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Site Remediation Program Application for the South Ditch, Lower South Ditch, and New SWMU

prepared by

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July 18, 1997

Table of Contents

Introduction
Purpose 1
Scope 1

I. Applicability of the Site Remediation Program to the Ditch Remediation and Closure 2
Point #1 3
Point #2 4
Point #3 4
Summary 4

II. Site Remediation Program Application
Remedial Applicant 5
Remedial Site Owner 5
Authorized Agent 5
Contact Person(s) 5
Other Affected Properties 5
Remediation Sites 5
No Further Remediation Determination Request 5
Site Maps 6
Agency Support Services 6
Project Schedule 6
Current and Post Remediation Uses 6
Current Applicable Agency Permits held by Remedial Applicant 6
Remedial Applicant FEIN or SSN 6
Remedial Applicant Certification of Accuracy and Completeness 6

III. Review and Evaluation Services Agreement 7

IV. Focused Site Investigation
Mid Mill Ditch, North Dredge Pile, South Dredge Pile, and Surface Drainage Ditch 8
South Ditch 8
Lower South Ditch 8
Treated Retention Reservoir Material 9
New SWMU 9
Groundwater 9
Retention Reservoir and North Ditch Clean Closure Sampling 9
Summary 10
Table 5-3: Phase 1, Interim Status Closure Plan, Nov. 26, 1998
Table 5-4: Phase 1, Interim Status Closure Plan, Nov. 26, 1998
Table 5-10: Phase 1, Interim Status Closure Plan, Nov. 26, 1998
Table 5-2: Revised Phase 2 Closure Plan, June 15, 1992

Table 5-7: Revised Phase 2 Closure Plan, June 15, 1992
Table 5-16: Revised Phase 2 Closure Plan, June 15, 1992
Table 2: Closure Document Report, Retention Reservoir, July 24, 1994
Table 6: Closure Document Report, Retention Reservoir, July 24, 1994
Table 1: TCSA (Temporary Container Storage Area)..., May 24, 1994
Figure 1: TCSA (Temporary Container Storage Area)..., May 24, 1994
Figure 2: TCSA (Temporary Container Storage Area)..., May 24, 1994
Figure 3: TCSA (Temporary Container Storage Area)..., May 24, 1994
Figure 4: TCSA (Temporary Container Storage Area)..., May 24, 1994
Table 6-4: Revised Phase 2 Closure Plan, June 15, 1992
Table 5-1: Revised Phase 2 Closure Plan, June 15, 1992
Table 6: Closure Document Report, North Ditch Remediation, Nov. 5, 1996

V. Determination of Remediation Objectives

Determination of Remediation Objectives for Tier 1 Evaluation (35 IAC 742, Subpart E) 11
Inhalation Exposure Route (35 IAC 742.505 (a)(1)(B)) 11
Soil Ingestion Exposure Route (35 IAC 742.505 (a)(2)(B)) 11
Migration to Groundwater Portion of Groundwater Ingestion Exposure Route (35 IAC 742.505 (a)(3)(A and B)) 11
Dermal Contact with Soil Exposure Route (35 IAC 742.505 (a)(4)) 11
Groundwater Remediation Objectives (35 IAC 742.505 (b)) 11
Determination of Remediation Objectives for Tier 2 Evaluation (35 IAC 742, Subpart F) 11
Determination of Remediation Objectives for Tier 3 Evaluation (35 IAC 742, Subpart I) 11
Summary of Remedial Objectives 12
Tier 1 Remedial Objectives 12
Tier 2 Remedial Objectives for Soil 12
Tier 3 Soil Remediation Objective 12

VI. Remediation Objectives Report

Inhalation Exposure Route (35 IAC 742.505 (a)(1)(B)) 14
Soil Ingestion Exposure Route (35 IAC 742.505 (a)(2)(B)) and Migration to Groundwater Portion of the Groundwater Ingestion Route (35 IAC 742.505 (a)(3)(A and B)) 14
Dermal Contact with Soil Exposure Route (35 IAC 742.505 (a)(4)) 14
Groundwater Remediation Objectives (35 IAC 742.505 (b)) 14
Summary 14

VII. Remedial Action Plan

South Ditch Remedial Action Plan 16

VIII. Remedial Action Completion Report 17

References 18

Appendix

Consent Order
Consent Decree
Site Maps
Keystone Steel & Wire Aerial Photograph, December 1995
1994 Updated Plat Survey
"Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996
"Outline for Tasks for Water Management to achieve South Ditch Closure" and the Proposed Schedule Spreadsheet
Drawing: Outline for Tasks for Water Management to Acheive South Ditch Closure

Introduction

Purpose

The purpose of this Site Remediation Program Application is to request an amendment to the Modification Request to the Revised Phase 2 Closure Plan (May 5, 1995) to include the new regulations under 35 IAC 740 (Site Remediation Program) and 35 IAC 742 (Tiered Approach to Corrective Action Objectives) and to have the new amendments to the Closure Plan be incorporated into the Consent Order (7-2-93). Keystone requests that IEPA approve this amendment to the Revised Phase 2 Closure Plan and issue "No Further Remediation" determination letters for the South Ditch, Lower South Ditch, and New SWMU upon completion of the proposed Remedial Action Plan under 35 IAC 740 and 35 IAC 742, subject to an appropriate amendment to the Consent Order, (People of the State of Illinois vs. Keystone Consolidated Industries, Inc., In the Circuit Court of the Tenth Judicial Circuit, Peoria County, Illinois, Chancery Division, No. 93 CH 000103, filed July 2, 1993)

Scope

The scope of this Site Remediation Program Application is to provide to the Agency the required information and documentation necessary to obtain No Further Remediation Determination Letters for the South Ditch, Lower South Ditch, and New SWMU upon completion of this proposed Remedial Action Plan under 35 IAC 740.430. This application is an amendment to the Revised Phase 2 Closure Plan (May 5, 1995) and covers the South Ditch, Lower South Ditch, and New SWMU remedial sites only and does not apply to any other properties owned by Keystone Steel & Wire Company.

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I. Applicability of the Site Remediation Program to the Ditch Remediation and Closure

Three sections of Title 35 Illinois Administrative Code have been revised to comply with the Environmental Protection Act Section 58.11(c) that directs the Agency to submit to the board proposed regulations prescribing procedures and standards for the administration of the Agency's duties under the Site Remediation Program in Title XVII of the Environmental Protection Act. These Sections, Part 732 (Petroleum Leaking Underground Storage Tanks), Part 740 (Site Remediation Program), and Part 742 (Tiered Approach to Corrective Action Objectives), will set forth the criteria for all site remediation projects in Illinois with the exception of CERCLA sites. (Statement of Reasons, Site Remediation Program 35 IAC 740).

The Statement of Reasons, Site Remediation Program 35 IAC 740 identifies 5 objectives for the Site Remediation Program:

1. To establish a risk-based system of remediation based on protection of human health and the environment relative to the present and future uses of the land;

2. To assure that the land use for which remedial action was undertaken will not be modified without consideration of the adequacy of such remedial action for the new land use;

3. To provide incentives for the private sector to undertake remedial action;

4. To establish expeditious alternatives for the review of site investigation and remedial activities, including a privatized review process;

5. To assure that the resources of the Hazardous Waste Fund are used in a manner that is protective of human health and the environment relative to present and future uses of the site and surrounding area.

These five objectives form the basis for which the proposed rules are structured.

The Statement of Reasons, Site Remediation Program 35 IAC 740 identifies the applicability of the proposed rules:

> "It is available on an elective basis for any person performing site investigation or Remediation under the Act unless the site is subject to a federally delegated program, federal court order, or United States Environmental Protection Agency ("U.S.EPA") administrative order. Id. § 58.1(a)(2). Even then, the procedures may be followed if no conflict with the federally delegated program, federal court order, or U.S.EPA administrative order is created. Id. Participants may enter the Program on a voluntary basis or through the enforcement process."

This applicability statement is reflected in the regulations in Part 740.105(a)-(e).

Section 740.105

(a) The procedures set forth in this Part may be used by any person required under the Act or electing to perform investigative or remedial activities at a site where there is a release, threatened release, or suspected release of hazardous substances, pesticides, or petroleum unless

1) The site is on the National Priorities List (Appendix B of 40 CFR 300);

2) The investigative and remedial activities for which Agency review, evaluation and approval are sought are required under a state or federal solid or hazardous waste permit or are closure requirements for a solid or hazardous waste treatment, storage or disposal site under applicable state or federal laws and implementing regulations;

3) The investigative and remedial activities for which the Agency review, evaluation and approval are requested are required under state or federal underground storage tank laws and implementing regulations; or

4) The investigative and remedial activities for which the Agency review, evaluation and approval are requested are required by a federal court order or an order issued by the United States Environmental Protection Agency and compliance with this Part would be contrary to the terms of that order.

(b) Any person whose site is excluded under subsections (a)(1)-(a)(4) above may utilize the provisions of this Part to the extent allowed by federal law, federal authorization, or by other federal approval.

(c) Any person whose site is otherwise eligible under Title XVII of the Environmental Protection Act ("ACT") (415 ILCS 5) and this Part and who had begun but not completed investigative or remedial activities as of the effective date of the Part may elect to use the procedures provided in this part. In determining compliance with Title XVII of the Act and this Part for activities at such sites, the Agency may accept any documents that are comparable to those required to be submitted under this Part.

(d) Except for sites excluded under subsection (a) above, investigative or remedial activities at agrichemical facilities may be performed under this Part.

(e) All applicable requirements of this Part, including those for plans and reports, shall be satisfied prior to the issuance of a No further Remediation Letter.

It follows that if there is no specific language in the Consent Decree (United States of America vs. Keystone Consolidated Industries,Inc., In the United States District Court for the Central District of Illinois, Civil Action No. 836-1212, Judge Mihm) or the Consent Order for the Ditch Remediation that conflicts with implementing the Site Remediation Program guidelines to achieve closure, then Keystone should be able to use the Tiered Approach to Cleanup Objectives (TACO) for the remainder of the Ditch Remediation.

Point #1

In the Consent Decree (6-29-88) General Provisions, Item 22 states the following:

> "This consent decree does not eliminate or affect Keystone's responsibility to comply with RCRA and any other federal and state environmental laws, including any responsibility Keystone may have under corrective action authority established by Sections 3004(u), 3004(v), and 3008(h) of RCRA, 42 U.S.C. § 6924(u), 6924(v), and 6924(h)."

This provides the intention that the Consent Decree will not interfere with the applicability of other environmental regulations.

Point #2
In the Consent Order (7-2-93) Section II. Background, Item 6 states:

> "On June 29, 1988, the USEPA and Keystone entered into a consent decree in the United States District Court for the Central District of Illinois. (see exhibit D attached). The consent decree requires Keystone to close its Units (with the exception of the Lower South Ditch) as required under RCRA, 42 U.S.C. 6901, et seq., and with an Agency approved closure plan."

This statement establishes the intention that the Units be closed under an Agency approved closure plan. The Consent Order itself does not specifically address how closure is to be accomplished. The Consent Order does incorporate the Closure Plan that was approved by the Agency (Section VI. Performance of Work, Item 26)

Point #3
In the Consent Order (7-2-93), Section XX Subsequent Amendments, Item 55 states:

> " In addition to the procedures set forth elsewhere in this Consent Order, this Consent Order may be amended by mutual agreement of the Parties. Any amendment of this Consent Order shall be in writing, signed by the Illinois Attorney General, Agency and Keystone and shall be effective upon the date of entry by the Court."

Since the Consent Order incorporates the Closure Plan, the above Section XX will allow for amending the Closure Plan under the Consent Order with consent from the Parties (Agency (IEPA) and Keystone).

Summary
Given that the proposed rules 35 I.A.C. Part 740 and 742 allow for parties undergoing enforcement actions to use the Site Remediation Program approach and Points 1-3 establish that the Consent Order does not prohibit amending the Closure Plan under mutual agreement, Keystone wishes to apply the Site Remediation Program guidelines to close the remaining Units of the ditches under the Consent Order.

II. Site Remediation Program Application

Remedial Applicant
Keystone Steel & Wire Company
7000 SW Adams St.
Peoria, IL 61641

Remedial Site Owner
Keystone Consolidated Industries, Inc.
5430 LBJ Freeway
3 Lincoln Centre, Suite 1700
Dallas, TX 75240

Authorized Agent
This application is being submitted on behalf of Keystone Steel & Wire Company by:

Authorized Agent: Dale L. Bennington P. E.
Manager, Energy & Environmental Engineering
Phone: (309) 697-7552 Fax: (309) 697-7430

Technical Contact Person(s)

David R. Semelroth	Phone: (309) 697-7551	Fax: (309) 697-7430
John R. (Jack) Skelley	Phone: (309) 697-7538	Fax: (309) 697-7430

Other Affected Properties
The adjacent affected property is owned by Union Pacific Railroad. Please refer to Section III. Review and Evaluation Services Agreement for further details.

Remediation Sites
Three remediation sites (South Ditch (North and South Half), Lower South Ditch, and New SWMU) are included in this Site Remediation Application. The South Ditch (North and South Half) and the Lower South Ditch have been described in the Revised Phase 2 Closure Plan, Dated: June 15, 1992 (ERM, WWES). The third remediation site, named the New SWMU, is the waste pile described in the TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM). All three sites are located at 7000 SW Adams Street, Peoria, IL 61641. The approximate size of each site is as follows:

South Ditch (North and South Half)	0.66 acres
Lower South Ditch	5.97 acres
New SWMU	0.26 acres

No Further Remediation Determination Request
Keystone Steel & Wire Company requests a No Further Remediation Determination Letter under

35 IAC 740.430 for the South Ditch (North and South Half), Lower South Ditch, and New SWMU. The Revised Phase 2 Closure Plan, Dated: June 15, 1992 (ERM, WWES) establishes lead as the only contaminant of concern for these sites. Keystone requests this determination because the contaminant of concern does not pose a risk to human health or the environment at these sites.

Site Maps
The site maps as required by 35 IAC 740.210 (a)(7)(A-D) are presented in the Appendix.

Agency Support Services
Keystone does not anticipate using any Agency Support Services for the completion of this Site Remediation Project.

Project Schedule
The projected schedule is presented in a spreadsheet with the "Outline for Tasks for Water Management to achieve South Ditch Closure" in the Appendix.

Current and Post Remediation Uses
The current and post remediation use of the three sites is for industrial/commercial purposes, specifically stormwater management. No process water management use will occur at these sites in the future.

Current Applicable Agency Permits held by Remedial Applicant
Keystone operates an industrial WWTP treating process and stormwater under NPDES Permit No. IL0002526. No other Agency permits are applicable to these remedial sites.

Remedial Applicant FEIN or SSN
Keystone Steel & Wire Company's Federal Tax ID number is 37-0364250.

Remedial Applicant Certification of Accuracy and Completeness
This application is being submitted on behalf of Keystone Steel & Wire Company and is accurate and complete to the best of my knowledge concerning the remedial sites and contaminants of concern described in this application.

Authorized Agent: Dale L. Bennington P. E. Dale Bennington Date 7/18/97
Manager, Energy & Environmental Engineering
Phone: (309) 697-7552 Fax: (309) 697-7430

III. Review and Evaluation Services Agreement

Keystone requests a modified approval approach for this project in regards to the adjacent property owner (Union Pacific Railroad). To comply with 35 IAC 740.210 (a)(3)(A-D), Keystone must reach an agreement with the Union Pacific Railroad to qualify for a No Further Remediation Letter under 35 IAC 740.430 for the South Ditch and Lower South Ditch. Keystone requests the Agency grant an initial approval for this application contingent upon Keystone reaching an acceptable agreement with the Union Pacific Railroad. Once the agreement with the Union Pacific Railroad is reached, Keystone requests the Agency then grant final approval of this Site Remediation Application.

Keystone does not anticipate requiring any additional support services from the Agency for the completion of this remedial project upon final approval of this application.

IV. Focused Site Investigation

The focused site investigation for the three sites has been performed previously to comply with the Consent Decree, Consent Order, and 1992 Closure Plan for the Ditch Remediation as amended at Keystone Steel & Wire Co. The data for the focused site investigation is primarily contained in the following reports previously submitted to the Agency:

- Phase 1 - Interim Status Closure Plan; Ditches, Retention Reservoir, and Dredge Piles. Dated: Nov. 26, 1989 (ERM, Geoscience Research Assoc., Inc.)
- Revised Phase 2 Closure Plan. Dated: June 15, 1992 (ERM, WWES)
- TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling. Dated: May 24, 1994 (ERM)
- Hazardous Waste Management Units, Quarterly Ground Water Technical Memorandum for November 1996, (Annual Report 1996). Dated: January 27, 1997 (WWES)
- Closure Documentation Report, Retention Reservoir Remediation, Dated: July 29, 1994 (ERM)
- Closure Documentation Report, North Ditch Remediation, Dated: November 25, 1996 (ERM)

Mid Mill Ditch, North Dredge Pile, South Dredge Pile, and Surface Drainage Ditch
These Units are not part of this Focused Site Investigation as the required remediation, closure sampling, and closure documents have been completed. Keystone will submit these documents to the Agency once the approval of the North Ditch Closure is received. The closure sampling results from these Units show the lead in the sediments has not migrated to the natural soils below the sediments.

South Ditch
The South Ditch (north half and south half) data is presented in Tables 5-3, 5-4, and 5-10 from the 1989 Phase 1 - Interim Status Closure Plan and in Tables 5-2 and 5-7 from the 1992 Revised Phase 2 Closure Plan. Tables 5-10 from the 1989 Phase 1 - Interim Status Closure Plan and 5-2 from the 1992 Revised Phase 2 Closure Plan show the lead levels in the soils beneath the South ditch sediments. The total lead levels in the South ditch sediments range from 6040 to 106000 mg/kg (Tables 5-3 and 5-4). The lead in the natural soils beneath the sediments ranges from 19.8 to 80.5 mg/kg (Tables 5-10 and 5-2). This data confirms the lead in the sediments has not migrated to the natural soils below the sediments.

The TCLP data (Table 5-7) show the lead levels to range from 2.3 to 50 mg/L. The TCLP data for the natural soils show the lead levels to range from <0.05 to 0.10 mg/L. This data also confirms the lead in the sediments has not migrated to the natural soils below the sediments.

Lower South Ditch
The Lower South Ditch data is presented in Table 5-16 from the 1992 Revised Phase 2 Closure Plan. The TCLP data (Table 5-16) show the lead levels to be below the hazardous waste toxicity

characteristic of 5 mg/L for all but one sample (KS-42 was 7 mg/L). The TCLP data for the natural soils show the lead levels to be below 0.027 mg/L. This data shows the lead in the sediments has not migrated to the natural soils below the sediments.

Treated Retention Reservoir Material Treated Retention Reservoir Material that was placed in the Lower South Ditch during the Retention Reservoir Remediation is presented in pages 77-85 of Table 2 in the Closure Documentation Report, Retention Reservoir Remediation, Dated: July 29, 1994 (ERM). The data shows the treated material placed in the Lower South Ditch does not exhibit the toxicity characteristic for hazardous waste for lead, cadmium, chromium, or zinc.

New SWMU

The waste pile discovered between the Temporary Container Storage Area (TCSA) and the Lower South Ditch as described in the report "TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)" is referred to as the "New SWMU". The New SWMU data is presented in Tables 1 &2 and Figure 1-4 from the TCSA Soil Sampling (May 24, 1994 report). The total lead levels ranged from 6.2 to 19,000 mg/kg and the TCLP levels ranged from 3.47 to 14.40 mg/L. Figures 1, 2 ,3, & 4 show the sample locations and estimated extent of the New SWMU.

Groundwater

The groundwater data for the entire South Ditch, Lower South Ditch, and New SWMU area is presented in the Revised Phase 2 Closure Plan. Dated: June 15, 1992 (ERM, WWES) Table 6-4 and the quarterly reports produced since 1989. The 1996 Annual Report is referenced to show the current condition of the groundwater for these areas.

The soil permeability data is presented in Revised Phase 2 Closure Plan, Dated: June 15, 1992 (ERM, WWES) Table 5-1. The soil permeability over the remedial site area has an overall permeability of less than 10^{-7} cm/sec.

The groundwater lead levels in Table 6-4 are all ≤ 0.1 mg/L in the Revised Phase 2 Closure Plan. Dated: June 15, 1992 (ERM, WWES). As stated in the Hazardous Waste Management Units, Quarterly Ground Water Technical Memorandum for November 1996, (Annual Report 1996). Dated: January 27, 1997 (WWES), page 4, "All lead values for the deep wells for the November 1996 sampling were reported as less than detection limit (5.0 ug/L). The Class I groundwater limit (7.5 ug/L) has not been exceeded in any well since August 1989.".

The lead levels data from the shallow wells versus the deep wells and the soil permeability data provides evidence there is an effective soil barrier to prevent any migration of groundwater from surficial Class II groundwater aquifers to deeper Class I groundwater aquifers.

Retention Reservoir and North Ditch Clean Closure Sampling

The inorganic results from the Retention Reservoir Clean Closure Sampling are given in Table 6 (45 pages) in the Closure Documentation Report, Retention Reservoir Remediation, Dated: July

29, 1994 (ERM). The inorganic results from the North Ditch Clean Closure Sampling are given in Table 6 (7 pages) in the Closure Documentation Report, North Ditch Remediation, Dated: November 25, 1996 (ERM).

The results from the Retention Reservoir and North Ditch Clean Closure Sampling both verify that the soils beneath the sediments are not contaminated and no migration of lead or other contaminants has occurred from the sediments to the underlying soils.

