.15	14.2	Clear
MW4	03/18/03	15:02 / 15:35	4.31	4.5	0.14	7.40	0.577	9.16	11.4	Clear
MW5	03/18/03	13:43 / 14:09	4.18	4.5	0.17	6.53	0.818	0.00	12.9	Clear
MW6	03/18/03	16:40 / 17:06	5.73	6	0.23	7.09	2.280	0.00	9.7	Clear
MW7	03/18/03	18:18 / 18:53	6.12	6.5	0.19	6.47	1.460	1.00	11.9	Clear
MW8	03/19/03	8:57 / 9:32	2.73	3	0.09	6.64	1.330	6.74	5.0	Clear
MW9	03/19/03	9:55 / 10:16	4.96	5	0.24	7.02	3.310	9.48	12.6	Clear
MW10	03/18/03	7:15 / 7:56	4.80	5	0.12	6.00	0.116	16.58	8.7	Clear
MW11	06/20/03	13:43 / 13:50	1.80	2	0.29	13.65	0.992	16.27	18.5	Clear
G101	03/18/03	9:39 / 9:55	3.00	3	0.19	7.33	0.732	13.70	11.2	Clear
G102	03/18/03	10:24 / 11:00	6.66	7	0.19	7.05	1.19	7.70	10.0	Clear
G103	03/19/03	7:27 / 7:49	5.62	6	0.27	6.72	1.600	0.00	9.1	Clear
G104	03/18/03	11:22 / 11:46	4.23	4.5	0.19	6.88	1.75	0.08	13.1	Clear
G105	03/18/03	12:12 / 12:47	6.84	7	0.20	6.97	1.04	5.05	11.0	Clear
G106	03/19/03	8:08 / 8:38	6.39	6.5	0.22	6.79	1.380	4.22	11.5	Clear
G107	03/19/03	11:48 / 12:08	6.57	3 (dry)	0.15	6.61	1.330	0.47	9.5	Clear
G109	03/18/03	8:37 / 9:10	5.62	6	0.18	7.12	0.353	4.59	10.7	Clear
TW5	06/20/03	NR / 14:25	1.00	0.5 (dry)	--	NM	NM	NM	NM	NR
TW6	06/20/03	14:34 / 14:36	1.00	0.5	0.25	3.75	0.756	19.80	14.4	Clear
TW7	06/20/03	NR / 15:15	0.72	0.5 (dry)	--	NM	NM	NM	NM	NR

umhos/cm = micromohs per centimeter
mg/L = milligrams per liter
C = Centigrade
NR - Not Recorded
NM - Not Measured

ENVIRON

November 12, 2003

Mr. Dion Novak
Superfund Division
United States Environmental Protection Agency
77 West Jackson Boulevard
Mail Code: SR-6J
Chicago, Illinois 60604

Re: Eagle Zinc Company Site
Hillsboro, Illinois

Dear Mr. Novak:

This letter provides responses to additional comments on the draft Phase 2 Technical Memorandum for the Eagle Zinc Site contained in your letter to Roy Ball dated November 4, 2003. As we discussed during our telephone conversation on November 10, 2003, these responses will provide the basis for a conference call for the purpose of discussing the remaining Phase 2 issues. Following the resolution of the remaining issues during our call, final edits will be made to the Phase 2 Technical Memorandum and the document will be submitted in final form for approval.

The Agency's comments are repeated below in italics, followed by a response prepared by ENVIRON on behalf of the Eagle Zinc Site Parties.

Response to EPA comment 3. *The statement that well MW8 is in a better position to monitor downgradient impacts from the SW pond is subjective and should be removed.*

This statement will be removed as requested. Additional discussion concerning MW8 is provided below.

Response to EPA comment 6. *Well purge forms or a well purge summary table should be included with this document,. Some wells were reported to have low yields (G-107, TW5, TW7) and this will demonstrate that they were purged properly.*

Information on well purging conducted prior to ground water sampling is included in Appendix B. The drilling contractor, Philip Environmental Services, developed all monitoring wells in accordance with the methodology discussed in the Phase 2 Technical Memorandum, although development information was not recorded. Purging conducted for development and sampling were combined for the temporary wells. Additional well purging notes will be added to Appendix B for these wells.

Response to EPA comment 8. *Footnote 3 edits were not made in the revised text.*

Edits will be made as requested.

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Response to EPA comment 9. *The reference for the TAL metals statement was not in the May 30 letter, it was in a June 19 email.*

It is unclear what is meant by this statement, as ENVIRON's response to EPA comment 9 does not mention ENVIRON's May 30, 2003 letter to USEPA.