Summary

The analytical results from the South Ditch sediment and soil sampling, Lower South Ditch sediment and soil sampling, surficial aquifer and deep well groundwater sampling, Retention Reservoir Clean Closure Sampling and North Ditch Clean Closure Sampling all consistently verify that the soils beneath the sediments at the remediation sites are not contaminated and no migration of lead or other contaminants has occurred from the sediments to the underlying soils.

TABLE 5-3

KEYSTONE STEEL AND WIRE COMPANY
SOUTH DITCH (NORTH HALF)

SAMPLE NO.	SDN-1	SDN-2	SDN-3	SDN-4	AVERAGE
EP Toxicity Metals (mg/l)					
Arsenic	U	U	U	U	0.000
* Barium	0.313	0.275	0.132	0.101	0.205
* Cadmium	U	U	U	U	0.000
* Chromium	U	U	U	U	0.000
* Lead	U	U	U	U	0.000
Mercury	U	U	U	U	0.000
* Nickel	U	U	U	U	0.000
Selenium	U	U	U	U	0.000
Silver	U	U	U	U	0.000
Total Metals (mg/kg)					
Arsenic	42	44	46	41	43
* Barium	111	112	123	115	115
* Cadmium	4.8	4.8	14	5.4	7.3
* Chromium	474	535	480	387	469
* Lead	12000	12400	106000	13600	36000
Mercury	U	U	U	U	0.00
* Nickel	93	67	67	66	73
Selenium	U	U	U	U	0.0
Silver	1.1	U	1.5	2.0	1.2

* Compounds that could possibly have been in plant discharge waters

Taken From:
Phase 1-Interim Status Closure Plan; Ditches, Retention Reservoir, and Dredge Piles. Dated Nov. 26, 1988
ERM, Geoscience Res. Assoc., Inc.)

TABLE ~~2-5~~ 5-4

KEYSTONE STEEL AND WIRE COMPANY
SOUTH DITCH (SOUTH HALF)

SAMPLE NO.	SDS-1	SDS-2	SDS-3	SDS-4	AVERAGE
EP Toxicity Metals (mg/l)					
Arsenic	U	U	U	U	0.000
* Barium	0.113 B	0.104 B	0.195 B	0.092 B	0.126
* Cadmium	U	U	U	U	0.000
* Chromium	U	U	U	U	0.000
* Lead	U	U	U	U	0.000
Mercury	U	U	U	U	0.000
* Nickel	U	U	U	U	0.000
Selenium	U	U	U	U	0.000
Silver	U	U	U	U	0.000
Total Metals (mg/kg)					
Arsenic	56	40	35	33	41
* Barium	103	121	107	127	115
* Cadmium	22	4.1	2.8	5.0	8.5
* Chromium	598	613	480	400	523
* Lead	17800	13900	13100	6040	12710
Mercury	0.43	0.25	0.40	0.82	0.48
* Nickel	56	52	49	45	51
Selenium	U	U	U	U	0.0
Silver	1.2	0.66 B	0.56 B	0.39	0.70

* Compounds that could possibly have been in plant discharge waters

Taken From:
Phase 1-Interim Status Closure Plan;
Ditches, Retention Reservoir, and
Dredge Piles. Dated Nov. 26, 1988
ERM, Geoscience Res. Assoc., Inc.)

TABLE 5-10

ANALYSIS OF NATURAL SOILS UNDER SEDIMENTS
(ALL RESULTS IN mg/kg)

Sample Location and Designation	Sample Date	Lead	Total Chromium
Retention Reservoir 0.0 - 0.5'			
RR 2	06-22-87	48.2	23.0
RR 5	06-23-87	356.0	28.4
RR 10	06-23-87	34.1	16.0
RR 13	06-24-87	52.5	23.8
RR 15	06-24-87	130.0	23.8
RR 15R	06-24-87	74.0	18.2
Rentention Reservoir 0.5 - 1.0'			
RR 2	06-22-87	53.5	23.7
RR 5	06-23-87	89.0	19.8
RR 10	06-23-87	30.4	15.2
RR 13	06-24-87	110.0	20.2
RR 15	06-24-87	65.0	27.9
RR 15R	06-24-87	46.6	1.0
South Ditch 0.0 - 0.5'			
SDS 1	06-30-87	52.5	28.7
SDS 2	06-30-87	40.1	20.9
SDN 2	07-01-87	50.1	25.5
SDN 3	07-01-87	53.5	80.5
South Ditch 0.5 - 1.0'			
SDS 1	06-30-87	35.8	19.8
SDS 2	06-30-87	41.4	21.8
SDN 2	07-01-87	50.0	25.6
SDN 3	07-01-87	38.8	21.4

Taken From:
Phase 1-Interim Status Closure Plan; Ditches, Retention Reservoir, and Dredge Piles. Dated Nov. 26, 1988
ERM, Geoscience Res. Assoc.

Taken From:
Revised Phase 2 Closure Plan.
Dated: June 15, 1992 (ERM,WWES)

TABLE 5-2

ANALYSIS OF NATURAL SOILS UNDER SEDIMENT
(All results in mg/kg)

Sample Location and Depth Below Sediments	Designation	Sample Date	Lead	Total Chromium
Retention Reservoir	RR 2	06-22-87	48.2	23.0
0.0 - 0.5'	RR 5	06-23-87	356.0	28.4
	RR 10	06-23-87	34.1	16.0
	RR 13	06-24-87	52.5	23.8
	RR 15	06-24-87	130.0	23.8
	RR 15R	06-24-87	74.0	18.2
Retention Reservoir	RR 2	06-22-87	53.5	23.7
0.5 - 1.0'	RR 5	06-23-87	89.0	19.8
	RR 10	06-23-87	30.4	15.2
	RR 13	06-24-87	110.0	20.2
	RR 15	06-24-87	65.0	27.9
	RR 15R	06-24-87	46.6	1.0
South Ditch	SDS 1	06-30-87	52.5	28.7
0.0 - 0.5'	SDS 2	06-30-87	40.1	20.9
	SDN 2	07-01-87	50.1	25.5
	SDN 3	07-01-87	53.5	80.5
South Ditch	SDS 1	06-30-87	35.8	19.8
0.5 - 1.0'	SDS 2	06-30-87	41.4	21.8
	SDN 2	07-01-87	50.0	25.6
	SDN 3	07-01-87	38.8	21.4
Mid-Mill Ditch	MM 1	07-02-87	34.8	18.3
0.0 - 0.5'	MM 2	07-02-87	33.0	17.2
Mid-Mill Ditch	MM 1	07-02-87	37.4	19.3
0.5 - 1.0'	MM 2	07-02-87	42.8	23.7

TABLE 5-7

SOUTH DITCH
EP TOXICITY AND TCLP RESULTS FOR
SLUDGE AND NATURAL SOIL SAMPLES (1)

Sample Location		KS-9		KS-10		KS-11		KS-12		
Date Sampled		10/09/90	10/09/90	10/09/90	10/09/90	10/10/90	10/10/90	10/10/90	10/10/90	10/10/90
Parameter	Clean-up Objectives	Sludge	Natural Soil	Sludge	Natural Soil	Sludge	Natural Soil	Sludge	Sludge Rep	Natural Soil
EP Toxicity (ug/l)										
Arsenic	200	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0	<8.0
Barium	5,000	1100	280	1200	90	1200	160	800	740	410
Cadmium	50	<0.5	1.4	5.1	<0.5	0.8	1.1	<0.5	<0.5	<0.5
Chromium	1,000	8.0	<5.0	<5.0	<5.0	90	<5.0	<5.0	<5.0	<5.0
Lead	100	13000	10	14000	<5.0	50000	5.0	3100	2300	<5.0
Mercury	10	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Nickel	20,000	300	40	400	<10	5200	<10	800	690	<10
Selenium	20	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Silver	NA	<10	<10	<10	<10	<10	<10	<10	<10	20
TCLP (ug/l)										
Cadmium	50	3.5	--	6.3	--	2.5	--	31	<2.0	--
Chromium	1,000	<5.0	--	52	--	<5.0	--	<5.0	<5.0	--
Lead	100	400	--	28000	--	340	--	110	130	--
pH	NA	7.57	7.17	7.36	6.0	7.09	4.30	8.16	8.67	7.22

Note: (1) Samples analyzed for TCLP were collected in December 1990.
Key: -- Not analyzed.
NA -- If post-cleanup soil samples indicate the presence of the compound, Keystone Steel & Wire must submit a modification to the IEPA requesting clean-up objectives for the parameter(s) in question.

Taken From:
Revised Phase 2 Closure Plan.
Dated: June 15, 1992 (ERM, WWES)

TABLE 5-16

Taken From:
Revised Phase 2 Closure Plan.
Dated: June 15, 1992 (ERM,WWES)

LOWER SOUTH DITCH
EP TOXICITY AND TCLP RESULTS FOR SLUDGE AND NATURAL SOIL SAMPLES

Sample Location		KS-43		KS-44		KS-45		KS-46		KS-47	
Date Sampled		02/25/91	02/25/91	02/20/91	02/21/91	02/21/91	02/21/91	02/21/91	02/21/91	02/22/91	02/22/91
Parameter	Clean-up Objectives	Sludge	Natural Soil	Sludge	Natural Soil	Sludge	Natural Soil	Sludge	Natural Soil	Sludge	Natural Soil
TCLP (ug/l)											
Arsenic	200	4.8	2.8	4.0	1.1	4.6	1.4	7.2	7.0	3.3	3.2
Barium	5,000	520	590	800	190	750	520	440	710	230	170
Cadmium	50	20	1.9	22	3.8	27	6.5	29	6.2	52	18
Chromium	1,000	3.1	4.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.7	1.9
Lead	100	1900	3.3	19	12	213	8.8	316	13	<1.0	22
Mercury	10	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.7
Nickel	20,000	140	20	90	<10	170	30	50	90	110	130
Selenium	20	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	NA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
EP Toxicity (ug/l)											
Cadmium	50	88	1.4	320	80	514	61	110	64	44	2.9
Chromium	1,000	2.5	<1.0	100	<1.0	3.7	<1.0	16	<1.0	1.4	1.3
Lead	100	1900	1.2	1,940	<1.0	1,830	<1.0	280	<1.0	195	<1.0
Nickel	20,000	140	<10	260	<10	220	20	180	40	100	50
pH	NA	6.95	7.15	6.55	6.79	7.34	5.80	6.97	7.17	6.90	5.99

Note: % recoveries was 77.7 and the MSD was 77.7%.

Key: NA -- If post-cleanup soil samples indicate the presence of the compound, Keystone Steel & Wire must submit a Closure Plan modification to the IEPA requesting clean-up objectives for the parameter(s) in question.

TABLE 5-16

LOWER SOUTH DITCH
EP TOXICITY AND TCLP RESULTS FOR
SLUDGE AND NATURAL SOIL SAMPLES

Sample Location		KS-35		KS-38	KS-39				KS-40		KS-41		KS-42	
Date Sampled		02/19/91	02/19/91	02/28/91	02/28/91	02/28/91	02/28/91	02/28/91	02/27/91	02/27/91	02/27/91	02/27/91	02/26/91	02/26/91
Parameter	Clean-up Objectives	Sludge	Natural Soil	Sludge	Sludge	Sludge Rep	Natural Soil	Natural Soil Rep	Sludge	Natural Soil	Sludge	Natural Soil	Sludge	Natural Soil
TCLP (ug/l)														
Arsenic	200	5.7	<1.0	8.4	4.0	6.4	3.2	6.0	12	4.0	36	4.2	14	3.4
Barium	5,000	890	180	1400	670	760	580	610	940	670	670	260	1500	800
Cadmium	50	3.8	11	49	42	40	18	11	58.0	3.2	19	4.5	59	0.77
Chromium	1,000	2.9	1.7	480	2.3	1.9	<1.0	1.9	4.4	1.5	4.1	<1.0	6.6	3.6
Lead	100	40	27	1000	1200	1100	24	19	4200	13	4600	3.6	7000	5.6
Mercury	10	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Nickel	20,000	90	90	260	170	140	40	50	300	30	120	40	80	<10
Selenium	20	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	NA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
EP Toxicity (ug/l)														
Cadmium	50	27	6.6	43	76	87	3.2	3.5	348	0.50	2.6	4.2	64	0.2
Chromium	1,000	<1.0	<1.0	60	4.8	50	1.2	1.0	1.9	1.7	2.5	2.5	2.4	2.0
Lead	100	6.0	<1.0	480	1700	2500	<1.0	<1.0	3000	<1.0	160	1.7	3700	<1.0
Nickel	20,000	50	80	240	230	210	10	<10	430	<10	50	40	100	<10
pH	NA	8.66	--	7.90	7.28	7.32	6.52	6.84	7.32	7.09	6.48	6.54	7.37	7.21

Key: -- Not analyzed.
NA -- If post-cleanup soil samples indicate the presence of the compound, Keystone Steel & Wire must submit a Closure Plan modification to the IEPA requesting clean-up objectives for the parameter(s) in question.

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS
(Page 77 of 85)

Taken From:
Closure Documentation Report,
Retention Reservoir,
Dated: July 24, 1994 (ERM)

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
176S	13,000	-	-	-	-	Pass	Mid-Mill Ditch
176T	21,000	-	-	-	-	Pass	Mid-Mill Ditch
177A	3,500	-	-	-	-	Pass	Mid-Mill Ditch
177B	16,000	-	-	-	-	Pass	Mid-Mill Ditch
177C	5,800	-	-	-	-	Pass	Mid-Mill Ditch
177D	9,800	-	-	-	-	Pass	Mid-Mill Ditch
177E	62,000	-	-	1.688	-	Pass	Mid-Mill Ditch
177F	14,000	-	-	0.534	-	Pass	Mid-Mill Ditch
177G	9,100	-	-	-	-	Pass	Mid-Mill Ditch
177H	8,800	-	-	-	-	Pass	Mid-Mill Ditch
177I	16,000	-	-	0.380	-	Pass	Mid-Mill Ditch
177J	14,500	-	-	-	-	Pass	Mid-Mill Ditch
177K	28,000	-	-	-	-	Pass	Mid-Mill Ditch
177L	14,000	-	-	0.940	-	Pass	Mid-Mill Ditch
177M	2,700	-	-	-	-	Pass	Mid-Mill Ditch
177N	26,000	-	-	-	-	Pass	Mid-Mill Ditch
177O	24,000	-	-	2.207	-	Pass	Mid-Mill Ditch
177P	9,000	-	-	-	-	Pass	Mid-Mill Ditch
177Q	12,000	-	-	-	-	Pass	Mid-Mill Ditch
177R	37,000	-	-	-	-	Pass	Lower South Ditch
177S	29,000	-	-	-	-	Pass	Lower South Ditch
177T	36,000	-	-	-	-	Pass	Lower South Ditch
178A	66,000	-	-	-	-	Pass	Lower South Ditch
178B	11,000	-	-	-	-	Pass	Lower South Ditch
178C	17,000	-	-	-	-	Pass	Lower South Ditch
178D	69,000	-	-	-	-	Pass	Lower South Ditch
178E	49,000	-	-	1.143	-	Pass	Lower South Ditch
178F	43,000	< 0.005	< 0.010	< 0.040	0.916	Pass	Landfill
178G	9,350	-	-	-	-	Pass	Lower South Ditch
178H	7,500	-	-	-	-	Pass	Lower South Ditch
178I	8,800	-	-	-	-	Pass	Lower South Ditch
178J	72,000	-	-	-	-	Pass	Lower South Ditch
178K	31,000	-	-	-	-	Pass	Lower South Ditch
178L	30,000	-	-	-	-	Pass	Lower South Ditch
178M	72,000	-	-	-	-	Pass	Lower South Ditch
178N	70,000	-	-	-	-	Pass	Lower South Ditch
178O	64,000	-	-	2.634	-	Pass	Lower South Ditch
178P	27,000	-	-	-	-	Pass	Lower South Ditch
178Q	136,500	-	-	0.433	-	Pass	Lower South Ditch
178R	18,000	-	-	-	-	Pass	Lower South Ditch
178S	27,000	-	-	-	-	Pass	Lower South Ditch
178T	32,000	-	-	-	-	Pass	Lower South Ditch
179A	15,000	-	-	-	-	Pass	Mid-Mill Ditch
179B	17,000	-	-	-	-	Pass	Mid-Mill Ditch
179C	23,000	-	-	1.544	-	Pass	Mid-Mill Ditch
179D	24,000	-	-	-	-	Pass	Mid-Mill Ditch

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
179E	34,000	-	-	3.339	-	Pass	Mid-Mill Ditch
179F	19,000	-	-	0.509	-	Pass	Mid-Mill Ditch
179G	25,000	-	-	-	-	Pass	Mid-Mill Ditch
179H	94,000	-	-	-	-	Pass	Mid-Mill Ditch
179I	21,000	-	-	1.565	-	Pass	Lower South Ditch
179J	13,000	-	-	-	-	Pass	Mid-Mill Ditch
179K	37,000	-	-	-	-	Pass	Mid-Mill Ditch
179L	21,000	-	-	-	-	Pass	Mid-Mill Ditch
179M	19,000	-	-	-	-	Pass	Lower South Ditch
179N	29,000	-	-	-	-	Pass	Lower South Ditch
179O	14,500	-	-	0.573	-	Pass	Lower South Ditch
179P	25,000	-	-	-	-	Pass	Mid-Mill Ditch
179Q	20,000	-	-	-	-	Pass	Lower South Ditch
179R	20,000	-	-	1.547	-	Pass	Mid-Mill Ditch
179S	25,000	-	-	-	-	Pass	Mid-Mill Ditch
179T	16,000	-	-	-	-	Pass	Mid-Mill Ditch
180A	11,000	-	-	-	-	Pass	Lower South Ditch
180B	36,000	-	-	-	-	Pass	Lower South Ditch
180C	76,000	-	-	0.772	-	Pass	Lower South Ditch
180D	43,000	-	-	-	-	Pass	Lower South Ditch
180E	35,000	-	-	1.913	-	Pass	Lower South Ditch
180F	45,000	-	-	3.261	-	Pass	Lower South Ditch
180G	21,000	-	-	-	-	Pass	Lower South Ditch
180H	90,000	-	-	2.156	-	Pass	Lower South Ditch
180I	87,000	-	-	0.550	-	Pass	Lower South Ditch
180J	152,000	< 0.005	< 0.010	0.123	5.037	Pass	Landfill
180K	21,000	-	-	-	-	Pass	Lower South Ditch
180L	14,000	-	-	-	-	Pass	Lower South Ditch
180M	13,000	-	-	-	-	Pass	Lower South Ditch
180N	25,000	-	-	-	-	Pass	Lower South Ditch
180O	30,000	-	-	1.410	-	Pass	Lower South Ditch
180P	18,000	-	-	-	-	Pass	Lower South Ditch
180Q	17,000	-	-	-	-	Pass	Lower South Ditch
180R	30,000	-	-	3.467	-	Pass	Lower South Ditch
180S	38,000	-	-	-	-	Pass	Lower South Ditch
180T	45,000	-	-	-	-	Pass	Lower South Ditch
181A	42,000	-	-	-	-	Pass	Lower South Ditch
181B	44,000	-	-	-	-	Pass	Lower South Ditch
181C	35,000	-	-	2.516	-	Pass	Lower South Ditch
181D	43,000	-	-	-	-	Pass	Lower South Ditch
181E	37,000	-	-	2.111	-	Pass	Lower South Ditch
181F	32,000	-	-	1.577	-	Pass	Lower South Ditch
181G	78,000	-	-	-	-	Pass	Lower South Ditch
181H	43,000	-	-	-	-	Pass	Lower South Ditch
181I	57,000	-	-	2.783	-	Pass	Lower South Ditch
181J	55,000	-	-	-	-	Pass	Lower South Ditch

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
181K	33,000	-	-	-	-	Pass	Lower South Ditch
181L	54,000	-	-	2.152	-	Pass	Lower South Ditch
181M	62,000	-	-	-	-	Pass	Lower South Ditch
181N	40,000	-	-	-	-	Pass	Lower South Ditch
181O	55,000	-	-	2.810	-	Pass	Lower South Ditch
181P	27,000	-	-	-	-	Pass	Lower South Ditch
181Q	48,000	-	-	-	-	Pass	Lower South Ditch
181R	32,000	-	-	0.997	-	Pass	Lower South Ditch
181S	158,500	< 0.006	< 0.010	< 0.040	0.084	Pass	Landfill
181T	88,000	< 0.006	< 0.010	0.083	4.755	Pass	Landfill
182A	78,000	-	-	-	-	Pass	Lower South Ditch
182B	53,000	-	-	-	-	Pass	Lower South Ditch
182C	78,000	-	-	0.905	-	Pass	Lower South Ditch
182D	99,000	0.007	0.021	0.150	3.494	Pass	Landfill
182E	44,000	-	-	2.669	-	Pass	Lower South Ditch
182F	66,000	-	-	1.100	-	Pass	Lower South Ditch
182G	44,000	-	-	-	-	Pass	Lower South Ditch
182H	70,000	-	-	-	-	Pass	Lower South Ditch
182I	162,000	< 0.006	< 0.010	< 0.040	0.388	Pass	Landfill
182J	86,000	-	-	0.958	-	Pass	Lower South Ditch
182K	112,000	< 0.006	< 0.010	< 0.040	0.177	Pass	Landfill
182L	71,000	-	-	2.946	-	Pass	Lower South Ditch
182M	34,000	-	-	-	-	Pass	Lower South Ditch
182N	55,000	-	-	-	-	Pass	Lower South Ditch
182O	6,900	0.006	< 0.010	< 0.040	0.939	Pass	Landfill
182P	78,000	-	-	-	-	Pass	Lower South Ditch
182Q	114,000	< 0.006	< 0.010	< 0.040	0.166	Pass	Landfill
182R	60,000	-	-	2.846	-	Pass	Lower South Ditch
182S	56,000	-	-	-	-	Pass	Lower South Ditch
183A	-	-	-	-	-	-	Mid-Mill Ditch
183B	-	-	-	-	-	-	Mid-Mill Ditch
183C	-	-	-	-	-	-	Mid-Mill Ditch
183D	-	-	-	-	-	-	Mid-Mill Ditch
183E	-	-	-	-	-	-	Mid-Mill Ditch
183F	-	-	-	-	-	-	Lower South Ditch
183G	159,000	< 0.005	< 0.010	< 0.040	0.247	Pass	Landfill
183H	166,000	< 0.005	0.298	< 0.040	0.027	Pass	Landfill
183I	181,000	< 0.005	< 0.010	< 0.040	0.443	Pass	Landfill
183J	157,000	< 0.005	< 0.010	< 0.040	0.305	Pass	Landfill
183K	35,000	< 0.005	0.069	0.082	0.653	Pass	Landfill
183L	192,000	< 0.005	< 0.010	< 0.040	0.460	Pass	Landfill
183M	207,000	< 0.005	< 0.010	0.046	1.038	Pass	Landfill
183N	215,000	< 0.005	< 0.010	< 0.040	0.393	Pass	Landfill
183O	225,000	< 0.005	< 0.010	< 0.040	0.352	Pass	Landfill
183P	222,000	< 0.005	< 0.010	< 0.040	0.237	Pass	Landfill
183Q	221,000	< 0.005	< 0.010	< 0.040	0.315	Pass	Landfill

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
183R	200,000	< 0.005	0.015	< 0.040	0.078	Pass	Landfill
183S	216,000	< 0.005	0.012	< 0.040	0.183	Pass	Landfill
183T	14,000	0.020	0.016	0.108	1.393	Pass	Landfill
184A	-	-	-	-	-	-	Lower South Ditch
184B	-	-	-	-	-	-	Lower South Ditch
184C	-	-	-	-	-	-	Lower South Ditch
184D	-	-	-	-	-	-	Lower South Ditch
184E	-	-	-	-	-	-	Lower South Ditch
184F	-	-	-	-	-	-	Lower South Ditch
184G	-	-	-	-	-	-	Lower South Ditch
184H	-	-	-	-	-	-	Lower South Ditch
184I	-	-	-	-	-	-	Lower South Ditch
184J	-	-	-	-	-	-	Lower South Ditch
184K	-	-	-	-	-	-	Lower South Ditch
184L	-	-	-	-	-	-	Lower South Ditch
184M	-	-	-	-	-	-	Lower South Ditch
184N	-	-	-	-	-	-	Lower South Ditch
184O	-	-	-	-	-	-	Lower South Ditch
184P	-	-	-	-	-	-	Lower South Ditch
184Q	-	-	-	-	-	-	Lower South Ditch
184R	-	-	-	-	-	-	Lower South Ditch
184S	-	-	-	-	-	-	Lower South Ditch
184T	-	-	-	-	-	-	Lower South Ditch
185A	24,000	0.022	0.016	0.071	1.980	Pass	Landfill
185B	52,000	0.029	0.053	0.178	2.388	Pass	Landfill
185C	16,000	< 0.005	< 0.010	0.104	0.020	Pass	Landfill
185D	26,000	0.012	< 0.010	0.063	1.383	Pass	Landfill
185E	23,000	0.021	0.013	0.082	1.723	Pass	Landfill
185F	21,000	0.016	0.140	0.272	2.606	Pass	Lower South Ditch
185G	14,000	0.006	0.010	0.087	1.203	Pass	Landfill
185H	21,000	0.011	0.016	0.109	1.453	Pass	Landfill
185I	14,000	0.008	0.054	0.178	1.411	Pass	Landfill
185J	18,000	0.015	0.014	0.109	1.811	Pass	Landfill
185K	14,000	0.018	< 0.010	0.099	2.022	Pass	Landfill
185L	19,000	< 0.005	0.104	0.176	1.346	Pass	Landfill
185M	19,000	0.010	0.017	0.115	1.296	Pass	Landfill
185N	57,000	0.014	0.048	0.065	2.070	Pass	Landfill
185O	14,000	< 0.005	0.012	< 0.040	1.362	Pass	Landfill
185P	73,000	0.015	0.073	0.060	2.190	Pass	Landfill
185Q	14,000	-	-	0.290	-	Pass	Lower South Ditch
185R	20,000	0.011	0.036	0.137	1.405	Pass	Landfill
185S	17,000	< 0.005	0.012	0.041	1.070	Pass	Landfill
185T	20,000	< 0.005	0.035	0.110	1.200	Pass	Landfill
186A	52,000	< 0.005	0.123	0.065	1.170	Pass	Landfill
186B	14,000	< 0.005	< 0.010	< 0.040	0.936	Pass	Landfill
186C	14,000	0.008	0.014	0.045	0.943	Pass	Landfill

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
186D	21,000	< 0.005	0.020	< 0.040	0.849	Pass	Landfill
186E	11,000	0.005	0.014	0.071	0.915	Pass	Landfill
186F	5,400	< 0.005	< 0.010	< 0.040	0.634	Pass	Landfill
186G	8,300	< 0.005	< 0.010	< 0.040	0.810	Pass	Landfill
186H	9,300	< 0.005	0.012	0.127	1.030	Pass	Landfill
186I	9,100	< 0.005	< 0.010	< 0.040	0.337	Pass	Landfill
186J	6,400	< 0.005	< 0.010	< 0.040	0.721	Pass	Landfill
186K	18,000	0.019	0.055	0.073	2.040	Pass	Landfill
186L	15,000	0.008	0.021	0.053	0.814	Pass	Landfill
186M	11,000	< 0.005	< 0.010	< 0.040	1.420	Pass	Landfill
186N	18,000	-	-	1.230	-	Pass	Lower South Ditch
186O	11,000	< 0.005	0.051	0.148	0.887	Pass	Landfill
186P	9,300	< 0.005	0.030	0.118	1.250	Pass	Landfill
186Q	18,000	< 0.005	0.029	0.047	0.940	Pass	Landfill
186R	17,500	0.005	0.039	0.119	1.281	Pass	Landfill
186S	12,000	< 0.005	< 0.010	< 0.040	0.942	Pass	Landfill
186T	14,000	< 0.005	0.013	< 0.040	0.745	Pass	Landfill
187A	42,000	< 0.005	0.013	< 0.040	0.900	Pass	Landfill
187B	9,300	0.006	0.010	< 0.040	1.090	Pass	Landfill
187C	12,000	0.007	0.031	0.186	1.176	Pass	Landfill
187D	8,400	< 0.005	< 0.010	< 0.040	0.636	Pass	Landfill
187E	26,000	-	-	0.352	-	Pass	Lower South Ditch
187F	13,000	0.005	0.011	0.087	0.944	Pass	Landfill
187G	17,000	< 0.005	0.071	0.168	1.240	Pass	Landfill
187H	22,000	0.007	0.071	0.062	1.450	Pass	Landfill
187I	7,900	< 0.005	< 0.010	0.066	0.719	Pass	Landfill
187J	8,200	< 0.005	< 0.010	< 0.040	0.791	Pass	Landfill
187K	9,000	< 0.005	< 0.010	< 0.040	0.911	Pass	Landfill
187L	14,000	< 0.005	< 0.010	0.068	0.620	Pass	Landfill
187M	12,000	< 0.005	< 0.010	0.041	1.260	Pass	Landfill
187N	12,000	< 0.005	< 0.010	< 0.040	0.731	Pass	Landfill
187O	8,000	< 0.005	< 0.010	0.079	0.485	Pass	Landfill
187P	11,000	< 0.005	< 0.010	< 0.040	0.860	Pass	Landfill
187Q	12,000	< 0.005	< 0.010	< 0.040	0.920	Pass	Landfill
187R	10,450	0.006	< 0.010	0.068	0.743	Pass	Landfill
187S	13,000	0.007	0.020	0.041	1.470	Pass	Landfill
187T	13,000	0.005	< 0.010	< 0.040	1.160	Pass	Landfill
188A	18,000	0.018	< 0.010	0.071	2.150	Pass	Landfill
188B	21,000	0.023	0.033	0.180	2.520	Pass	Landfill
188C	20,000	0.009	0.031	0.060	0.976	Pass	Landfill
188D	18,000	-	-	1.100	-	Pass	Lower South Ditch
188E	17,000	0.019	0.020	0.143	1.495	Pass	Landfill
188F	10,000	0.010	0.012	0.081	1.030	Pass	Landfill
188G	39,000	0.020	0.013	0.116	3.810	Pass	Landfill
188H	36,000	0.007	0.033	0.118	1.670	Pass	Landfill
188I	17,000	0.011	0.034	0.089	1.099	Pass	Landfill

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
188J	9,200	-	-	0.310	-	Pass	Lower South Ditch
188K	20,000	0.010	0.018	0.047	1.670	Pass	Landfill
188L	56,000	0.152	0.127	0.229	2.007	Pass	Lower South Ditch
188M	17,000	0.010	< 0.010	< 0.040	1.140	Pass	Landfill
188N	11,000	< 0.005	< 0.010	< 0.040	0.741	Pass	Landfill
188O	33,000	-	-	0.476	-	Pass	Lower South Ditch
188P	11,000	< 0.005	< 0.010	< 0.040	1.250	Pass	Landfill
188Q	20,000	0.008	0.043	0.059	1.440	Pass	Landfill
188R	35,000	-	-	0.298	-	Pass	Lower South Ditch
188S	32,000	-	-	1.120	-	Pass	Lower South Ditch
188T	29,000	< 0.005	0.104	0.127	1.240	Pass	Landfill
189A	14,000	-	-	0.300	-	Pass	Lower South Ditch
189B	11,000	0.010	< 0.010	< 0.040	1.360	Pass	Landfill
189C	13,000	0.006	< 0.010	0.024	0.940	Pass	Landfill
189D	14,000	0.009	0.013	< 0.040	1.560	Pass	Landfill
189E	11,000	0.014	0.018	0.109	1.618	Pass	Landfill
189F	12,000	< 0.005	0.097	0.233	1.051	Pass	Landfill
189G	18,000	0.007	0.031	0.112	1.460	Pass	Landfill
189H	43,000	-	-	0.507	-	Pass	Lower South Ditch
189I	48,000	< 0.005	0.103	0.049	1.190	Pass	Landfill
189J	47,000	0.020	0.044	0.127	2.440	Pass	Landfill
189K	32,000	-	-	0.400	-	Pass	Lower South Ditch
189L	16,000	< 0.005	0.050	0.041	1.300	Pass	Landfill
189M	101,000	< 0.005	< 0.010	< 0.040	0.357	Pass	Landfill
189N	21,000	< 0.005	0.146	0.215	1.500	Pass	Landfill
189O	67,000	-	-	0.292	-	Pass	Lower South Ditch
189P	11,000	< 0.005	0.013	0.025	0.799	Pass	Landfill
189Q	12,600	< 0.005	0.011	0.033	1.020	Pass	Landfill
189R	35,000	-	-	0.300	-	Pass	Lower South Ditch
189S	36,000	-	-	1.150	-	Pass	Lower South Ditch
189T	84,000	< 0.005	0.010	< 0.040	1.260	Pass	Landfill
190A	-	-	-	-	-	Pass	Lower South Ditch
190B	-	-	-	-	-	Pass	Lower South Ditch
190C	-	-	-	-	-	Pass	Lower South Ditch
190D	-	-	-	-	-	Pass	Lower South Ditch
190E	-	-	-	-	-	Pass	Lower South Ditch
190F	-	-	-	-	-	Pass	Lower South Ditch
190G	-	-	-	-	-	Pass	Lower South Ditch
190H	-	-	-	-	-	Pass	Lower South Ditch
190I	-	-	-	-	-	Pass	Lower South Ditch
190J	-	-	-	-	-	Pass	Lower South Ditch
190K	-	-	-	-	-	Pass	Lower South Ditch
190L	-	-	-	-	-	Pass	Lower South Ditch
190M	-	-	-	-	-	Pass	Lower South Ditch
190N	-	-	-	-	-	Pass	Lower South Ditch
190O	-	-	-	-	-	Pass	Lower South Ditch

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
190P	-	-	-	-	-	Pass	Lower South Ditch
190Q	-	-	-	-	-	Pass	Lower South Ditch
190R	-	-	-	-	-	Pass	Lower South Ditch
190S	-	-	-	-	-	Pass	Lower South Ditch
190T	-	-	-	-	-	Pass	Lower South Ditch
191A	-	-	-	-	-	Pass	Lower South Ditch
191B	-	-	-	-	-	Pass	Lower South Ditch
191C	-	-	-	-	-	Pass	Lower South Ditch
191D	-	-	-	-	-	Pass	Lower South Ditch
191E	-	-	-	-	-	Pass	Lower South Ditch
191F	-	-	-	-	-	Pass	Lower South Ditch
191G	-	-	-	-	-	Pass	Lower South Ditch
191H	-	-	-	-	-	Pass	Lower South Ditch
191I	-	-	-	-	-	Pass	Lower South Ditch
191J	-	-	-	-	-	Pass	Lower South Ditch
191K	-	-	-	-	-	Pass	Lower South Ditch
191L	-	-	-	-	-	Pass	Lower South Ditch
191M	-	-	-	-	-	Pass	Lower South Ditch
191N	-	-	-	-	-	Pass	Lower South Ditch
191O	-	-	-	-	-	Pass	Lower South Ditch
191P	-	-	-	-	-	Pass	Lower South Ditch
191Q	-	-	-	-	-	Pass	Lower South Ditch
191R	-	-	-	-	-	Pass	Lower South Ditch
191S	-	-	-	-	-	Pass	Lower South Ditch
191T	-	-	-	-	-	Pass	Lower South Ditch
192A	-	-	-	-	-	Pass	Lower South Ditch
192B	-	-	-	-	-	Pass	Lower South Ditch
192C	-	-	-	-	-	Pass	Lower South Ditch
192D	-	-	-	-	-	Pass	Lower South Ditch
192E	-	-	-	-	-	Pass	Lower South Ditch
192F	-	-	-	-	-	Pass	Lower South Ditch
192G	-	-	-	-	-	Pass	Lower South Ditch
192H	-	-	-	-	-	Pass	Lower South Ditch
192I	93,000	-	-	0.760	-	Pass	Lower South Ditch
192J	65,000	-	-	3.243	-	Pass	Lower South Ditch
192K	8,300	-	-	1.463	-	Pass	Lower South Ditch
192L	49,000	-	-	3.182	-	Pass	Lower South Ditch
192M	25,000	-	-	0.796	-	Pass	Lower South Ditch
192N	53,000	-	-	0.500	-	Pass	Lower South Ditch
192O	50,000	-	-	3.369	-	Pass	Lower South Ditch
192P	51,000	-	-	2.536	-	Pass	Lower South Ditch
192Q	79,000	-	-	2.796	-	Pass	Lower South Ditch
192R	67,000	-	-	1.776	-	Pass	Lower South Ditch
192S	73,000	-	-	2.202	-	Pass	Lower South Ditch
192T	3,200	< 0.005	< 0.010	0.069	1.417	Pass	Landfill
193A	22,000	0.007	0.226	0.116	1.840	Pass	Landfill

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification (2)	Alkalinity (mg/kg)	TCLP Analysis Cadmium (mg/l)	Chromium (mg/l)	Lead (mg/l)	Zinc (mg/l)	Paint Filter (Pass/Fail)	Disposal Location
193B	61,000	< 0.005	< 0.010	< 0.040	1.570	Pass	Landfill
193C	8,500	-	-	0.505	-	Pass	Lower South Ditch
193D	21,000	< 0.005	0.294	0.223	1.530	Pass	Landfill
193E	23,000	< 0.005	0.196	0.153	1.190	Pass	Landfill
193F	6,600	0.014	0.013	0.096	1.810	Pass	Landfill
193G	38,000	-	-	0.258	-	Pass	Lower South Ditch
193H	70,000	-	-	0.799	-	Pass	Lower South Ditch
193I	81,000	0.006	0.284	0.213	2.360	Pass	Landfill
193J	78,000	-	-	0.484	-	Pass	Lower South Ditch
193K	70,000	-	-	0.264	-	Pass	Lower South Ditch
193L	77,000	-	-	1.850	-	Pass	Lower South Ditch
193M	98,000	< 0.005	< 0.010	0.235	3.840	Pass	Landfill
193N	106,000	< 0.005	< 0.010	< 0.040	0.374	Pass	Landfill
193O	-	-	-	-	-	Pass	Lower South Ditch
193P	12,000	< 0.005	0.071	0.390	2.176	Pass	Lower South Ditch
193Q	1,500	< 0.005	< 0.010	< 0.020	1.075	Pass	Landfill
193R	5,800	< 0.005	< 0.010	< 0.020	1.201	Pass	Landfill
193S	8,100	< 0.005	< 0.010	< 0.020	1.087	Pass	Landfill
193T	4,100	< 0.005	< 0.010	0.077	1.263	Pass	Landfill
194A	4,900	0.008	< 0.010	0.061	1.791	Pass	Landfill
194B	4,100	< 0.005	< 0.010	0.020	1.152	Pass	Landfill
194C	4,000	0.006	< 0.010	0.045	1.410	Pass	Landfill
194D	8,350	< 0.005	< 0.010	0.024	1.311	Pass	Landfill
194E	3,300	0.006	< 0.010	0.028	1.460	Pass	Landfill
194F	4,900	0.007	< 0.010	0.028	1.314	Pass	Landfill
194G	43,000	0.005	0.285	0.085	1.316	Pass	Landfill
194H	3,200	< 0.005	< 0.010	0.041	1.251	Pass	Landfill
194I	1,600	< 0.005	< 0.010	< 0.020	1.012	Pass	Landfill
194J	4,100	< 0.005	< 0.010	0.024	0.951	Pass	Landfill
194K	3,000	< 0.005	< 0.010	< 0.020	0.897	Pass	Landfill
194L	3,200	< 0.005	< 0.010	< 0.020	1.101	Pass	Landfill
194M	5,700	< 0.005	< 0.010	< 0.020	0.980	Pass	Landfill
194N	4,900	< 0.005	< 0.010	< 0.020	1.085	Pass	Landfill
194O	7,400	< 0.005	< 0.010	0.020	1.296	Pass	Landfill
194P	12,000	< 0.005	< 0.010	0.041	1.463	Pass	Landfill
194Q	5,800	< 0.005	< 0.010	0.077	1.771	Pass	Landfill
194R	4,900	< 0.005	< 0.010	0.057	1.141	Pass	Landfill
194S	4,800	< 0.005	< 0.010	0.057	1.282	Pass	Landfill
194T	4,100	< 0.005	< 0.010	0.134	1.504	Pass	Landfill
195A	6,400	< 0.005	< 0.010	< 0.020	0.870	Pass	Landfill
195B	4,900	< 0.005	< 0.010	< 0.020	0.906	Pass	Landfill
195C	-	-	-	-	-	-	Lower South Ditch
195D	-	-	-	-	-	-	Lower South Ditch
195E	-	-	-	-	-	-	Lower South Ditch
195F	-	-	-	-	-	-	Lower South Ditch
195G	-	-	-	-	-	-	Lower South Ditch

TABLE 2

SUMMARY OF VERIFICATION SAMPLING ANALYTICAL RESULTS (1)
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Notes:

(1) Verification sampling began on March 5, 1994 and was completed on May 26, 1994.

(2) Sample identification numbers are comprised of a three-digit lot number and a one-letter load designation:
Example: 001A
001 = Lot number.
A = Load designation.

Key:

TCLP = Toxicity Characteristic Leaching Procedure.
\- = Analysis not required.