EPA is not entirely convinced that MW-8 is downgradient of SW-WD-9 and SW-WD-PN all of the time as Environ represents in this response. The source of these detections remains unknown. Collection of groundwater for VOC analysis from the MW-11 location would provide valuable information upgradient of these sediment locations and perhaps help identify a reason for these detections in the on-site drainage way. In the absence of this information, EPA will have to choose a remedy that will include and potentially address this uncertainty. The source of the VOC detections in the sediment should also be investigated in the upgradient direction for the same reasons. Simply stating that these results are not reproduced in a downgradient direction that is not clearly downgradient all the time does not answer the question and does not address potential future migration or potential future risks associated with such contamination.

Concerning the statement that MW8 may not be located downgradient of SW-WD-9 and SW-WD-PN, the natural topography of the southwest portion of the site and the shallow ground water flow pattern determined from the monitoring wells and piezometers in this area clearly indicate that this well is located downgradient of the noted surface water sample locations. Please provide any evidence to the contrary.

Concerning the issue of installing a monitoring well at the originally proposed location for MW11 and sampling this well for TCL organics, PCBs and TAL inorganics, the following should be noted:

The location originally planned for MW11 was intended to monitor ground water downgradient (southwest) of a location where a soil sample contained cadmium above a soil screening level. The Phase 1 Technical Memorandum inadvertently proposed a location for this well that was within the Western Drainageway, a location found to be inaccessible using a drilling rig. The surface drainage occurs in a wide lowland, which exhibited saturated conditions (i.e., standing water) in March and June 2003. As noted in ENVIRON's September 26, 2003 letter, even if a well could be installed in this area, it would in effect be a surface water monitoring point. Surface water, ground water and sediment samples collected downstream/downgradient (southwest) of the isolated samples that contained VOCs indicate that the extent of these minor detections are limited and do not extend off-site. Figure 1 shows soil, sediment, surface water and ground water sampling points in the southwest part of the site, highlighting those samples that were analyzed for TCL Organics (including TCL VOCs) in addition to metals. It is noted that the VOCs detected in SW-WD-9 were not detected in ground water samples collected from upgradient wells G-109 (1999 sampling by Goodwin-Broms, Inc.) and MW-4, or downgradient wells G-108 (1999 sampling by Goodwin-Broms, Inc.) and MW-8. As the VOC detections are limited to the Western Drainageway itself, this as a minor sediment/surface water issue. These data will be appropriately analyzed in the Risk Assessment.

Response to EPA comment 12. *Outfall 001 is mislabeled as 002 on Figures II-1, IV-1, IV-2 and IV-3.*

Correction will be made.

***Response to EPA comment 15**. It is recommended that the text from footnote 9 on page 13 be also moved into the discussion presented in Section III.C.*

Edit will be made as requested.

***Response to EPA comment 20.** As was discussed and agreed to at our review meeting, the southern PAOC boundary should be extended off-site to the south and be drawn east-west between TW-5 and G-107. Groundwater samples from GW-107 and MW-7 show exceedances for cadmium, zinc and manganese. The statement that southerly flow is precluded by site conditions may not be correct and arbitrarily drawing the line along the southern property boundary is not supported by available data. Please make the change as agreed in our meeting.*

The southern boundary for the ground water AOC will be extended southward off-site to a point that is half the distance from G107 to TW5.

***Response to EPA comment 29**. The comment about national ambient water quality criteria being used as screening tools still remains factual. The comment was that any exceedances of these criteria be called PCOCs to be brought forward and analyzed in the risk assessment. Environ's response that this evaluation not be used to support such a screening appears premature and may rule out a COPC from risk analysis.*

We do not dispute that these criteria will be considered and analyzed in the risk assessment.

Please do not hesitate to call me if you have any questions concerning this letter or any other project matter.

Sincerely,

ENVIRON International Corporation

F. Ross Jones

F. Ross Jones, P.G.
Manager

FRJ:alb
Client Project Files\Eagle Zinc – Hillsboro_21-7400E\Tech memo 2\Word\Phase2 Novak_ltr_111203.doc

cc: T. Krueger, EPA ORC
R. Lanham, IEPA
C. English, CH2M Hill
J. Ix, Dechert
D. Ucci, Quantum Management Group, Inc.
P. Harper, Eagle Picher
G. Kuntz, The Sherwin Williams Company
R. Ball, ENVIRON

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

November 4, 2003

Roy Ball
Environ Corporation
740 Waukegan Road
Suite 401
Deerfield, IL 60015

Dear Roy:

I have received and reviewed the Revised Draft Phase 2 Technical Memorandum, prepared by Environ for the Eagle Zinc site in Hillsboro, Illinois. This document is approved with the following corrections:

Response to EPA comment 3. The statement that well MW8 is in a better position to monitor downgradient impacts from the SW pond is subjective and should be removed.