Taken From:
Closure Documentation Report,
Retention Reservoir,
Dated: July 24, 1994 (ERM)

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			A10(15)(0-0.5)5/20F	A12(14)(0-0.5)5/20F	V12(14)(0-0.5)5/20F	A14(13)(0-0.5)5/20F	A14(13)(0-0.5)FB5/20F
Sample Type			SOIL	SOIL	A12 FIELD DUPLICATE	SOIL	A14 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	<0.0010	<0.0010	<0.0010	0.0012	<0.001
Barium	0.01	5.0	1.80	1.67	1.60	2.36	<0.010
Cadmium	0.002	0.05	0.0002	<0.0002	<0.0002	0.0040	<0.0002
Chromium	0.001	1.0	0.016	<0.0020	<0.0020	0.013	<0.002
Lead	0.001	0.1	0.0051	0.0062	0.0070	0.0054	<0.003
Nickel	0.001	20	0.017	0.030	0.035	0.051	0.067
Selenium	0.002	0.02	<0.0020	<0.0100	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			A15(16)(0-0.5)5/20F	A17(15)(0-0.5)5/20F	A19(14)(0-0.5)5/20F	A21(13)(0-0.5)5/18F	A22(16)(0-0.5)5/18F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	0.0002	0.0002
Arsenic	0.001	0.2	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Barium	0.01	5.0	1.10	1.43	1.40	<1.0	1.44
Cadmium	0.002	0.05	0.0009	<0.0002	<0.0002	0.0004	0.0004
Chromium	0.001	1.0	0.387	0.393	0.416	0.0030	0.0050
Lead	0.001	0.1	0.0042	<0.0030	<0.0030	0.0074	0.0050
Nickel	0.001	20	0.0048	<0.0020	<0.0020	0.146	0.047
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			A24(15)(0-0.5)5/18F	V24(15)(0-0.5)5/18F	A26(14)(0-0.5)5/18F	A26(14)(0-0.5)FB5/18F	A28(13)(0-0.5)5/18F
Sample Type			SOIL	A24 FIELD DUPLICATE	SOIL	A26 FIELD BLANK	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	0.0002	0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	<0.0010	<0.0010	<0.0010	<0.0010	0.0010
Barium	0.01	5.0	2.06	2.28	2.18	<0.010	2.00
Cadmium	0.002	0.05	0.0025	0.0023	0.0013	0.0019	0.0012
Chromium	0.001	1.0	0.0090	0.014	0.010	0.0044	0.0037
Lead	0.001	0.1	<0.0030	0.0038	0.0043	<0.003	<0.0030
Nickel	0.001	20	0.034	0.036	0.015	0.053	0.0098
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			A29(16)(0-0.5)5/10F	B10(3)(0-0.5)5/13F	B12(2)(0-0.5)5/13F	U12(2)(0-0.5)5/13F	B14(1)(0-0.5)5/13F
Sample Type			SOIL	SOIL	SOIL	B12 FIELD DUPLICATE	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	<0.0010	0.0091	0.0072	0.0076	0.0065
Barium	0.01	5.0	1.98	1.92	2.07	2.32	2.21
Cadmium	0.002	0.05	0.0023	0.0023	0.0039	0.0027	0.0013
Chromium	0.001	1.0	0.022	0.0078	0.0043	0.0073	0.0060
Lead	0.001	0.1	0.0074	0.019	0.026	0.019	0.012
Nickel	0.001	20	0.289	0.038	0.042	0.030	0.035
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			B15(4)(0-0.5)5/17F	B17(3)(0-0.5)5/20F	B17(3)(0-0.5)FB5/20F	B22(4)(0-0.5)5/18F	B24(3)(0-0.5)5/18F
Sample Type			SOIL	SOIL	B17 FIELD BLANK	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0054	0.0086	<0.001	0.0029	0.0034
Barium	0.01	5.0	1.78	1.65	<0.010	1.44	1.82
Cadmium	0.002	0.05	0.0009	0.0012	0.0004	0.0021	0.0027
Chromium	0.001	1.0	0.0045	<0.0020	<0.002	0.0044	0.0040
Lead	0.001	0.1	0.0078	0.0032	<0.003	0.0032	0.0045
Nickel	0.001	20	0.017	0.015	0.032	0.032	0.051
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			B26(2)(0-0.5)5/18F	V26(2)(0-0.5)5/18F	B28(1)(0-0.5)5/18F	B29(4)(0-0.5)5/25F	V29(4)(0-0.5)5/25F
Sample Type			SOIL	B26 FIELD DUPLICATE	SOIL	SOIL	B29 FIELD DUPLICATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	<0.0010	<0.0010	0.011	0.014	0.016
Barium	0.01	5.0	1.26	1.42	1.54	1.59	1.76
Cadmium	0.002	0.05	0.0016	0.0018	0.0044	0.023	0.0049
Chromium	0.001	1.0	0.0062	0.0061	0.0044	<0.0020	<0.0020
Lead	0.001	0.1	<0.0030	<0.0030	0.016	0.023	0.014
Nickel	0.001	20	0.029	0.046	0.034	0.051	0.045
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			B31(3)(0-0.5)5/11F	B33(2)(0-0.5)5/5F	B3(3)(0-0.5)5/20F	B5(2)(0-0.5)5/13F	B7(1)(0-0.5)5/13F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0035	0.0013	0.0043	0.0048	0.0076
Barium	0.01	5.0	2.37	<1.00	2.30	1.86	1.90
Cadmium	0.002	0.05	0.0014	<0.0002	0.029	0.0046	0.0037
Chromium	0.001	1.0	0.0074	0.0082	0.0033	0.0049	0.0067
Lead	0.001	0.1	0.017	<0.0030	0.081	0.018	0.011
Nickel	0.001	20	0.033	0.028	0.073	0.043	0.014
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			D10(7)(0-0.5)5/13F	D12(6)(0-0.5)5/13F	D14(5)(0-0.5)5/13F	D15(8)(0-0.5)5/17F	U15(8)(0-0.5)5/17F
Sample Type			SOIL	SOIL	SOIL	SOIL	D15 FIELD DUPLICATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.011	0.0095	0.010	0.0044	0.0044
Barium	0.01	5.0	1.49	2.43	2.01	2.41	2.49
Cadmium	0.002	0.05	<0.0002	<0.0002	0.0005	0.0018	0.0068
Chromium	0.001	1.0	0.0050	0.0066	0.0060	0.0048	0.0049
Lead	0.001	0.1	0.0076	0.0088	0.013	0.0084	0.0091
Nickel	0.001	20	0.027	0.025	0.033	0.059	0.036
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			D17(7)(0-0.5)5/20F	D19(6)(0-0.5)5/17F	D1(8)(0-0.5)5/5F	D22(8)(0-0.5)5/20F	D24(7)(0-0.5)5/20F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	0.0005	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0052	0.0076	0.0012	0.0047	0.0067
Barium	0.01	5.0	1.75	1.39	1.14	1.35	1.60
Cadmium	0.002	0.05	0.0013	0.019	0.0005	0.0065	0.0012
Chromium	0.001	1.0	0.0036	0.0026	0.017	<0.0020	0.165
Lead	0.001	0.1	0.0039	0.048	0.016	<0.0030	0.0072
Nickel	0.001	20	0.016	0.063	0.065	0.017	0.019
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			D26(6)(0-0.5)5/17F	D26(6)(0-0.5)FB5/17F	D28(5)(0-0.5)5/11F	D29(8)(0-0.5)5/11F	U29(8)(0-0.5)5/11F
Sample Type			SOIL	D26 FIELD BLANK	SOIL	SOIL	D29 FIELD DUPLICATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0063	<0.001	0.0039	0.0029	0.0038
Barium	0.01	5.0	1.85	<0.010	1.43	2.60	2.72
Cadmium	0.002	0.05	0.0011	<0.0002	0.0022	0.0012	0.0013
Chromium	0.001	1.0	0.0043	<0.002	0.0047	0.0079	0.0067
Lead	0.001	0.1	0.0085	0.0044	0.0096	0.014	0.013
Nickel	0.001	20	0.033	0.067	0.063	0.114	0.074
Selenium	0.002	0.02	<0.0020	<0.002	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			D31(7)(0-0.5)5/11F	D33(6)(0-0.5)5/5F	D3(7)(0-0.5)5/13F	D5(6)(0-0.5)5/13F	D5(6)(0-0.5)FB5/13F
Sample Type			SOIL	SOIL	SOIL	SOIL	D5 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0040	0.0011	0.0040	<0.0010	<0.001
Barium	0.01	5.0	2.27	<1.00	2.12	1.05	<0.010
Cadmium	0.002	0.05	0.019	0.0009	0.0003	0.0005	0.0002
Chromium	0.001	1.0	0.015	0.016	0.0046	0.0035	<0.002
Lead	0.001	0.1	0.058	<0.0030	0.0076	0.0068	0.0044
Nickel	0.001	20	0.054	0.049	0.027	0.052	0.0051
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			D7(6)(0-0.5)5/13F	U7(6)(0-0.5)5/13F	F12(10)(0-0.5)5/13F	F14(9)(0-0.5)5/13F	F14(9)(0-0.5)FB5/13F
Sample Type			SOIL	D7 FIELD DUPLICATE	SOIL	SOIL	F14 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0010	<0.0010	0.0087	0.018	<0.001
Barium	0.01	5.0	1.74	1.86	2.05	2.14	0.013
Cadmium	0.002	0.05	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	0.001	1.0	0.0068	0.0066	0.010	0.0068	0.0029
Lead	0.001	0.1	0.0076	0.0095	0.0092	0.0096	0.011
Nickel	0.001	20	0.012	0.0094	0.024	0.029	0.039
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			F15(2)(0-0.5)5/17F	F17(11)(0-0.5)5/17F	F19(10)(0-0.5)5/20F	F1(12)(0-0.5)5/5F	U1(12)(0-0.5)5/5F
Sample Type			SOIL	SOIL	SOIL	SOIL	F1 FIELD DUPLCATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	0.0007	<0.0002	<0.0002	0.0006	<0.0002
Arsenic	0.001	0.2	0.0070	0.0075	0.0062	0.0024	0.0018
Barium	0.01	5.0	1.86	1.98	1.62	2.19	1.61
Cadmium	0.002	0.05	0.0009	0.0024	0.0008	0.0025	0.0024
Chromium	0.001	1.0	0.0048	0.0047	0.0086	0.153	0.027
Lead	0.001	0.1	0.0058	0.021	<0.0030	0.022	0.0064
Nickel	0.001	20	0.030	0.033	0.012	0.098	0.051
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			F22(12)(0-0.5)5/20F	F22(12)(0-0.5)FB5/18F	F24(11)(0-0.5)5/20F	F26(10)(0-0.5)5/11F	F28(9)(0-0.5)5/12F
Sample Type			SOIL	F22 FIELD BLANK	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0073	<0.001	0.0066	0.0067	0.0078
Barium	0.01	5.0	2.35	<0.010	1.80	2.38	1.77
Cadmium	0.002	0.05	0.0015	0.0005	0.0020	0.0008	0.0014
Chromium	0.001	1.0	<0.0020	0.0038	<0.0020	0.0052	0.0065
Lead	0.001	0.1	0.0048	<0.003	0.0066	0.010	0.0098
Nickel	0.001	20	0.031	0.062	0.035	0.043	0.042
Selenium	0.002	0.02	<0.0020	<0.002	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			F29(12)(0-0.5)5/11F	F29(12)(0-0.5)FB5/11F	F31(11)(0-0.5)5/18F	F33(10)(0-0.5)5/5F	F33(10)(0-0.5)FB5/5F
Sample Type			SOIL	F29 FIELD BLANK	SOIL	SOIL	F33 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	0.0002	<0.0002
Arsenic	0.001	0.2	0.011	<0.001	0.0036	<0.0010	<0.001
Barium	0.01	5.0	3.11	<0.010	2.02	<1.00	<0.010
Cadmium	0.002	0.05	0.0010	<0.0002	0.0022	0.0014	<0.0002
Chromium	0.001	1.0	0.016	0.0048	0.0038	0.0059	<0.002
Lead	0.001	0.1	0.028	0.0015	0.0051	0.0038	<0.003
Nickel	0.001	20	0.028	0.052	0.048	0.043	0.076
Selenium	0.002	0.02	<0.0020	<0.002	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			F3(1)(0-0.5)5/6F	F3(1)(0-0.5)FB5/6F	F5(10)(0-0.5)5/6F	F7(6)(0-0.5)5/6F	H12(14)(0-0.5)5/13F
Sample Type			SOIL	F3 FIELD BLANK	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	<0.0010	<0.001	<0.0010	0.0042	0.0072
Barium	0.01	5.0	1.40	<0.010	1.08	1.34	2.14
Cadmium	0.002	0.05	0.0065	0.0003	<0.0002	0.0007	<0.0002
Chromium	0.001	1.0	0.0058	0.027	0.367	0.014	0.0064
Lead	0.001	0.1	0.065	0.068	0.014	0.015	0.0076
Nickel	0.001	20	0.067	0.086	0.165	0.055	0.026
Selenium	0.002	0.02	<0.0020	<0.002	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			H14(13)(0-0.5)5/13F	H15(16)(0-0.5)5/17F	H17(15)(0-0.5)5/17F	H19(14)(0-0.5)5/17F	H19(14)(0-0.5)FB5/17F
Sample Type			SOIL	SOIL	SOIL	SOIL	H19 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	0.0002	<0.0002
Arsenic	0.001	0.2	0.0074	0.0097	0.011	0.0052	<0.001
Barium	0.01	5.0	2.55	1.90	2.73	2.06	<0.010
Cadmium	0.002	0.05	0.0002	0.0025	0.0008	0.0014	<0.0002
Chromium	0.001	1.0	0.019	0.0070	0.0077	0.0035	<0.002
Lead	0.001	0.1	0.013	0.024	0.012	0.0088	<0.003
Nickel	0.001	20	0.044	0.020	0.038	0.038	0.053
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			H1(16)(0-0.5)5/5F	H22(16)(0-0.5)5/12F	U22(16)(0-0.5)5/12F	H24(15)(0-0.5)5/12F	H26(14)(0-0.5)5/11F
Sample Type			SOIL	SOIL	H22 FIELD DUPLICATE	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0019	0.0055	0.0043	0.0045	0.0078
Barium	0.01	5.0	1.04	2.15	2.21	1.70	1.80
Cadmium	0.002	0.05	0.0014	0.0016	0.0017	0.013	0.0016
Chromium	0.001	1.0	0.014	0.0058	0.0062	0.0055	0.0072
Lead	0.001	0.1	0.0067	0.014	0.018	0.022	0.015
Nickel	0.001	20	0.020	0.046	0.051	0.077	0.038
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			H28(13)(0-0.5)5/11F	U28(13)(0-0.5)5/11F	H29(16)(0-0.5)5/11F	H31(15)(0-0.5)5/11F	H33(14)(0-0.5)5/5F
Sample Type			SOIL	H28 FIELD DUPLICATE	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	0.001	0.2	0.0036	0.0041	0.0049	0.0063	0.0012
Barium	0.01	5.0	1.70	1.67	2.12	1.88	1.69
Cadmium	0.002	0.05	0.0007	0.0006	0.0006	0.0025	0.0005
Chromium	0.001	1.0	0.0047	0.0051	0.0067	0.0043	<0.0020
Lead	0.001	0.1	0.0087	0.0090	0.011	0.015	0.0047
Nickel	0.001	20	0.023	0.025	0.027	0.083	0.16
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	0.0017

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			H3(15)(0-0.5)6/2F	H5(14)(0-0.5)5/6F	H7(13)(0-0.5)5/18F	H8(16)(0-0.5)5/6F	I12(2)(0-0.5)5/13F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0040	0.0018	<0.0010	0.0019	0.0025
Barium	0.01	5.0	2.77	<1.0	1.81	3.00	2.19
Cadmium	0.002	0.05	0.0076	<0.0002	0.0018	0.0004	0.0035
Chromium	0.001	1.0	0.016	0.0024	0.0042	0.0057	0.0084
Lead	0.001	0.1	0.022	0.020	0.0037	0.027	0.013
Nickel	0.001	20	0.037	0.038	0.062	0.065	0.061
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			I14(1)(0-0.5)5/13F	I17(3)(0-0.5)5/17F	I19(2)(0-0.5)5/17F	I22(4)(0-0.5)5/12F	I24(3)(0-0.5)5/12F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.012	0.0087	0.0071	0.0070	0.0076
Barium	0.01	5.0	2.06	1.91	1.54	2.01	1.94
Cadmium	0.002	0.05	0.0008	0.0009	0.0009	0.0010	0.0014
Chromium	0.001	1.0	0.010	0.0052	0.0055	0.0079	0.0071
Lead	0.001	0.1	0.012	0.0063	0.0058	0.011	0.013
Nickel	0.001	20	0.038	0.020	0.020	0.033	0.051
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			I28(1)(0-0.5)5/12F	I29(4)(0-0.5)5/18F	I31(3)(0-0.5)5/17F	I33(2)(0-0.5)5/5F	I3(3)(0-0.5)6/2F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	0.0004	<0.0002
Arsenic	0.001	0.2	0.0084	0.0062	0.017	<0.0010	0.0020
Barium	0.01	5.0	1.65	2.02	1.70	<1.00	2.03
Cadmium	0.002	0.05	0.0011	0.0006	0.0005	0.0002	0.0035
Chromium	0.001	1.0	0.0054	0.0054	0.0055	0.0021	0.0099
Lead	0.001	0.1	0.0098	0.0037	0.016	0.0041	0.0095
Nickel	0.001	20	0.034	0.010	0.015	0.0080	0.017
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			I5(2)(0-0.5)5/6F	I7(1)(0-0.5)5/9F	I8(4)(0-0.5)5/9F	K12(6)(0-0.5)5/25F	K14(5)(0-0.5)5/10F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0018	<0.0010	0.0019	0.0030	0.022
Barium	0.01	5.0	<1.0	1.07	1.78	<1.0	1.44
Cadmium	0.002	0.05	0.0005	0.0008	0.0007	0.0003	0.0022
Chromium	0.001	1.0	0.0094	0.0040	0.0061	<0.0020	0.0050
Lead	0.001	0.1	0.0075	0.046	0.013	0.027	0.010
Nickel	0.001	20	0.026	0.022	0.025	0.022	0.070
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	0.00096	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			K17(7)(0-0.5)5/10F	K19(6)(0-0.5)5/10F	K22(8)(0-0.5)5/12F	K24(7)(0-0.5)5/12F	K28(5)(0-0.5)5/12F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0061	0.0074	0.0075	0.0084	0.0041
Barium	0.01	5.0	1.36	1.50	1.94	1.76	2.11
Cadmium	0.002	0.05	0.0008	0.0023	0.0008	0.0007	0.0016
Chromium	0.001	1.0	0.0052	0.0058	0.0082	0.0061	0.0060
Lead	0.001	0.1	0.010	0.012	0.013	0.010	0.013
Nickel	0.001	20	0.121	0.120	0.048	0.036	0.056
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	0.0025
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			K28(5)(0-0.5)FB5/12F	K29(8)(0-0.5)5/11F	K31(7)(0-0.5)5/11F	K33(6)(0-0.5)5/5F	K3(7)(0-0.5)5/6F
Sample Type			K28 FIELD BLANK	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	0.0002	<0.0002
Arsenic	0.001	0.2	<0.001	0.0061	0.0035	0.0019	<0.0010
Barium	0.01	5.0	<0.010	1.76	1.95	1.04	1.59
Cadmium	0.002	0.05	<0.0002	0.0010	0.0010	0.0005	0.0002
Chromium	0.001	1.0	<0.002	0.0097	0.0050	0.0034	0.016
Lead	0.001	0.1	0.0021	0.018	0.011	0.018	0.0067
Nickel	0.001	20	0.133	0.027	0.076	0.036	0.036
Selenium	0.002	0.02	<0.002	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			U3(7)(0-0.5)5/6F	K5(6)(0-0.5)5/6F	K7(5)(0-0.5)5/9F	K8(8)(0-0.5)5/9F	U8(8)(0-0.5)5/9F
Sample Type			K3 FIELD DUPLICATE	SOIL	SOIL	SOIL	K8 FIELD DUPLICATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Barium	0.01	5.0	1.63	1.26	<1.0	1.02	1.22
Cadmium	0.002	0.05	0.0014	0.0020	0.0089	0.0008	0.0012
Chromium	0.001	1.0	0.0067	0.0035	0.0062	0.0052	0.0046
Lead	0.001	0.1	0.0080	0.020	0.020	0.0084	0.012
Nickel	0.001	20	0.035	0.034	0.209	0.038	0.041
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	0.0011	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			M10(11)(0-0.5)5/9F	M10(11)(0-0.5)FB5/9F	M12(10)(0-0.5)5/10F	M12(10)(0-0.5)FB5/10F	M14(9)(0-0.5)5/10F
Sample Type			SOIL	M10 FIELD BLANK	SOIL	M12 FIELD BLANK	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0097	<0.001	0.0017	<0.001	0.0031
Barium	0.01	5.0	1.38	<0.010	1.52	<0.010	2.58
Cadmium	0.002	0.05	0.0006	<0.0002	0.0010	<0.0002	0.0008
Chromium	0.001	1.0	0.0052	0.003	0.0041	0.0033	0.0063
Lead	0.001	0.1	0.043	<0.001	0.0059	0.0015	0.018
Nickel	0.001	20	0.338	0.047	0.107	0.045	0.074
Selenium	0.002	0.02	<0.0020	<0.002	<0.0020	<0.002	<0.0020
Silver	0.005	0.005	0.0027	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			U14(9)(0-0.5)5/10F	M17(11)(0-0.5)5/10F	M19(10)(0-0.5)5/10F	M19(10)(0-0.5)FB5/10F	M21(9)(0-0.5)5/17F
Sample Type			M14 FIELD DUPLICATE	SOIL	SOIL	M19 FIELD BLANK	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0025	0.011	0.012	<0.001	0.0070
Barium	0.01	5.0	3.11	<1.0	1.31	<0.010	1.30
Cadmium	0.002	0.05	0.0007	0.0011	0.0013	<0.0002	0.0009
Chromium	0.001	1.0	0.021	0.0040	0.016	<0.002	0.0059
Lead	0.001	0.1	0.022	0.0086	0.0089	0.0015	0.0069
Nickel	0.001	20	0.093	0.096	0.167	0.011	0.018
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.002	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			M22(12)(0-0.5)5/12F	M24(11)(0-0.5)5/12F	M26(10)(0-0.5)5/11F	M29(12)(0-0.5)5/12F	M31(11)(0-0.5)5/11F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0077	0.0074	0.0037	0.0085	0.0068
Barium	0.01	5.0	1.75	1.79	2.41	1.81	1.88
Cadmium	0.002	0.05	0.0007	0.0016	0.021	0.0005	0.0017
Chromium	0.001	1.0	0.0076	0.0052	0.0095	0.0061	0.0080
Lead	0.001	0.1	0.011	0.011	0.020	0.0092	0.012
Nickel	0.001	20	0.030	0.040	0.158	0.022	0.050
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			M31(11)(0-0.5)FB5/11F	M33(10)(0-0.5)5/5F	U33(10)(0-0.5)5/5F	M35(9)(0-0.5)5/5F	M3(11)(0-0.5)5/6F
Sample Type			M31 FIELD BLANK	SOIL	M33 FIELD DUPLICATE	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	0.0002	0.0002	0.0002	<0.0002
Arsenic	0.001	0.2	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Barium	0.01	5.0	<0.010	<1.00	<1.00	1.25	2.15
Cadmium	0.002	0.05	0.0002	0.0008	0.0010	0.0004	0.0014
Chromium	0.001	1.0	0.039	0.0030	0.0044	0.0080	0.013
Lead	0.001	0.1	0.062	0.028	0.061	0.0089	0.049
Nickel	0.001	20	0.057	0.045	0.053	0.150	0.224
Selenium	0.002	0.02	<0.002	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			M5(10)(0-0.5)5/18F	U5(10)(0-0.5)5/18F	M7(9)(0-0.5)5/9F	M7(9)(0-0.5)FB5/9F	M8(12)(0-0.5)5/9F
Sample Type			SOIL	M5 FIELD DUPLICATE	SOIL	M7 FIELD BLANK	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0019	0.0019	0.0026	<0.001	0.0021
Barium	0.01	5.0	1.71	1.75	1.42	<0.010	1.86
Cadmium	0.002	0.05	0.0012	0.0027	0.0040	<0.0002	0.0013
Chromium	0.001	1.0	0.0040	0.0038	0.0067	<0.002	0.0053
Lead	0.001	0.1	<0.0030	0.0038	0.012	<0.001	0.023
Nickel	0.001	20	0.0080	0.0080	0.079	0.013	0.106
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.002	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	0.00050	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			O10(15)(0-0.5)5/9F	O12(14)(0-0.5)5/10F	O14(13)(0-0.5)5/10F	O19(14)(0-0.5)5/10F	O21(13)(0-0.5)5/17F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0015	0.0075	0.0031	0.0073	0.0052
Barium	0.01	5.0	2.21	1.68	2.69	1.29	1.69
Cadmium	0.002	0.05	0.0066	0.0045	0.0051	0.0010	0.0004
Chromium	0.001	1.0	0.020	0.0045	0.0083	0.0068	0.0058
Lead	0.001	0.1	0.013	0.027	0.020	0.012	0.0085
Nickel	0.001	20	0.098	0.216	0.079	0.225	0.012
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			U21(13)(0-0.5)5/17F	O22(16)(0-0.5)5/12F	O24(15)(0-0.5)5/12F	U24(15)(0-0.5)5/12F	O26(14)(0-0.5)5/12F
Sample Type			O21 FIELD DUPLICATE	SOIL	SOIL	O24 FIELD DUPLICATE	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0052	0.0054	0.0050	0.0047	0.0036
Barium	0.01	5.0	1.67	1.85	2.29	1.90	1.98
Cadmium	0.002	0.05	0.0003	0.0016	0.0010	0.0009	0.015
Chromium	0.001	1.0	0.0053	0.0056	0.0096	0.0054	0.016
Lead	0.001	0.1	0.0065	0.010	0.014	0.0097	0.020
Nickel	0.001	20	0.013	0.047	0.064	0.063	0.182
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			O29(16)(0-0.5)5/12F	O31(15)(0-0.5)5/11F	O33(14)(0-0.5)5/5F	O35(12)(0-0.5)5/5F	O3(15)(0-0.5)5/6F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0062	0.0073	0.0011	<0.0010	<0.0010
Barium	0.01	5.0	2.00	1.55	<1.00	<1.00	<1.0
Cadmium	0.002	0.05	0.0033	0.0010	0.0005	<0.0002	0.0004
Chromium	0.001	1.0	0.0068	0.0036	<0.0020	0.068	0.0042
Lead	0.001	0.1	0.0098	0.0076	0.0074	0.019	0.010
Nickel	0.001	20	0.028	0.042	0.200	0.0054	0.055
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			O5(14)(0-0.5)5/6F	O7(13)(0-0.5)5/9F	O8(16)(0-0.5)5/9F	P10(3)(0-0.5)5/9F	U10(3)(0-0.5)5/9F
Sample Type			SOIL	SOIL	SOIL	SOIL	P10 FIELD DUPLICATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0065	<0.0010	0.0024	0.0046	0.0038
Barium	0.01	5.0	1.44	<1.0	<1.0	<1.0	<1.0
Cadmium	0.002	0.05	0.0005	0.0043	0.0090	0.0051	0.0074
Chromium	0.001	1.0	0.0042	0.0046	0.0042	0.0047	0.0049
Lead	0.001	0.1	0.0080	0.026	0.015	0.0052	0.0068
Nickel	0.001	20	0.063	0.052	0.102	0.110	0.102
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			P12(2)(0-0.5)5/9F	P14(1)(0-0.5)5/10F	P15(4)(0-0.5)5/10F	P19(2)(0-0.5)5/10F	U19(2)(0-0.5)5/10F
Sample Type			SOIL	SOIL	SOIL	SOIL	P19 FIELD DUPLICATE
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0036	0.0053	0.0022	0.0068	0.0071
Barium	0.01	5.0	<1.0	1.86	1.22	1.42	1.33
Cadmium	0.002	0.05	0.0007	0.0012	0.0012	0.0039	0.0037
Chromium	0.001	1.0	0.0033	0.0058	0.0065	0.0062	0.038
Lead	0.001	0.1	0.0059	0.021	0.020	0.030	0.063
Nickel	0.001	20	0.064	0.083	0.116	0.112	0.235
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			P21(1)(0-0.5)5/17F	P22(4)(0-0.5)5/17F	P24(3)(0-0.5)5/12F	P26(2)(0-0.5)5/11F	P29(4)(0-0.5)5/17F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	0.0002
Arsenic	0.001	0.2	0.0054	0.0043	0.0088	0.0049	0.0040
Barium	0.01	5.0	1.74	1.57	2.21	2.15	1.17
Cadmium	0.002	0.05	0.0012	0.0009	0.0007	0.011	<0.0002
Chromium	0.001	1.0	0.0070	0.0049	0.011	0.0063	0.0055
Lead	0.001	0.1	0.070	0.021	0.0096	0.025	<0.0030
Nickel	0.001	20	0.056	0.014	0.022	0.072	0.011
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			P31(3)(0-0.5)5/20F	U31(3)(0-0.5)5/20F	P33(2)(0-0.5)5/5F	P33(2)(0-0.5)FB5/5F	P35(1)(0-0.5)5/5F
Sample Type			SOIL	P31 FIELD DUPLICATE	SOIL	P33 FIELD BLANK	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0073	0.0076	0.0052	<0.001	0.0013
Barium	0.01	5.0	2.10	2.12	1.12	<0.010	<1.00
Cadmium	0.002	0.05	0.0006	0.0007	0.0004	0.0002	0.0012
Chromium	0.001	1.0	0.0039	0.0020	0.553	0.0094	0.029
Lead	0.001	0.1	0.0048	0.0049	0.041	0.005	0.0037
Nickel	0.001	20	0.014	0.014	0.180	0.110	0.027
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.002	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			P3(3)(0-0.5)5/6F	P5(2)(0-0.5)5/6F	P7(1)(0-0.5)5/9F	P8(4)(0-0.5)5/9F	R10(7)(0-0.5)5/9F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	0.0016	0.0005
Arsenic	0.001	0.2	0.0023	0.0018	<0.0010	0.0016	<0.0010
Barium	0.01	5.0	1.03	1.49	1.48	<1.0	<1.0
Cadmium	0.002	0.05	0.0008	0.0028	0.0027	0.0068	0.0024
Chromium	0.001	1.0	0.013	0.0078	0.0055	0.0066	0.0041
Lead	0.001	0.1	<0.0030	0.019	0.0055	0.0047	<0.0030
Nickel	0.001	20	0.015	0.032	0.060	0.111	0.014
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	0.0030

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			R12(6)(0-0.5)5/9F	R14(5)(0-0.5)5/18F	R15(8)(0-0.5)5/10F	R19(6)(0-0.5)5/25F	R19(6)(0-0.5)FB5/25F
Sample Type			SOIL	SOIL	SOIL	SOIL	R19 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0029	<0.0010	0.0074	0.0043	<0.001
Barium	0.01	5.0	<1.0	1.96	1.30	1.42	<0.010
Cadmium	0.002	0.05	0.0052	0.0018	0.0087	0.0008	0.0003
Chromium	0.001	1.0	0.0074	0.0041	0.0048	<0.0020	<0.002
Lead	0.001	0.1	0.025	0.0038	0.051	0.0062	0.0073
Nickel	0.001	20	0.055	0.077	0.114	0.069	0.051
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	0.029	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			R21(5)(0-0.5)5/10F	R22(8)(0-0.5)5/17F	R24(7)(0-0.5)5/12F	R24(7)(0-0.5)FB5/12F	R26(6)(0-0.5)5/18F
Sample Type			SOIL	SOIL	SOIL	R24 FIELD BLANK	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0078	0.0059	0.0063	<0.001	0.0043
Barium	0.01	5.0	2.02	1.68	2.46	<0.010	2.12
Cadmium	0.002	0.05	0.020	0.0011	0.0011	<0.0002	0.0018
Chromium	0.001	1.0	0.0077	0.0045	0.014	<0.002	0.0042
Lead	0.001	0.1	0.068	0.011	0.014	0.0038	0.0039
Nickel	0.001	20	0.199	0.034	0.050	0.015	0.041
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.002	<0.0020
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			R29(8)(0-0.5)5/13F	R31(7)(0-0.5)5/20F	R33(6)(0-0.5)6/2F	V33(6)(0-0.5)6/2F	R33(6)(0-0.5)FB6/2F
Sample Type			SOIL	SOIL	SOIL	R33 FIELD DUPLICATE	R33 FIELD BLANK
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0063	0.0077	0.0091	0.0061	<0.001
Barium	0.01	5.0	1.95	2.09	1.78	2.60	0.031
Cadmium	0.002	0.05	<0.0002	0.0009	0.0009	0.0008	0.0005
Chromium	0.001	1.0	0.0054	<0.0020	0.0040	0.0058	<0.002
Lead	0.001	0.1	0.011	0.0062	0.0072	0.0099	0.0043
Nickel	0.001	20	0.046	0.019	0.030	0.085	0.0049
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
Silver	0.005	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			R35(5)(0-0.5)5/5F	R5(8)(0-0.5)5/18F	R7(5)(0-0.5)5/9F	R8(8)(0-0.5)5/9F	T31(11)(0-0.5)5/11F
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
Arsenic	0.001	0.2	0.0011	0.0061	0.0037	0.0097	<0.0010
Barium	0.01	5.0	<1.00	2.15	1.22	<1.0	1.89
Cadmium	0.002	0.05	<0.0002	0.0021	0.030	0.015	0.0007
Chromium	0.001	1.0	0.011	0.0059	0.0032	0.041	0.0047
Lead	0.001	0.1	0.0030	0.0054	0.030	0.032	0.0070
Nickel	0.001	20	0.022	0.040	0.137	0.147	0.016
Selenium	0.002	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.005	0.005	0.0008	<0.0005	0.0011	<0.0005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number [2]			T33(10)(0-0.5)5/5F
Sample Type			SOIL
Inorganics	IDLs (Soils)[3]	Closure CUOs	Results
Units	mg/l	mg/l	mg/l
Mercury	0.0002	0.01	0.0003
Arsenic	0.001	0.2	0.0038
Barium	0.01	5.0	<1.00
Cadmium	0.002	0.05	0.0006
Chromium	0.001	1.0	0.0053
Lead	0.001	0.1	0.011
Nickel	0.001	20	0.073
Selenium	0.002	0.02	<0.0020
Silver	0.005	0.005	<0.0005

TABLE 6
CLEAN CLOSURE[1] INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

NOTES:

[1] Clean Closure Sampling began on May 5, 1994 and was completed on June 2, 1994.

[2] Sample identification number: Example: A22(16)(0.0-0.5)5/12F
A22(16) = Location code
(0.0-0.5) = Depth modifier
5/12 = Date sampled
F = Clean closure modifier

Additional modifiers include: FB = Field blank

[3] The given instrument detection limits are only applicable for soil samples.

TABLE 1
SUMMARY OF ANALYTICAL RESULTS OF THE TEMPORARY CONTAINER STORAGE AREA

KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification	Total (mg/kg)				TCLP (mg/l)			
	Cadmium	Chromiu	Lead	Zinc	Cadmium	Chromiu	Lead	Zinc
Closure Levels	ND	ND	ND	ND	0.05	1	0.1	ND
Preconstruction Samples								
CSA1 NW	0.74	56	240	210	0.005	<0.010	<0.020	2
CSA1 SE	0.55	54	26	81	<0.005	<0.010	<0.020	0.47
CSA2 NW	0.99	17	38	110	<0.005	<0.010	0.045	0.78
CSA2 SE	0.28	25	20	64	<0.005	<0.010	<0.020	0.42
DSA2 SE	0.24	21	14	57	<0.005	<0.010	<0.020	0.49
CSA3 NW	0.28	10	14	34	0.007	<0.010	0.026	0.79
CSA3 SE	0.69	26	27	170	0.007	<0.010	0.022	1.7
ECS NW	0.68	84	23	140	0.007	<0.010	<0.020	1.1
ECS SE	0.54	18	32	160	<0.005	<0.010	<0.020	1.4
SSC	0.66	36	120	150	<0.005	<0.010	0.095	1.8
TTA	0.99	39	51	280	0.009	<0.010	<0.020	4.6
Additional Samples								
SS1 NW	0.98	270	6400	520	0.013	<0.010	0.053	0.94
SS1 SE	0.38	41	5200	150	<0.005	<0.010	7.26	0.38
SURF E-1	2.7	120	4700	570	0.03	<0.010	0.64	1.5
DEEP E-1	0.33	61	6700	220	<0.005	<0.010	30	0.04
SURF E-2	2.1	120	2700	400	0.01	<0.010	1.3	2.5
DEEP E-2	2.1	250	6800	560	0.02	<0.010	0.47	2.2
SURF E-3	2.2	41	36	130	NA	NA	NA	NA
Background								
BG-8	0.4	19.6	19	78.5	0.0017	<0.0027	<0.0024	0.0527
BG-9A	1.3	26.4	57	195	0.0045	<0.0027	0.0078	0.235
BG-11A	0.28	26.9	22.6	89.1	<0.00068	0.0043	0.0078	0.0123

NOTE: 1) QA/QC duplicate of sample CSA2SE

KEY: NA = Not analyzed.
ND = Clean closure level not required for this parameter.
= Result exceeds clean closure level.

Taken From:
TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)

Taken From:
TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)

TABLE 2

SUMMARY OF ANALYTICAL RESULTS USED TO DELINEATE EXTENT OF SOIL CONTAMINATION
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Number	Total Lead (mg/kg)	TCLP Lead (mg/l)
AO(0-1) 1/26D	52	na
AO(1-2) 1/26D	14	na
A1(0-1) 1/26D	90	na
A1(1-2) 1/26D	6.2	na
A2(0-1) 2/11D	39	na
BO(0-1) 1/26D	12	na
BO(1-2) 1/26D	16	na
B1(0-1) 1/26D	94	na
B1(1-2) 1/26D	9.6	na
B1(2-3) 1/26D	11	na
B2(0-1) 1/27D	4600	7.75
B2(1-2) 1/27D	9500	na
B2(2-3) 1/27D	4400	na
B3(0-1) 1/27D	150	na
B3(1-2) 1/27D	54	na
B3(2-3) 1/27D	24	na
B4(0-1) 2/11D	2400	na
B4(1-2) 2/11D	330	na
B4(2-3) 2/11D	220	na

Sample Number	Total Lead (mg/kg)	TCLP Lead (mg/l)
CO(1-2) 1/26D	11	na
C1(0-1) 1/26D	1100	0.50
C1(1-2) 1/26D	48	na
C1(2-3) 1/26D	6.8	na
C2(0-1) 1/27D	1900	na
C2(1-2) 1/27D	19000	na
C2(2-3) 1/27D	5200	na
C2(3-4) 1/27D	150	na
C2(4-5) 1/27D	38	na
C3(0-1) 1/27D	4700	na
C3(1-2) 1/27D	5700	na
C3(2-3) 1/27D	7700	na
C3(3-4) 1/27D	900	na
C3(4-5) 1/27D	24	na
C4(0-1) 1/27D	12000	49.9
C4(1-2) 1/27D	4200	na
C4(2-3) 1/27D	1400	na
C4(3-4) 1/27D	90	na
C5(0-1) 2/10D	8000	na

TABLE 2

SUMMARY OF ANALYTICAL RESULTS USED TO DELINEATE
EXTENT OF SOIL CONTAMINATION
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Number	Total Lead (mg/kg)	TCLP Lead (mg/l)
B6(0-1) 2/11D	100	na
B10(0-1) 2/11D	460	na
CC1(0-1) 1/27D	1400	na
CC1(1-2) 1/27D	5700	na
CC1(2-3) 1/27D	11000	na
CC7(0-1) 2/11D	18000	na
CC7(1-2) 2/11D	3200	na
CC7(2-3) 2/11D	380	na
CO(0-1) 1/26D	35	na
C8(2-3) 2/10D	400	na
C9(0-1) 2/10D	9600	na
C9(1-2) 2/10D	2000	na
C9(2-3) 2/10D	25	na
C10(0-1) 2/11D	1400	na
C10(1-2) 2/11D	4500	na
C10(2-3) 2/11D	70	na
C11(0-1) 2/11D	200	na
C11(1-2) 2/11D	17	na
C12(0-1) 2/11D	780	na

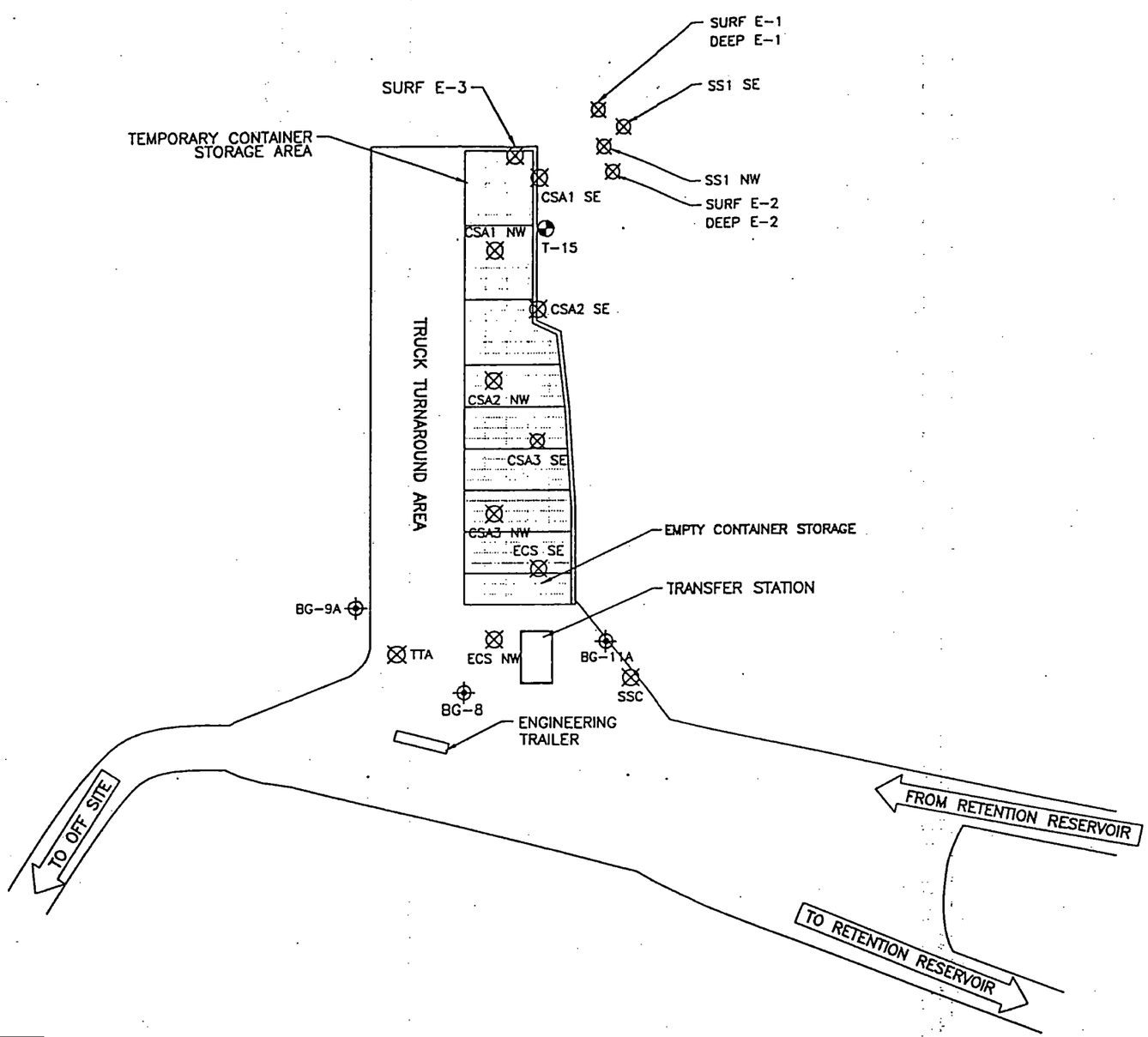
Sample Number	Total Lead (mg/kg)	TCLP Lead (mg/l)
C5(1-2) 2/10D	64	na
C6(0-1) 2/10D	3400	na
C6(1-2) 2/10D	6400	na
C6(2-3) 2/10D	48	na
C7(0-1) 2/10D	4900	na
C7(1-2) 2/10D	8900	na
C7(2-3) 2/10D	53	na
C8(0-1) 2/10D	5900	na
C8(1-2) 2/10D	11000	na
D5(1-2) 2/10D	30	na
D6(0-1) 2/10D	6000	na
D6(1-2) 2/10D	7200	na
D6(2-3) 2/10D	81	na
D7(0-1) 2/10D	2600	na
D7(1-2) 2/10D	11	na
D8(0-1) 2/10D	2400	na
D8(1-2) 2/10D	21	na
D9(0-1) 2/11D	180	na
D10(0-1) 2/11D	13	na