Response to EPA comment 6. Well purge forms or a well purge summary table should be included with this document,. Some wells were reported to have low yields (G-107, TW5, TW7) and this will demonstrate that they were purged properly.

Response to EPA comment 8. Footnote 3 edits were not made in the revised text.

Response to EPA comment 9. The reference for the TAL metals statement was not in the May 30 letter, it was in a June 19 email.

EPA is not entirely convinced that MW-8 is downgradient of SW-WD-9 and SW-WD-PN all of the time as Environ represents in this response. The source of these detections remains unknown. Collection of groundwater for VOC analysis from the MW-11 location would provide valuable information upgradient of these sediment locations and perhaps help identify a reason

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for these detections in the on-site drainage way. In the absence of this information, EPA will have to choose a remedy that will include and potentially address this uncertainty. The source of the VOC detections in the sediment should also be investigated in the upgradient direction for the same reasons. Simply stating that these results are not reproduced in a downgradient direction that is not clearly downgradient all the time does not answer the question and does not address potential future migration or potential future risks associated with such contamination.

Response to EPA comment 12. Outfall 001 is mislabeled as 002 on Figures II-1, IV-1, IV-2 and IV-3.

Response to EPA comment 15. It is recommended that the text from footnote 9 on page 13 be also moved into the discussion presented in Section III.C.

Response to EPA comment 20. As was discussed and agreed to at our review meeting, the southern PAOC boundary should be extended off-site to the south and be drawn east-west between TW-5 and G-107. Groundwater samples from GW-107 and MW-7 show exceedances for cadmium, zinc and manganese. The statement that southerly flow is precluded by site conditions may not be correct and arbitrarily drawing the line along the southern property boundary is not supported by available data. Please make the change as agreed in our meeting.

Response to EPA comment 29. The comment about national ambient water quality criteria being used as screening tools still remains factual. The comment was that any exceedances of these criteria be called PCOCs to be brought forward and analyzed in the risk assessment. Environ's response that this evaluation not be used to support such a screening appears premature and may rule out a COPC from risk analysis.

The revisions necessitated by these comments are due within 14 days of receipt of this letter, or November 18, 2003. If you have any questions, please contact me.

Sincerely yours,

Dion Novak

Dion Novak
Remedial Project Manager

cc: R. Lanham, IEPA
T. Krueger, EPA ORC
C. English, CH2M Hill

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REPLY TO THE ATTENTION OF:

September 8, 2003

Roy Ball
Environ Corporation
740 Waukegan Road
Suite 401
Deerfield, IL 60015

Dear Roy:

I have received and reviewed the Environ document entitled "Technical Memorandum-Remedial Investigation Phase 2: Migration Pathway Assessment, prepared for the Eagle Zinc Company site. EPA review has generated the following comments which were communicated in our review meeting on August 28, 2003. Some of the comments that were discussed at that meeting were communicated verbally and will not be listed here but should be included in the revised document. Please revise the document and resubmit in accordance with the RI/FS schedule.

1. Page 1 Section A, par 1. Please refer to 5/30 as the date of the Environ letter, referenced in the 3rd to last line.

2. Page 4 Piezometer Installation. Please list the piezometers that were moved from their original locations and a schematic to demonstrate distances.

3. Page 6 1st bullet. Well G108 should be replaced. As was discussed at our meeting, you had proposed to locate a well more downgradient of the pond to replace this one-please indicate when this work will be completed.

4. Page 6 2nd bullet. Please indicate how far from the original location this well was installed.

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5. Page 6 1st full par. Please delete the sentence beginning with "USEPA's on-site..."

6. Page 7 1st complete par. Were water quality parameters measured during well purging?

7. Page 7 par 2. Were the temporary wells developed before sampling and were water quality parameters measured during well development?

8. Page 8 Section 5 1st sentence. Please insert "with the exception of sulfate from MW-11" after temporary monitoring wells in this sentence.