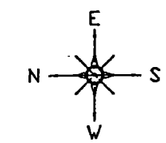
TABLE 2

SUMMARY OF ANALYTICAL RESULTS USED TO DELINEATE
EXTENT OF SOIL CONTAMINATION
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Number	Total Lead (mg/kg)	TCLP Lead (mg/l)	Sample Number	Total Lead (mg/kg)	TCLP Lead (mg/l)
C12(1-2) 2/11D	100	na	D11(0-1) 2/11D	92	na
DO(0-1) 1/26D	45	na	DE4(0-1) 1/27D	1200	na
DO(1-2) 1/26D	11	na	DE4(1-2) 1/27D	630	na
D1(0-1) 1/26D	13	na	DE4(2-3) 1/27D	5000	na
D1(1-2) 1/26D	12	na	E2(0-1) 1/27D	10	na
D1(2-3) 1/26D	14	na	E2(1-2) 1/27D	13	na
D2(0-1) 1/27D	12000	14.40	E2(2-3) 1/27D	9.7	na
D2(1-2) 1/27D	73	na	E3(0-1) 1/27D	63	na
D2(2-3) 1/27D	8.2	na	E3(1-2) 1/27D	140	na
D3(0-1) 1/27D	380	na	E3(2-3) 1/27D	11	na
D3(1-2) 1/27D	7400	3.47	E4(0-1) 1/27D	110	na
D3(2-3) 1/27D	7300	na	E4(1-2) 1/27D	12	na
D3(3-4) 1/27D	6800	na	E4(2-3) 1/27D	7.5	na
D4(0-1) 1/27D	5800	na	E5(0-1) 2/10D	160	na
D4(1-2) 1/27D	13	na	E6(0-1) 2/10D	120	na
D4(2-3) 1/27D	41	na	E7(0-1) 2/10D	110	na
D5(0-1) 2/10D	3500	na			

na = Not Analyzed





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PERMIT SECTION

Taken From:
TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)

SYMBOL LEGEND:

- MONITORING WELL
- BACKGROUND SAMPLE LOCATION
- SAMPLE LOCATIONS

APPROX. SCALE (ft.)
0 150

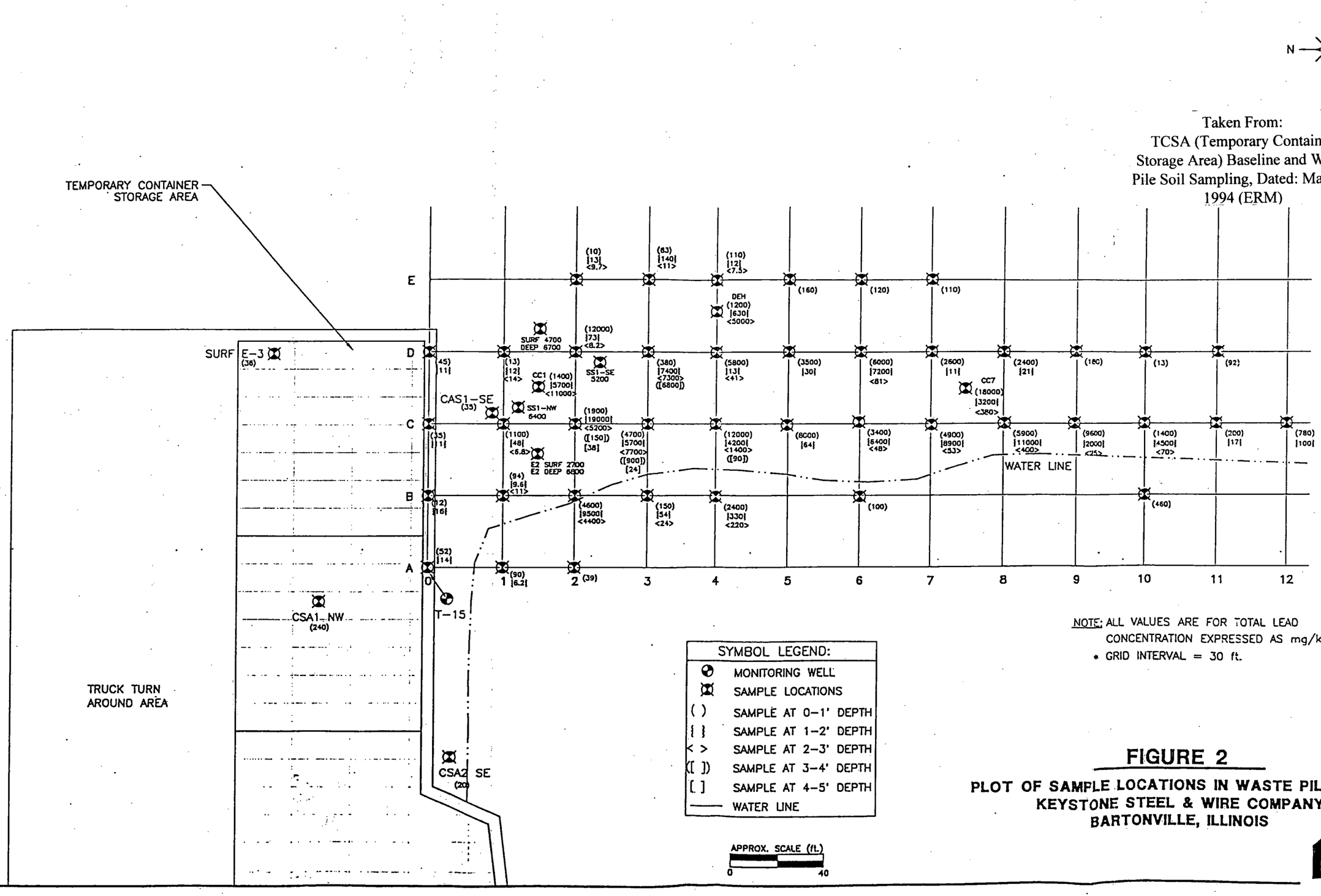
FIGURE 1

TEMPORARY CONTAINER STORAGE AREA SAMPLE LOCATIONS
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

ERM

CLIENT NAME: KEYSTONE STEEL & WIRE COMPANY
FILE NAME
DATE 04/29/94
DRAWN EDB
SNA
APPROV.
PROJECT 92130EB

Taken From:
TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)



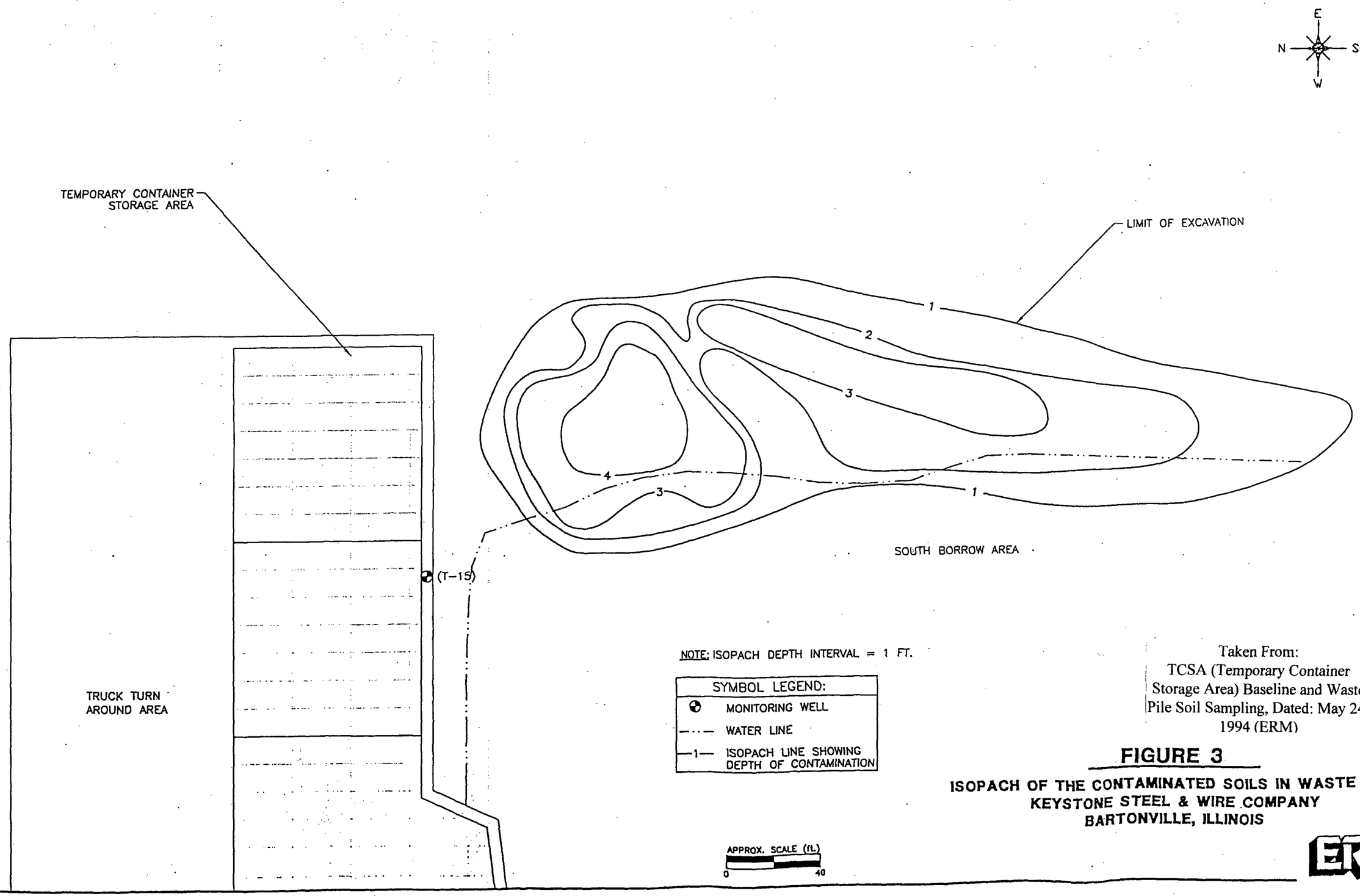
NOTE: ALL VALUES ARE FOR TOTAL LEAD CONCENTRATION EXPRESSED AS mg/kg.
* GRID INTERVAL = 30 ft.

FIGURE 2

PLOT OF SAMPLE LOCATIONS IN WASTE PILE AREA
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

ERM

KEYSTONE STEEL & WIRE COMPANY | 04/20/94 | EDB | SNA | 82130E8



Taken From:
TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)

FIGURE 3

ISOPACH OF THE CONTAMINATED SOILS IN WASTE PILE
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

ERM

PROJECT 92138EB | NOTES: | DRAWN N/A | CHECKED EDB | DATE 04/29/94 | FILE NAME | CLIENT NAME KEYSTONE STEEL & WIRE COMPANY

Taken From:
TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling, Dated: May 24, 1994 (ERM)

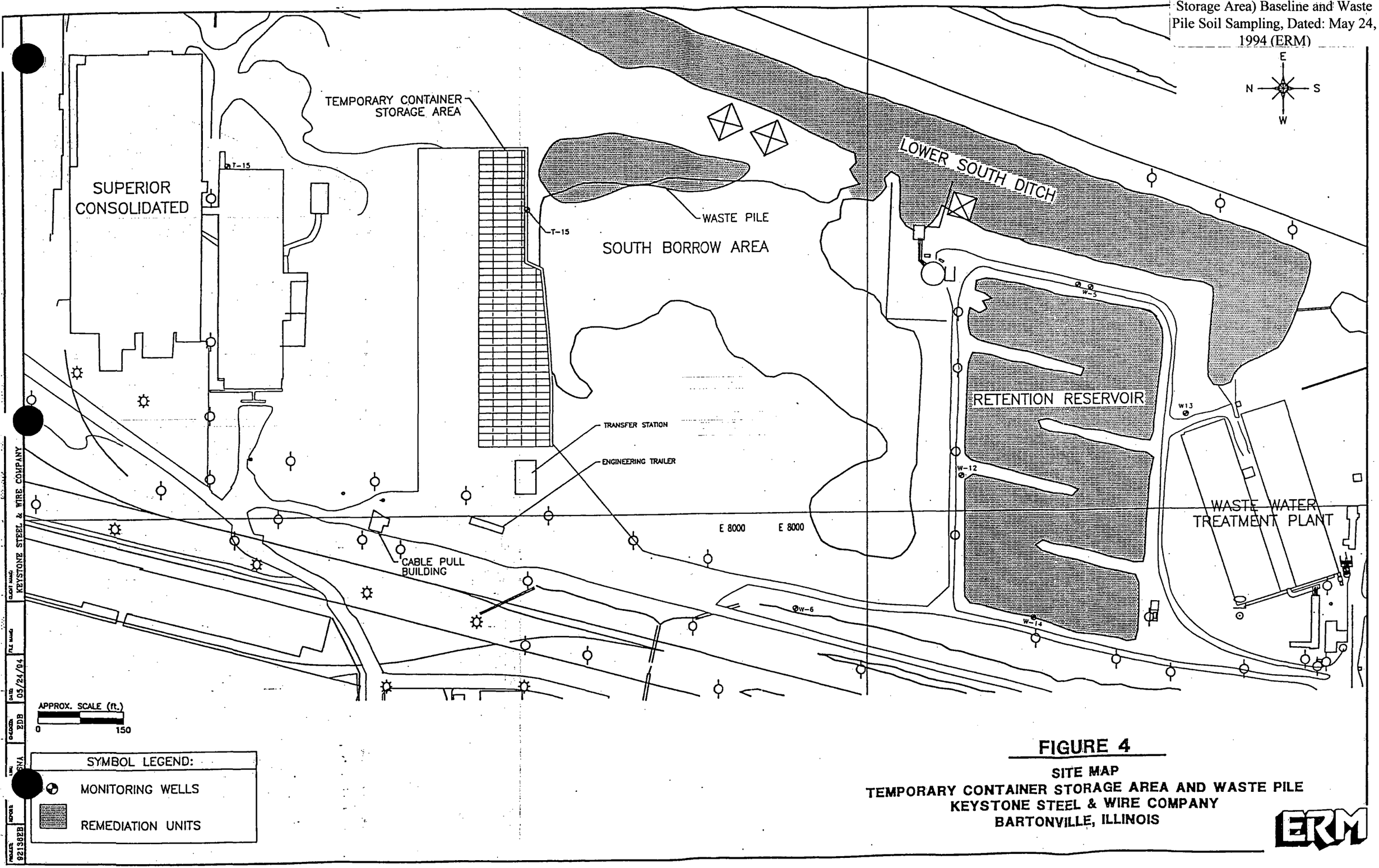


FIGURE 4

SITE MAP
TEMPORARY CONTAINER STORAGE AREA AND WASTE PILE
KEYSTONE STEEL & WIRE COMPANY
BARTONVILLE, ILLINOIS

ERM

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
T-1	02/27/90	WWES	<250	<2.0	50	<10	360000	<50	<10	<10	<10	<50	130000	1300	<0.2	10	5600*	<2.0	150000	<20	<50	
T-1	05/22/90	WWES	<200	<2.0	50	<2.0	430000	<10*	<10	<10	60	<5.0	150000	1600	<0.2	<10	4300	<2.0	73000	<20	<10	
T-1	08/29/90	WWES	<200	<2.0	40	<2.0	492000	<10	<10	<10	10	<2.0	163000	1700	<0.2	20	4600	<2.0	73000	<20	<10	
T-1	11/28/90	WWES				<2.0	478000	<10			20	<2.0	161000	1700		20		<2.0	70000	<20		
T-1	02/27/91	WWES				<2.0	530000	<10			10	<1.0	176000	1900		10		<2.0	74000	<20		
T-1	02/27/91	WWES				2.0	535000	<10			<10	<1.0	179000	1800		10		<2.0	75000	<20		Replicate Sample
T-1	05/29/91	WWES				2.1	566000	<2.0			<10	<1.0	177000	2000		<10		<2.0	76000	30		
T-2A	11/27/89	WWES				0.96		<10				<5.0										
T-2A	02/26/90	WWES	<250	<2.0	40	<10	230000	<50	<10	<10	<10	<50	79000	200	<0.2	<10	<5000*	<2.0	85000	<20	<50	
T-2A	02/26/90	WWES	<250	<2.0	40	<10	230000	<50	<10	<10	<10	<50	78000	200	<0.2	<10	<5000*	<2.0	54000	<20	<50	Replicate Sample
T-2A	05/22/90	WWES	<200	<2.0	50	3.0	200000	<10*	<10	<10	40	<5.0	74000	210	<0.2	<10	4200	<2.0	42000	<20	<10	
T-2A	08/29/90	WWES	<200	<2.0	60	<2.0	222000	<10	<10	<10	150	<2.0	76000	150	<0.2	20	4600	<2.0	45000	<20	<10	
T-2A	11/27/90	WWES				<2	200000	<10			160	<2.0	72000	210		<10		<2.0	44000	<20		
T-2A	02/26/91	WWES				<2.0	222000	<10			40	<1.0	72000	150		<10		<2.0	53000	<20		
T-2A	05/29/91	WWES				<2.0	229000	<2.0			100	<1.0	71000	160		<10		<2.0	61000	<20		
T-2B	02/26/90	WWES	<250	<2.0	40	<10	680000	<50	<10	<10	13000	<50	160000	1600	<0.2	<10	7600*	<2.0	90000	<20	<50	
T-2B	05/22/90	WWES	240	<2.0	30	2.0	680000	<10*	<10	<10	15000	<5.0	160000	1700	<0.2	<10	5600	<2.0	41000	<20	<10	
T-2B	08/29/90	WWES	<200	<2.0	30	<2.0	699000	<10	<10	<10	15000	<2.0	154000	1800	<0.2	20	5600	<2.0	44000	<20	<10	
T-2B	11/27/90	WWES				<2	595000	<10			16000	<2.0	135000	1700		<10		<2.0	38000	<20		
T-2B	02/26/91	WWES				<2.0	683000	<10			16000	<1.0	155000	1800		<10		<2.0	39000	<20		
T-2B	05/29/91	WWES				<2.0	667000	<2.0			17000	<1.0	159000	1800		<10		<2.0	43000	<20		
T-3	02/27/90	WWES	<250	<2.0	<200	<10	120000	<50	<10	<10	<10	<50	47000	520	<0.2	<10	<5000	<2.0	66000	<20	<50	
T-3	02/27/90	WWES	<250	<2.0	<200	<10	110000	<50	<10	<10	20	<50	45000	520	<0.2	<10	<5000	<2.0	66000	<20	<50	Replicate Sample
T-3	05/22/90	WWES	240	<2.0	70	<2.0	110000	<10*	<10	<10	<10	<5.0	44000	460	<0.2	<10	2200	<2.0	64000	<20	<10	
T-3	05/22/90	WWES	<200	<2.0	60	<2.0	110000	<10*	<10	<10	10	<5.0	45000	440	<0.2	<10	2200	<2.0	69000	<20	<10	Replicate Sample
T-3	08/29/90	WWES	<200	<2.0	60	<2.0	117000	<10	<10	<10	<10	<2.0	48000	410	<0.2	10	2500	<2.0	55000	<20	<10	
T-3	12/06/90	WWES				<2.0	123000	<10			10	7.0	42000	580		<10		<2.0	53000	420		
T-3	12/06/90	WWES				<2.0	123000	<10			10	7.0	42000	580		<10		<2.0	52000	420		Replicate Sample
T-3	02/26/91	WWES				<2.0	112000	<10			<10	3.2	47000	490		<10		<2.0	54000	200		
T-3	05/31/91	WWES				<2.0	106000	<2.0			<10	3.1	45000	430		<10		<2.0	52000	200		
T-3	05/31/91	WWES				<2.0	110000	<2.0			<10	2.5	43000	440		<10		<2.0	52000	150		Replicate Sample
T-4A	02/27/90	WWES	<250	<2.0	30	<10	320000	<50	<10	<10	<10	<50	94000	510	<0.2	20	<5000*	<2.0	80000	<20	<50	
T-4A	05/22/90	WWES	<200	<2.0	30	<2.0	300000	<10*	<10	<10	<10	<5.0	97000	420	<0.2	<10	2100	<2.0	63000	<20	<10	
T-4A	08/28/90	WWES	<200	<2.0	20	<2.0	315000	<10	<10	<10	20	<2.0	97000	450	<0.2	20	2200	<2.0	64000	<20	<10	
T-4A	11/28/90	WWES				<2	290000	<10			20	<2.0	91000	440		<10		<2.0	61000	<20		
T-4A	02/26/91	WWES				<2.0	240000	<10			<10	<1.0	93000	440		<10		<2.0	65000	<20		
T-4A	05/29/91	WWES				<2.0	311000	<2.0			60	<1.0	94000	420		<10		<2.0	67000	<20		
T-4B	02/27/90	WWES	<250	<2.0	<200	<10	180000	<50	<10	<10	100	<50	57000	1600	<0.2	<10	7100	<2.0	42000	<20	<50	
T-4B	02/27/90	WWES	<250	<2.0	<200	<10	190000	<50	<10	<10	100	<50	61000	1600	<0.2	<10	6700	<2.0	42000	<20	<50	Replicate Sample
T-4B	05/22/90	WWES	220	<2.0	90	<2.0	190000	<10*	<10	<10	120	<5.0	58000	1700	<0.2	<10	6500	<2.0	37000	<20	<10	
T-4B	05/22/90	WWES	480	<2.0	90	<2.0	190000	<10*	<10	<10	140	<5.0	55000	1700	<0.2	<10	6400	<2.0	36000	<20	<10	Replicate Sample
T-4B	08/28/90	WWES	<200	<2.0	70	<2.0	171000	<10	<10	<10	160	<2.0	51000	1500	<0.2	20	6400	<2.0	31000	<20	<10	
T-4B	08/28/90	WWES	<200	<2.0	70	<2.0	171000	<10	<10	<10	130	<2.0	52000	1500	<0.2	20*	6500	<2.0	31000	<20	<10	Replicate Sample