9. Page 8 Section 5 2nd sentence. Groundwater from MW-11 should have been sampled for TCL organics, PCBs and TAL inorganics as requested in EPA's 6/19/03 email to Environ.

A well should be placed in the originally proposed location, when surface conditions permit. The results from this well will be used to further investigate the chlorinated VOCs previously detected in sediment and surface water samples from this area.

Review of the Phase 2 RI analytical results indicates that cis-1,2-DCE and TCE were detected at low concentrations in surface water samples collected from the drainage area just upstream of the pond. Surface water sample SW-WD-9 had detectable concentrations of cis-1,2-DCE (2 ppb) and TCE (6.3 ppb). The northern pond sample SW-WD-PN had detectable concentrations of cis-1,2-DCE (2.2 ppb) and TCE (1.4 ppb). Sediment sample SD-WD-9 had detectable concentrations of vinyl chloride (13 ppb) during Phase 1. This indicates that there may be chlorinated solvents in soil and/or groundwater that may be contributing to the concentrations detected in surface water/sediment in the drainage area and pond. Based on the groundwater contour map presented as Figures IV-1 and IV-2, it appears that the shallow groundwater in the area is hydraulically connected to the pond, and, at times, the western drainageway, which is a tributary to Middle Fork Shoal Creek. Soil and groundwater samples should be collected from the proposed well location mentioned above to properly characterize potential VOCs near the drainage swale in this area.

10. Page 9 2nd full par. Please identify the monitoring wells that were pumped dry, referenced in the second to last sentence.

11. Page 9 Footnote 3. The field duplicate sample for the PCB fraction of TCL organics was also not analyzed. Field parameters measured during purging should be included in the text, perhaps as an appendix for proper reference.

12. Page 9 Section C par 1. Outfalls 1 and 2 should be included on all figures and identified with the correct terminology (001, 002?). IEPA's permit should also be referenced here.

13. Page 10 Section C, 2nd full par, 2nd sentence. The number of surface water sample locations listed as being analyzed for TCL organics and PCBs do not correlate with the number of sample locations listed in Tables IV-2B, IV-2C, and IV-2D.

14. Page 11 Section E, 2nd sentence. Soil pH samples were not collected at a depth of one foot below the depth at which undisturbed native soil was encountered in borings for MW-6, MW-8 and MW-9.

15. Page 12 par 1. Please provide any updated information to the physical characteristics discovered during Phase 2 sampling.

16. Page 13 Section F. Please provide the updated 2000 census data here.

17. Page 15 Section A.1. Discussion should be added addressing the radial groundwater flow from the groundwater divide. Also, discussion of flow to the north from the groundwater divide should also be added.

18. Page 15 Section 2. Please provide applicable updates to TACO standards.

19. Page 17 Section 3. Please rename section to Discussion, instead of Conclusions. Please delete the first and third bullets. As will be discussed in our October risk assessment call, it is recommended that dissolved metals results be used for identifying PCOCs and PAOCs. Thallium should be added as a groundwater PCOC.

20. Page 18 par 1. Please revise this sentence to read "As shown on Figure IV-3, an area including the SW portion of the Site and off-Site areas west of the western site boundary (wooded area on an industrial property) and south of the SW Site boundary are designated as a PAOC for groundwater.

21. Page 18 Section B.1a. The Secondary Contact and Indigenous Aquatic Life standard for cadmium should be checked again (either 0.15 ppm or 0.05 ppm(as listed). There is a discrepancy between the total cadmium result listed for SW-WD-10 in Table IV-2A (o.oo58 ppm) and the result on Figure IV-4 (0.058 ppm). If the figure is correct, then SW-WD-10 should be added as a location above the screening criteria.

22. Page 19 B.1b and 1c. It would be helpful for the results for sulfate and VOC detections (even though they are below screening criteria) be discussed here.

23. Page 19 Section C par 1. Please insert "the RCRA hazardous waste threshold value of" after in excess of in the 1st sentence.

24. Page 19 Section C par 2. Is this statement in addition to those piles identified in Phase 1 as TCLP exceedances?

25. Page 21 Section V, PCOC Table. Thallium should be added as a PCOC based on detections in MW-7.

26. Page 22 Potential Exposure Routes. Employee should be added to the on-site groundwater column. Construction worker, employee, trespasser, future resident should be added to the surface water column. Residue leaching to groundwater should be added to the residues column.

27. Table IV-1C. Recommend revising the listed standards using the latest version of TACO as there appear to be some discrepancies in the table.

28. Table IV-1D. Illinois GPA Class 1 and 2 groundwater standards appear to be listed incorrectly here-please see comment 27.