Taken From:
Revised Phase 2 Closure Plan.
Dated: June 15, 1992 (ERM,WWES)

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
T-4B	11/28/90	WWES				<2	141000	<10			640	<2.0	48000	700		<10		<2.0	33000	<20		
T-4B	02/26/91	WWES				<2.0	181000	<10			160	<1.0	54000	1600		<10		<2.0	<28000	<20		
T-4B	05/29/91	WWES				<2.0	174000	<2.0			160	<1.0	49000	1500		<10		<2.0	29000	<20		
T-5A	02/27/90	WWES	<250	<2.0	<200	<10	130000	<50	<10	<10	<10	<50	58000	380	<0.2	<10	<5000	<2.0	36000	<20	<50	
T-5A	05/22/90	WWES	<200	<2.0	30	<2.0	130000	<10*	<10	<10	30	<5.0	55000	290	<0.2	<10	2500	<2.0	35000	<20	<10	
T-5A	08/28/90	WWES	<200	<2.0	30	<2.0	134000	<10	<10	<10	<10	<2.0	58000	320	<0.2	20	2900	<2.0	40000	<20	<10	
T-5A	11/27/90	WWES				<2	119000	<10			20	<2.0	47000	320		<10		<2.0	39000	<20		
T-5A	02/25/91	WWES				<2.0	135000	<10			<10	<1.0	55000	330		<10		<2.0	41000	<20		
T-5A	05/29/91	WWES				<2.0	141000	<2.0			50	<1.0	54000	290		<10		<2.0	45000	<20		
T-5B	02/27/90	WWES	<250	<2.0	<200	<10	280000	<50	<10	<10	1400	<50	110000	140	0.3*	<10	<5000	<2.0	39000	<20	<50	
T-5B	05/22/90	WWES	<200	<2.0	30	<2.0	300000	<10*	<10	<10	600	<5.0	120000	160	<0.2	<10	2900	<2.0	35000	<20	<10	
T-5B	05/22/90	WWES	<200	<2.0	30	<2.0	310000	<10*	<10	<10	550	<5.0	120000	150	<0.2	<10	3000	<2.0	25000	<20	<10	Replicate Sample
T-5B	08/28/90	WWES	<200	<2.0	30	<2.0	321000	<10	<10	<10	490	<2.0	121000	160	0.2	<10	3100	<2.0	36000	<20	<10	
T-5B	11/27/90	WWES				<2.0	327000	<10			6500	<2.0	122000	170		<10		<2.0	31000	<20		
T-5B	02/25/91	WWES				<2.0	292000	<10			5200	<1.0	103000	160		<10		<2.0	34000	60		
T-5B	05/29/91	WWES				<2.0	325000	<2.0			5900	<1.0	112000	160		<10		<2.0	35000	<20		
T-5C	02/27/90	WWES	<250	<2.0	<200	<10	400000	<50	<10	<10	1700	<50	130000	510	<0.2	<10	<5000	<2.0	65000	<20	<50	
T-5C	05/22/90	WWES	<200	<2.0	40	<2.0	430000	<10*	<10	<10	4200	<5.0	140000	470	<0.2	<10	4100	<2.0	56000	<20	<10	
T-5C	08/28/90	WWES	<200	<2.0	30	<2.0	439000	<10	<10	<10	5000	<2.0	146000	630	0.3	<10	4200	<2.0	56000	<20	<10	
T-5C	11/27/90	WWES				<2	376000	<10			5100	<2.0	116000	530		<10		<2.0	52000	<20		
T-5C	02/25/91	WWES				<2.0	439000	<10			4300	<1.0	148000	640		<10		<2.0	55000	<20		
T-5C	05/29/91	WWES				<2.0	437000	<2.0			6000	<1.0	138000	580		<10		<2.0	59000	<20		
T-5C	05/29/91	WWES				<2.0	456000	<2.0			6000	<1.0	141000	640		<10		<2.0	60000	<20		Replicate Sample
T-6A	11/27/89	WWES				1.1		<10				<5.0										
T-6A	02/26/90	WWES	<250	<2.0	30	<10	96000	<50	<10	<10	<10	<50	54000	2300	<0.2	<10	<5000*	<2.0	78000	20	<50	
T-6A	05/22/90	WWES	270	<2.0	30	<2.0	120000	<10*	<10	<10	40	<5.0	62000	2500	<0.2	<10	<500	<2.0	74000	20	<10	
T-6A	08/29/90	WWES	<200	<2.0	30	<2.0	133000	<10	<10	<10	80	<2.0	72000	2400	<0.2	<10	<500	<2.0	78000	<20	<10	
T-6A	08/29/90	WWES	<200	<2.0	30	<2.0	127000	<10	<10	<10	20	<2.0	69000	2400	<0.2	<10	<500	<2.0	74000	<20	<10	Replicate Sample
T-6A	11/27/90	WWES				<2	119000	<10			90	2.1	62000	2700		10		<2.0	75000	<20		
T-6A	11/27/90	WWES				<2	120000	<10			100	<2.0	63000	2700		10		<2.0	75000	<20		Replicate Sample
T-6A	02/26/91	WWES				<2.0	144000	<10			<10	<1.0	75000	2500		<10		<2.0	73000	<20		
T-6A	02/26/91	WWES				<2.0	147000	<10			10	<1.0	72000	2500		<10		<2.0	75000	<20		Replicate Sample
T-6A	05/29/91	WWES				<2.0	153000	<2.0			30	<1.0	76000	2900		<10		<2.0	74000	<20		
T-6A	05/29/91	WWES				<2.0	156000	<2.0			30	<1.0	77000	2900		<10		<2.0	76000	<20		Replicate Sample
T-6B	02/26/90	WWES	<250	<2.0	40	<10	180000	<50	<10	<10	<10	<50	62000	240	<0.2	<10	<5000*	<2.0	59000	<20	<50	
T-6B	05/22/90	WWES	340	<2.0	30	<2.0	190000	<10	<10	<10	<10	<5.0	63000	230	<0.2	<10	2400	<2.0	57000	<20	<10	
T-6B	08/29/90	WWES	<200	<2.0	30	<2.0	189000	<10	<10	<10	<10	<2.0	70000	190	<0.2	<100	2800	<2.0	59000	<20	<10	
T-6B	11/27/90	WWES				<2.0	156000	<10			20	<2.0	54000	220		<10		<2.0	64000	<20		
T-6B	02/26/91	WWES				<2.0	174000	<10			<10	<1.0	60000	170		<10		<2.0	62000	<20		
T-6B	05/29/91	WWES				<2.0	175000	<2.0			<10	<1.0	55000	170		<10		<2.0	63000	<20		
T-6C	02/26/90	WWES	<250	<2.0	70	<10	460000	<50	<10	<10	3900	<50	170000	280	<0.2	<10	<5000*	<2.0	39000	<20	<50	
T-6C	05/22/90	WWES	340	<2.0	70	<2.0	450000	<10	<10	<10	9400	<5.0	170000	290	<0.2	<10	2800	<2.0	37000	<20	<10	
T-6C	08/29/90	WWES	<200	<2.0	80	<2.0	462000	<10	<10	<10	9000	<2.0	172000	270	<0.2	10	3400	<2.0	38000	<20	<10	
T-6C	11/27/90	WWES				<2	440000	<10			9900	<2.0	168000	260		<10		<2.0	39000	<20		
T-6C	02/26/91	WWES				<2.0	477000	<10			8000	<1.0	181000	270		<10		<2.0	37000	<20		

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
T-6C	05/29/91	WWES				<2.0	490000	<2.0			9600	<1.0	170000	240		<10		<2.0	38000	<20		
T-7A	02/28/90	WWES	<250	<2.0	<200	<10	200000	<50	<10	<10	10	<50	66000	300	<0.2	60	<5000	<2.0	580000	<20	<50	
T-7A	05/23/90	WWES	340	<2.0	50	<2.0	160000	<10	<10	<10	50	<5.0	56000	340	<0.2	30	<500	<2.0	530000	<20	<10	
T-7A	08/30/90	WWES	<200	<2.0	40	<2.0	83000	<10	<10	<10	<10	<2.0	28000	160	<0.2	40	<500	<2.0	334000	<20	<10	
T-7A	11/28/90	WWES				<2	79000	<10			40	<2.0	26000	220		60		<2.0	297000	<20		
T-7A	11/28/90	WWES				<2	77000	<10			20	<2.0	26000	230		60		<2.0	307000	<20		Replicate Sample
T-7A	02/27/91	WWES				<2.0	121000	<10			40	<1.0	42000	330		210		<2.0	454000	<20		
T-7A	05/29/91	WWES				<2.0	101000	7.1			170	<1.0	32000	230		120		<2.0	395000	<20		
T-7B	02/28/90	WWES	<250	<2.0	<200	<10	140000	<50	<10	<10	390	<50	59000	240	<0.2	<10	<5000	<2.0	82000	<20	<50	
T-7B	02/28/90	WWES	<250	<2.0	<200	<10	140000	<50	<10	<10	320	<50	59000	240	<0.2	<10	<5000	<2.0	83000	<20	<50	Replicate Sample
T-7B	05/23/90	WWES	<200	<2.0	110	<2.0	140000	<10	<10	<10	270	<5.0	58000	230	<0.2	<10	3000	<2.0	87000	<20	<10	
T-7B	05/23/90	WWES	<200	<2.0	120	<2.0	130000	<10	<10	<10	160	<5.0	54000	230	<0.2	<10	3200	<2.0	88000	<20	<10	Replicate Sample
T-7B	08/30/90	WWES	<200	<2.0	90	<2.0	153000	<10	<10	<10	390	<2.0	66000	220	<0.2	<10	3700	<2.0	84000	<20	<10	
T-7B	08/30/90	WWES	<200	<2.0	100	<2.0	149000	<10	<10	<10	270	<2.0	65000	220	<0.2	<10	3700	<2.0	84000	<20	<10	Replicate Sample
T-7B	11/28/90	WWES				<2	129000	<10			1500	<2.0	56000	350		<10		<2.0	75000	<20		
T-7B	02/27/91	WWES				<2.0	149000	<10			220	<1.0	67000	250		<10		<2.0	85000	<20		
T-7B	02/27/91	WWES				<2.0	148000	<10			260	<1.0	65000	260		<10		<2.0	85000	<20		Replicate Sample
T-7B	05/29/91	WWES				<2.0	182000	<2.0			440	1.0	72000	210		<10		<2.0	80000	40		
T-7B	05/29/91	WWES				<2.0	179000	<2.0			280	<1.0	71000	200		<10		<2.0	79000	<20		Replicate Sample
T-8	02/28/90	WWES	<250	<2.0	<200	<10	370000	<50	<10	<10	6500	<50	150000	870	<0.2	<10	<5000	<2.0	43000	<20	<50	
T-8	05/23/90	WWES	<200	<2.0	80	<2.0	340000	<10	<10	<10	5500	<5.0	150000	930	<0.2	<10	800	<2.0	50000	<20	<10	
T-8	08/29/90	WWES	<200	<2.0	60	<2.0	337000	<10	<10	<10	7200	<2.0	153000	940	<0.2	<10	950	<2.0	44000	<20	<10	
T-8	11/28/90	WWES				<2	311000	<10			7200	<2.0	143000	880		<10		<2.0	43000	<20		
T-8	02/27/91	WWES				<2.0	297000	<10			6000	<1.0	142000	870		<10		<2.0	41000	<20		
T-8	05/28/91	WWES				<2.0	316000	<2.0			5600	<1.0	129000	820		<10		<2.0	41000	<20		
T-9	02/28/90	WWES	<250	<2.0	<200	<10	130000	<50	<10	<10	250	<50	50000	840	<0.2	<10	<5000	<2.0	30000	<20	<50	
T-9	05/23/90	WWES	220	<2.0	80	<2.0	120000	<10	<10	<10	30	<5.0	51000	880	<0.2	<10	1200	<2.0	47000	<20	<10	
T-9	05/23/90	WWES	340	<2.0	60	<2.0	120000	<10	<10	<10	20	<5.0	51000	890	<0.2	<10	1100	<2.0	43000	<20	<10	Replicate Sample
T-9	08/29/90	WWES	<200	<2.0	70	<2.0	128000	<10	<10	<10	220	<2.0	56000	830	<0.2	<10	1600	<2.0	113000	<20	<10	
T-9	11/28/90	WWES				<2	115000	<10			200	<2.0	48000	800		10		<2.0	138000	<20		
T-9	11/28/90	WWES				<2	110000	<10			<10	<2.0	48000	720		10		<2.0	139000	<20		Replicate Sample
T-9	02/27/91	WWES				<2.0	128000	<10			10	<1.0	55000	760		<10		<2.0	208000	<20		
T-9	05/29/91	WWES				<2.0	130000	<2.0			<10	<1.0	49000	550		<10		<2.0	165000	<20		
T-10	02/28/90	WWES	<250	<2.0	<200	<10	1100000	<50	30	<10	29000	<50	270000	2900	<0.2	90	21000	<2.0	51000	<20	<50	
T-10	05/23/90	WWES	<200	<2.0	50	<2.0	1200000	<10	30	<10	31000	<5.0	260000	3200	<0.2	90	17000	<2.0	57000	<20	<10	
T-10	08/29/90	WWES	350	<2.0	40	<2.0	1280000	<10	40	<10	32000	<2.0	275000	3900	<0.2	110	21000	<2.0	59000	<20	<10	
T-10	11/28/90	WWES				<2	1270000	<10			35000	<2.0	248000	5200		110		<2.0*	62000	<20		
T-10	02/27/91	WWES				<2.0	1260000	<10			36000	<1.0	257000	5600		120		<2.0*	57000	<20		
T-10	05/29/91	WWES				31	1450000	<2.0			42000	<1.0	262000	6100		110		<2.0	65000	20		
T-11A	02/26/90	WWES	<250	<2.0	90	<10	83000	<50	<10	<10	<10	<50	34000	530	<0.2	<10	7400*	<2.0	180000	<20	<50	
T-11A	05/22/90	WWES	<200	<2.0	130	<2.0	120000	<10	<10	<10	100	<5.0	49000	850	<0.2	<10	3800	<2.0	52000	<20	<10	
T-11A	08/30/90	WWES	<200	<2.0	110	<2.0	113000	<10	<10	<10	640	<2.0	46000	850	<0.2	10	3300	<2.0	42000	<20	<10	
T-11A	11/27/90	WWES				<2	129000	<10			1900	<2.0	58000	970		<10		<2.0	49000	<20		
T-11A	02/26/91	WWES				<2.0	143000	<10			2600	<1.0	57000	1000		<10		<2.0	56000	<20		
T-11A	05/30/91	WWES				<2.0	132000	<2.0			2900	<1.0	52000	920		<10		<2.0	56000	<20		
T-11B	02/26/90	WWES	<250	<2.0	100	<10	150000	<50	<10	<10	<10	<50	57000	460	<0.2	20	5200*	<2.0	58000	30	<50	

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
T-11B	05/22/90	WWES	<200	<2.0	80	<2.0	160000	<10	<10	<10	70	<5.0	64000	670	<0.2	<10	3400	<2.0	53000	<20	<10	
T-11B	08/30/90	WWES	<200	<2.0	90	<2.0	159000	<10	<10	<10	40	<2.0	64000	630	<0.2	10	3600	<2.0	54000	<20	<10	
T-11B	11/27/90	WWES				<2	147000	<10			<10	<2.0	64000	640		10		<2.0	56000	<20		
T-11B	02/26/91	WWES				<2.0	175000	<10			<10	<1.0	69000	660		10		<2.0	58000	<20		
T-11B	05/30/91	WWES				<2.0	172000	<2.0			40	2.6	66000	620		<10		<2.0	51000	90		
T-11C	02/26/90	WWES	<250	2.6	110	<10	91000	<50	<10	<10	<10	<50	92000	1500	<0.2	30	<5000*	<2.0	50000	20	<50	
T-11C	05/22/90	WWES	<200	<2.0	40	<2.0	240000	<10	<10	<10	10	<5.0	97000	1800	<0.2	<10	3700	<2.0	47000	<20	<10	
T-11C	08/30/90	WWES	<200	<2.0	50	<2.0	256000	<10	<10	<10	150	<2.0	102000	1700	<0.2	10	5900	<2.0	46000	<20	<10	
T-11C	11/27/90	WWES				<2	234000	<10			<10	<2.0	102000	1800		10		<2.0	42000	<20		
T-11C	02/26/91	WWES				<2.0	276000	<10			20	<1.0	109000	1800		<10		<2.0	43000	<20		
T-11C	05/30/91	WWES				<2.0	288000	<2.0			40	<1.0	110000	1900		<10		<2.0	39000	<20		
T-12	02/27/90	WWES	<250	<2.0	30	<10	270000	<50	<10	<10	<10	<50	88000	680	<0.2	<10	<5000*	<2.0	62000	<20	<50	
T-12	05/24/90	WWES	340	<2.0	30	<2.0	280000	<10	<10	<10	930	<5.0	88000	1100	<0.2	<10	4000	<2.0	59000	<20	<10	
T-12	08/29/90	WWES																				N/A
T-12	11/28/90	WWES				<2	257000	<10			10	<2.0	93000	700		<10		<2.0	54000	<20		
T-12	02/28/91	WWES				<2.0	297000	<10			<10	<1.0	91000	790		<10		<2.0	64000	20		
T-13A	02/28/90	WWES	<250	<2.0	<200	40	530000	<50	140	<10	280000	<50	180000	16000	<0.2	560	17000	<2.0	62000	28000	<50	
T-13A	05/23/90	WWES	290	<2.0	50	41	610000	<10	110	<10	180000	35	240000	9700	<0.2	580	19000	<2.0	54000	37000	<10	
T-13A	08/28/90	WWES	<200	<2.0	110	26	532000	<10	60	<10	65000	7.3	227000	6500	<0.2	360	16000	<2.0	41000	25000	<10	
T-13A	11/28/90	WWES				19	489000	<10			73000	4.4	194000	6700		340		<2.0	36000	21000		
T-13A	02/28/91	WWES				21	505000	<10			73000	6.0	202000	6500		360		<2.0	43000	29000		
T-13A	05/29/91	WWES				<2.0	53200	<2.0			105000	3.8	209000	9300		590		<2.0	40000	89000		
T-13B	02/28/90	WWES	<250	<2.0	<200	<10	1500000	<50	50	<10	19000	<50	250000	17000	<0.2	30	13000	<2.0	130000	50	<50	
T-13B	05/23/90	WWES	<200	<2.0	120	<2.0	1600000	<10	60	<10	18000	<5.0	280000	18000	<0.2	30	10000	<2.0	150000	40	<10	
T-13B	08/28/90	WWES	<200	<2.0	110	<2.0	1750000	<10	60	<10	22000	<2.0	321000	18000	<0.2	50	11000	<2.0	139000	150	<10	
T-13B	11/28/90	WWES				<2	1640000	<10			32000	<2.0	291000	18000		30		<2.0	123000	<20		
T-13B	02/28/91	WWES				<2.0	1640000	<10			34000	<1.0	296000	18000		20		<2.0*	145000	120		
T-13B	05/29/91	WWES				<2.0	1830000	4.3			3300	<1.0	303000	19000		30		<2.0	147000	130		
T-14	02/28/90	WWES	<250	<2.0	<200	<10	340000	<50	<10	<10	4400	<50	130000	610	<0.2	<10	<5000	<2.0	80000	30	<50	
T-14	05/23/90	WWES	270	<2.0	40	<2.0	380000	<10	<10	<10	6200	<5.0	120000	610	<0.2	<10	3200	<2.0*	55000	<20	<10	
T-14	08/30/90	WWES	<200	<2.0	20	<2.0	394000	<10	<10	<10	12000	<2.0	148000	570	<0.2	<10	3100	<2.0	47000	60	<10	
T-14	11/27/90	WWES				<2	364000	<10			12000	<2.0	148000	580		<10		<2.0	44000	<20		
T-14	02/27/91	WWES				<2.0	407000	<10			97000	<1.0	150000	520		<10		<2.0	44000	<20		
T-14	05/28/91	WWES				<2.0	420000	<2.0			13000	<1.0	149000	590		<10		<2.0	43000	<20		
T-15	02/28/90	WWES	<250	<2.0	<200	<10	140000	60	10	<10	220	<50	60000	670	<0.2	20	<5000	<2.0	32000	<20	<50	
T-15	05/23/90	WWES	<200	<2.0	170	<2.0	130000	<10	<10	<10	1700	<5.0	56000	710	<0.2	<10	1800	<2.0	35000	380	<10	
T-15	08/29/90	WWES	<200	<2.0	1600	<2.0	140000	<10	<10	<10	1200	<2.0	57000	530	<0.2	<10	1800	<2.0	32000	<20	<10	
T-15	11/28/90	WWES				<2	145000	<10			590	<2.0	57000	690		10		<2.0	30000	<20		
T-15	02/27/91	WWES				<2.0	144000	<10			170	<1.0	55000	550		<10		<2.0	32000	<20		
T-15	05/28/91	WWES				<2.0	135000	<2.0			410	<1.0	54000	540		<10		<2.0	28000	<20		
T-16	02/27/90	WWES	<250	<2.0	<200	<10	420000	<50	<10	<10	<10	<50	130000	1300	<0.2	<10	6600	<2.0	61000	<20	<50	
T-16	05/24/90	WWES	<200	<2.0	40	<2.0	460000	<10	<10	<10	20	<5.0	120000	1400	<0.2	<10	5400	<2.0	62000	<20	<10	
T-16	08/29/90	WWES	<200	<2.0	40	<2.0	459000	<10	<10	<10	30	<2.0	150000	1300	<0.2	70	5500	<2.0	60000	<20	<10	
T-16	11/28/90	WWES				<2.0	446000	<10			360	<2.0	142000	1300		50		<2.0	55000	160		
T-16	02/28/91	WWES				<2.0	456000	<10			<10	<1.0	139000	1300		60		<2.0	59000	<20		