29. Table IV-2AC. Recommend using USEPA National Ambient Water Quality Criteria standards as screening criteria for analytes that do not have Illinois water quality standards.

30. Appendices. It is recommended that references be summarized in an attached appendix.

As discussed at our August 28 meeting, a conference call has been scheduled for October 2 with a communication due to EPA on September 26, in which draft risk assessment information, preliminary remediation goals and exposure scenarios will be presented by Environ for discussion.

If you have any questions, please contact me.

Sincerely yours,

Dion Novak

Dion Novak
Remedial Project Manager

cc: T. Biggs, CH2M Hill
R. Lanham, IEPA
T. Krueger, EPA

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REPLY TO THE ATTENTION OF:

June 9, 2003

Ross Jones
Environ Corporation
740 Waukegan Road
Suite 401
Deerfield, IL 60015

Dear Ross:

I have received and reviewed your letters dated May 30 and June 4, 2003, in which you propose additional data collection at Eagle Zinc and propose an extension of time for submitting the Phase 2 TM. You propose that the additional data be included in a comprehensive Phase 2 TM, rather than as an additional phase of data collection. This would streamline the submission and review of the TM and provide all of the data to be utilized in preparing the baseline risk assessment.

EPA concurs with your proposed approach and agrees that submittal of one TM with all Phase 2 data collected is most efficient. In your May 30 letter, you indicate that groundwater samples will be collected from three additional locations using a geoprobe and three additional surface water samples will be collected from drainageways to the west of the southwest corner of the site.

A permanent well that was to be installed during Phase 1 fieldwork but wasn't due to wet conditions, should be installed as part of this additional fieldwork. This well was in the SW corner of the site, near where soil sample WA-9 was collected. This location is outlined in the RI/FS workplan.

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You also propose a schedule for completion of this additional work. The proposed schedule includes 2 weeks for mobilization, 1 week for the sampling, 3 weeks for sample analysis, 2 weeks for data validation and 3 weeks for the preparation of a comprehensive Phase 2 TM. This is summarized in a request for a three month extension, from the time that EPA approval is granted. EPA is granting a two month extension to the schedule from the date that the Phase 2 TM was originally scheduled to be submitted to the Agencies (June 10), making the document due on August 10, 2003. EPA feels that the majority of the document has been prepared in advance of identifying the need for additional data collection and that the additional data can be incorporated into this document within this two month extension.

I plan to have CH2M Hill perform oversight of this additional fieldwork-please provide a detailed schedule as soon as it is available, both to myself and the rest of my team.

If you have any questions, please contact me.

Sincerely yours,

Dion Novak

Dion Novak
Remedial Project Manager

cc: T. Krueger, ORC
T. Biggs, CH2M Hill
R. Lanham, IEPA

ENVIRON

February 3, 2003

*****Via Facsimile*****

Mr. Dion Novak
Superfund Division
United State Environmental Protection Agency
77 West Jackson Boulevard
Mail Code: SR-6J
Chicago, Illinois 60604

Re: Remedial Investigation/Feasibility Study
Eagle Zinc Company Site, Hillsboro, Illinois

Dear Mr. Novak:

As we discussed during our telephone conversation on February 3, 2003, ENVIRON and the Eagle Zinc Site Parties propose the initiation of the Phase 2 field activities at the site on or about March 1, 2003, or at such a time when non-freezing conditions allow for the collection of surface water samples from the drainageways that originate on the site. Implementation of the Phase 2 field activities during non-freezing conditions will also facilitate the collection and compositing of the supplementary residue samples, soil samples for pH analysis, ground water sampling, and equipment decontamination procedures.

Upon USEPA's acceptance of this schedule modification, the project schedule submitted with the monthly progress reports will be revised accordingly. If frozen conditions in the drainageways persist in early March 2003, we will propose an alternative start date for this phase of the RI.

Please call me if you have any questions concerning this or any other project matter.

Sincerely,

ENVIRON International Corporation

F. Ross Jones

F. Ross Jones, P.G.
Manager

FRJ:als

cc: Thomas Krueger, Esq. – USEPA Region 5
Rick Lanham – IEPA Bureau of Land
Tim Biggs – CH2M Hill
Joseph Freudenberg, Esq. – Dechert
Paul Harper – Eagle-Picher
Doug Ucci – QMG; representing Eagle-Picher
Gordon Kuntz – Sherwin-Williams
Roy Ball – ENVIRON

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