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
T-16	02/28/91	WWES				2.0	452000	<10			<10	<1.0	137000	1300		60		<2.0	60000	<20		Replicate Sample
T-16	05/29/91	WWES				<2.0	461000	<2.0			230	<1.0	165000	1400		20		<2.0	62000	30		
T-17	05/30/91	WWES				<2.0	104000	<2.0			520	<1.0	43000	1700		<10		<2.0	34000	20		
T-17	05/30/91	WWES				<2.0	104000	<2.0			10	<1.0	45000	1300		<10		<2.0	35000	<20		Replicate Sample
T-18	05/28/91	WWES				<2.0	104000	<2.0			60	<1.0	45000	1000		<10		<2.0	27000	<20		
T-19A	05/29/91	WWES				<2.0	157000	<2.0			240	6.1	70000	1400		30		<2.0	33000	70		
T-19B	05/29/91	WWES				<2.0	171000	<2.0			160	<1.0	66000	660		10		<2.0	65000	20		
T-19C	05/29/91	WWES				<2.0	295000	<2.0			60	1.2	97000	1300		20		3.7	210000	20		
T-20	05/29/91	WWES				<2.0	502000	<2.0			4000*	<1.0	146000	3600		<10		<2.0	94000	30		
T-21	05/29/91	WWES				<2.0	432000	<2.0			31000	<1.0	107000	4500		10		<2.0	361000	20		
W-1	01/23/86	DAL						<5				40										Filtered
W-1	01/23/86	DAL						<5				40										Unfiltered
W-1	09/04/86	DAL		20*	40	<10		20			4200	20		2900	0.2			<1*	70000	70		
W-1	11/21/86	DAL		<5	60	8		<10			5200	70		8800	<0.2			<5	100000	60		
W-1	02/18/87	DAL		<5	10	6		<10			620	<20		3700	<0.2			<5	110000	350		
W-1	03/24/87	ECI										2						1				
W-1	03/24/87	DAL										<20						10				
W-1	04/23/87	ECI										<1						<1				
W-1	04/23/87	RASS										<1						<1				
W-1	05/27/87	RASS		<2	35	<10		<10			8190	<10		4130	<0.2			<2	94600	362		
W-1	09/14/87	RASS						<10				<10										Filtered
W-1	09/14/87	RASS						<10				<10										Unfiltered
W-1	02/17/88	RASS		<10	17	12.9		<10			117	<5		1560	0.25			<5	107000	3220		
W-1	05/25/88	RASS				<5		<10				<5										
W-1	08/24/88	RASS				<5		<10				<5										
W-1	11/22/88	RASS				<5		<10				<5										
W-1	03/02/89	RASS				<5.0		<10				<5.0										
W-1	05/23/89	RASS				9.3		<10				<5.0										
W-1	08/17/89	WWES																				Dry
W-1	11/28/89	WWES																				Dry
W-1	02/27/90	WWES	<250	<2.0	<200	<10	200000	<50	50	<10	<10	<50	77000	9300	<0.2	200	<5000	<2.0	120000	430	<50	
W-1	05/23/90	WWES	<200	<2.0	20	9.0	280000	<10	30	<10	70	<5.0	100000	3400	<0.2	140	2900	<2.0	190000	1500	<10	
W-1	08/28/90	WWES	220	2.7	80	<2.0	173000	<10	<10	<10	15000	<2.0	59000	6800	<0.2	20	2600	<2.0	66000	<20	<10	
W-1	11/28/90	WWES				<2	174000	<10			4200	<2.0	57000	3300		60		<2.0	72000	300		
W-1	02/27/91	WWES				<2.0	110000	<10			480	<1.0	39000	2100		30		<2.0	48000	110		
W-1	05/29/91	WWES				<2.0	132000	<2.0			1000	7.0	47000	4100	40	<2.0			65000	120		
W-1	08/26/91	WWES				<2.0		<10				<5.0										
W-1	08/26/91	WWES				<2.0		<10				<5.0										Replicate
W-1D	09/04/86	DAL		6*	80	<10		<10			<20	50		380	<0.2			2*	55000	20		
W-1D	11/21/86	DAL		<5	70	8		<10			<10	70		320	<0.2			6	49000	20		
W-1D	02/18/87	DAL		<5	30	<5		<10			20	<20		150	<0.2			<5	52000	10		
W-1D	03/24/87	ECI										1						5				
W-1D	03/24/87	DAL										<20						7				
W-1D	04/23/87	ECI										<1						<1				

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-1D	04/23/87	RASS										1						<1				
W-1D	05/27/87	RASS		<2	27	<10		<10			37	<10		100	<0.2			<2	40000	78		
W-1D	09/14/87	RASS						<10				<10										Filtered
W-1D	09/14/87	RASS						<10				<10										Unfiltered
W-1D	02/17/88	RASS		<10	36	<5		10.8			55	<5		71	<0.2			<5	42200	16		
W-1D	05/25/88	RASS				<5		<10				<5										
W-1D	08/24/88	RASS				<5		<10				<5										
W-1D	11/22/88	RASS				<5		<10				<5										
W-1D	03/01/89	RASS				<5.0		<10				<5.0										
W-1D	05/23/89	RASS				<5.0		<10				<5.0										
W-1D	08/17/89	RASS				<5.0*		<10				<5.0										
W-1D	11/28/89	WWES				1.7		<10				<5.0										
W-1D	11/28/89	WWES				1.1		<10				<5.0										Replicate Sample
W-1D	02/27/90	WWES	<250	<2.0	<200	<10	270000	<50	<10	<10	430	<50	100000	240	<0.2	30	<5000	<2.0	63000	<20	<50	
W-1D	05/23/90	WWES	<200	<2.0	60	<2.0	290000	<10	<10	<10	20	<5.0	98000	100	<0.2	10	4200	<2.0	78000	<20	<10	
W-1D	08/28/90	WWES	<200	<2.0	40	<2.0	246000	<10	<10	<10	<10	<2.0	89000	100	<0.2	20	4300	<2.0	76000	<20	<10	
W-1D	11/28/90	WWES				<2	254000	<10			<10	<2.0	89000	90		10		<2.0	84000	<20		
W-1D	02/27/91	WWES				<2.0	257000	<10			<10	<1.0	89000	90		10		<2.0	97000	<20		
W-1D	05/29/91	WWES				<2.0	245000	<2.0			60	<1.0	87000	100		20		<2.0	97000	<20		
W-1D	08/27/91	WWES				<2.0		<10				<5.0										
W-2	01/23/86	DAL						<5				40										Filtered
W-2	01/23/86	DAL						5				60										Unfiltered
W-2	09/04/86	DAL		5*	120	<10		<10			130	70		4300	<0.2			4*	56000	70		
W-2	09/04/86	DAL		4*	100	<10		<10			180	60		4100	<0.2			2*	56000	50		Replicate Sample
W-2	11/21/86	DAL		<5	80	8		<10			630	60		4500	<0.2			9	51000	40		
W-2	02/18/87	DAL		<5	50	<5		<10			110	<20		4900	0.4			<5	50000	30		
W-2	03/24/87	ECI										2						4				
W-2	03/24/87	DAL										<20						9				
W-2	04/23/87	ECI										<1						<1				
W-2	04/23/87	RASS										1						<1				
W-2	05/27/87	RASS		<2	31	<10		<10			451	<10		3530	<0.2			<2	40400	63		
W-2	09/14/87	RASS						<10				27										Filtered
W-2	09/14/87	RASS						13				60										Unfiltered
W-2	02/17/88	RASS		<10	33	<5		<10			771	7.2		4910	<0.2			<5	45600	3220		
W-2	05/25/88	RASS				<5		<10				<5										
W-2	08/24/88	RASS				<5		<10				<5										
W-2	11/22/88	RASS				<5		<10				<5										
W-2	03/01/89	RASS				<5.0		<10				<5.0										
W-2	05/23/89	RASS				<5.0		<10				<5.0										
W-2	08/17/89	RASS				<5.0*		<10				<5.0										
W-2	11/27/89	WWES				0.70		<10				<5.0										
W-2	02/26/90	WWES	<250	<2.0	40	<10	250000	<50	<10	<10	60	<50	82000	3000	<0.2	20	<5000*	<2.0	51000	<20	<50	
W-2	05/22/90	WWES	<200	<2.0	40	<2.0	210000	<10*	<10	<10	410	<5.0	72000	3100	<0.2	10	<500	<2.0	49000	<20	<10	
W-2	08/29/90	WWES	220	<2.0	40	<2.0	220000	<10	<10	<10	450	<2.0	80000	3700	<0.2	30	<500	<2.0	53000	<20	<10	
W-2	11/27/90	WWES				<2	191000	<10			520	<2.0	81000	4500		30		<2.0	48000	<20		
W-2	02/26/91	WWES				2.0	240000	<10			370	<1.0	87000	5300		10		<2.0	53000	<20		
W-2	05/29/91	WWES				<2.0	225000	<2.0			550	1.8	83000	4600		20		<2.0	57000	80		
W-2	08/27/91	WWES				<2.0	<10					<5.0										
W-2D	09/04/86	DAL		8*	240	<10		<10			<20	80		620	<0.2			6*	75000	50		
W-2D	11/21/86	DAL		5	50	7		<10			60	70		580	<0.2			9	49000	30		
W-2D	02/18/87	DAL		<5	30	<5		<10			20	<20		560	<0.2			<5	47000	10		

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-2D	03/24/87	ECI										1						<1				
W-2D	03/24/87	DAL										<20						7				
W-2D	04/23/87	ECI										<1						<1				
W-2D	04/23/87	RASS										<1						<1				
W-2D	05/27/87	RASS		<2	23	<10		<10			114	<10		451	<0.2			<2	41000	56		
W-2D	09/14/87	RASS						<10				<10										Filtered
W-2D	09/14/87	RASS						<10				<10										Unfiltered
W-2D	02/17/88	RASS		<10	29	<5		13.9			114	<5		482	<0.2			<5	48400	<10		
W-2D	05/25/88	RASS				<5		<10				<5										
W-2D	08/24/88	RASS				<5		<10				5.1										
W-2D	08/24/88	RASS				<5		<10				<5										Replicate Sample
W-2D	11/22/88	RASS				<5		<10				<5										
W-2D	05/23/89	RASS				<5.0		<10				<5.0										
W-2D	05/23/89	RASS				<5.0		<10				<5.0										Replicate Sample
W-2D	08/17/89	RASS				<5.0*		<10				<5.0										
W-2D	11/27/89	WWES				1.8		<10				<5.0										
W-2D	02/26/90	WWES	<250	<2.0	30	<10	320000	<50	<10	<10	<10	<50	93000	710	<0.2	20	8700*	<2.0	46000	<20	<50	
W-2D	05/22/90	WWES	<200	<2.0	30	<2.0	310000	<10	<10	<10	90	<5.0	89000	600	<0.2	<10	6300	<2.0	44000	<20	<10	
W-2D	08/29/90	WWES	<200	<2.0	30	<2.0	301000	<10	<10	<10	<10	<2.0	85000	620	<0.2	10	7000	<2.0	40000	<20	<10	
W-2D	11/27/90	WWES				<2	286000	<10			100	<2.0	88000	670		10		<2.0	37000	<20		
W-2D	02/26/91	WWES				<2.0	340000	<10			90	<1.0	96000	720		<10		<2.0	41000	<20		
W-2D	05/29/91	WWES				<2.0	229000	<2.0			90	<1.0	72000	600		<10		<2.0	44000	<20		
W-2D	08/27/91	WWES				<2.0		<10				<5.0										
W-3	01/23/86	DAL						5				50										Filtered
W-3	01/23/86	DAL						10				70										Unfiltered
W-3	09/05/86	DAL		7*	80	<10		<10			50	50		4100	<0.2			9*	73000	50		
W-3	11/21/86	DAL		<5	40	8		10			50	50		2400	<0.2			6	70000	30		
W-3	02/18/87	DAL		<5	20	<5		<10			90	<20		1700	<0.2			<5	50000	10		
W-3	03/25/87	ECI										<1						<1				
W-3	03/25/87	DAL										<20						7				
W-3	04/23/87	ECI										<1						1				
W-3	04/23/87	RASS										<1						<1				
W-3	05/28/87	RASS		<2	14	<10		<10			51	<10		1900	<0.2			<2	40100	67		
W-3	09/14/87	RASS						<10				<10										Filtered
W-3	09/14/87	RASS						20				19										Unfiltered
W-3	02/17/88	RASS		<10	31	<5		<10			216	<5		2910	<0.2			<5	70700	33		
W-3	05/25/88	RASS				<5		<10				<5										
W-3	08/24/88	RASS				<5		<10				<5										
W-3	11/22/88	RASS				<5		<10				<5										
W-3	03/02/89	RASS				<5.0		<10				<5.0										
W-3	05/23/89	RASS				<5.0		<10				<5.0										
W-3	08/17/89	RASS				<5.0*		<10				<5.0										
W-3	11/28/89	WWES				0.35		<10				<5.0										
W-3	02/27/90	WWES	<250	<2.0	<200	<10	120000	<50	<10	<10	<10	<50	43000	<10	<0.2	<10	<5000	<2.0	77000	<20	<50	
W-3	05/23/90	WWES	<200	<2.0	20	<2.0	120000	<10	<10	<10	40	<5.0	41000	1100	<0.2	40	<500	<2.0	77000	<20	<10	
W-3	08/29/90	WWES	<200	<2.0	30	<2.0	112000	<10	<10	<10	<10	<2.0	36000	1700	<0.2	40	680	<2.0	62000	<20	<10	
W-3	12/06/90	WWES				<2.0	118000	<10			50	<2.0	38000	800		10		<2.0	59000	<20		
W-3	02/27/91	WWES				<2.0	131000	<10			<10	<1.0	41000	340		<10		<2.0	52000	<20		
W-3	05/30/91	WWES				<2.0	136000	<2.0			50	<1.0	46000	1600		20		<2.0	53000	<2.0		
W-3	08/26/91	WWES				<2.0		<10				<5.0										

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-3D	09/05/86	DAL		13*	190	<10		<10			80	100		1500	<0.2			10*	97000	50		
W-3D	11/21/86	DAL		<5	70	8		<10			50	70		1900	<0.2			14	86000	20		
W-3D	02/18/87	DAL		<5	40	<5		<10			40	<20		1500	<0.2			<5	69000	20		
W-3D	03/25/87	ECI										1						<1				
W-3D	03/25/87	DAL										<20						15				
W-3D	04/23/87	ECI										2						<1				
W-3D	04/23/87	RASS										<1						<1				
W-3D	05/28/87	RASS		<2	25	<10		<10			59	<10		1100	<0.2			<2	65900	48		
W-3D	05/28/87	RASS		<2	26	<10		<10			32	<10		1060	<0.2			<2	61300	32		Replicate Sample
W-3D	09/14/87	RASS						<10				<10										Filtered
W-3D	09/14/87	RASS						21				29										Unfiltered
W-3D	02/17/88	RASS		<10	24	<5.0		<10			39	<5.0	1260		0.2			<5.0	63000	<10		
W-3D	05/25/88	RASS				<5.0		<10				<5.0										Replicate Sample
W-3D	05/25/88	RASS				<5.0		<10				<5.0										
W-3D	08/24/88	RASS				<5.0		<10				<5.0										Replicate Sample
W-3D	11/22/88	RASS				<5		<10				<5										
W-3D	11/22/88	RASS				<5		<10				<5										Replicate Sample
W-3D	03/01/89	RASS				<5.0		<10				<5.0										
W-3D	05/23/89	RASS				<5.0		<10				<5.0										
W-3D	08/17/89	RASS				<5.0*		<10				<5.0										
W-3D	11/28/89	WWES				0.34		<10				<5.0										
W-3D	02/27/90	WWES	<250	<2.0	<200	<10	350000	<50	<10	<10	<10	<50	110000	1500	<0.2	20	<5000	<2.0	45000	<20	<50	
W-3D	05/23/90	WWES	<200	<2.0	30	<2.0	370000	<10	<10	<10	70	<5.0	120000	1600	<0.2	20	2900	<2.0	58000	<20	<10	
W-3D	08/29/90	WWES	200	<2.0	30	<2.0	365000	<10	<10	<10	10	<2.0	115000	1500	<0.2	20	2400	<2.0	88000	<20	<10	
W-3D	12/06/90	WWES				<2.0	386000	<10			40	<2.0	123000	1500		<10		<2.0	112000	20		
W-3D	02/27/91	WWES				<2.0	407000	<10			10	<1.0	137000	1700		<10		<2.0	107000	<20		
W-3D	05/30/91	WWES				<2.0	<500	<2.0			20	<1.0	<500	2100		10		<2.0	105,000*	20		
W-3D	08/27/91	WWES				<2.0		<10				<5.0										
W-4	01/23/86	DAL						<5				60										Filtered
W-4	01/23/86	DAL						<5				70										Unfiltered
W-4	09/05/86	DAL		13*	80	<10		<10			110000	50		13000	1.9			10*	32000	610		
W-4	11/21/86	DAL		<5	30	28		<10			95000	90		13000	0.5			8	35000	570		
W-4	11/21/86	DAL		<5	40	33		<10			130000	90		14000	0.2			9	32000	570		Replicate Sample
W-4	02/18/87	DAL		<5	20	16		<10			160000	30		16000	1.0			<5	28000	1000		
W-4	03/25/87	ECI										<1						<1				
W-4	03/25/87	DAL										<20						<5				
W-4	04/24/87	ECI										<1						<1				
W-4	04/24/87	RASS										<1						<1				
W-4	05/28/87	RASS		<2	52	<10		<10			205000	53		12400	0.3			<2	27900	860		
W-4	09/15/87	RASS						<10				<10										Filtered
W-4	09/15/87	RASS						31				35										Unfiltered
W-4	02/17/88	RASS		<10	18	24.5		<10			122000	6.4		12200	0.9			<5.0	34900	660		
W-4	05/25/88	RASS				<5		<10				<5.0										
W-4	08/25/88	RASS				7		10				10.7										
W-4	11/22/88	RASS				<5		<10				<5.0										
W-4	03/02/89	RASS				<5.0		<10				<5.0										
W-4	05/23/89	RASS				8.2		<10				<5.0										
W-4	08/17/89	RASS				<5.0*		<10				<5.0										
W-4	11/28/89	WWES				4.8		<10				<5.0										
W-4	02/27/90	WWES	<250	<2.0	<200	<10	200000	<50	70	<10	25000	<50	32000	10000	<0.2	110	<5000	<2.0	33000	360	<50	
W-4	05/23/90	WWES	<200	<2.0	<20	4.0	250000	<10	80	<10	55000	<5.0	35000	11000	<0.2	120	1800	<2.0	39000	430	<10	
W-4	08/29/90	WWES	340*	<2.0	<20	5.0	278000	<10	80	<10	48000	<2.0	35000	10000	<0.2	120	2400	<2.0	36000	350	<10	

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-4	12/06/90	WWES				9.0	284000	<10			29000	<2.0	35000	12000		120		<2.0	33000	320		
W-4	02/28/91	WWES				7.1	317000	<10			50000	<1.0	38000	14000		160		<2.0	32000	400		
W-4	05/31/91	WWES				5.6	260000	4.2			53000	<1.0	34000	13000		250		<2.0	33000	370		
W-4	08/26/91	WWES				2.0		<10				<5.0										
W-4D	09/05/86	DAL		7*	40	<10		<10			120	50		1100	<0.2			6*	47000	40		
W-4D	11/21/86	DAL		<5	60	<5		<10			150	50		1000	<0.2			9	42000	20		
W-4D	02/18/87	DAL		<5	50	<5		<10			220	<20		890	<0.2			<5	45000	20		
W-4D	02/18/87	DAL		<5	50	<5		<10			<10	<20		930	<0.2			<5	48000	<10		Replicate Sample
W-4D	03/25/87	ECI										<1						4				
W-4D	03/25/87	DAL										<20						5				
W-4D	04/24/87	ECI										1						<1				Replicate Sample
W-4D	04/24/87	ECI										<1						<1				
W-4D	04/24/87	RASS										<1						<1				Replicate Sample
W-4D	04/24/87	RASS										<1						<1				
W-4D	05/28/87	RASS		<2	41	<10		<10			144	<10		728	0.9			<2	32900	54		
W-4D	09/15/87	RASS						<10				<10										Filtered
W-4D	09/15/87	RASS						<10				<10										Replicate Sample
W-4D	09/15/87	RASS						<10				10										Unfiltered
W-4D	09/15/87	RASS						<10				10										Replicate Sample
W-4D	02/17/88	RASS		<10	77	<5.0		<10			281	<5.0		1050	0.3			<5.0	44600	<10		
W-4D	05/25/88	RASS				<5.0		<10				<5.0										
W-4D	08/25/88	RASS				<5.0		<10				<5.0										
W-4D	11/22/88	RASS				<5.0		<10				<5.0										
W-4D	03/02/89	RASS				<5.0		<10				<5.0										
W-4D	05/23/89	RASS				<5.0		<10				<5.0										
W-4D	08/17/89	RASS				<5.0*		<10				5.7										
W-4D	11/28/89	WWES				0.53		<10				<5.0										
W-4D	11/28/89	WWES				0.28		<10				<5.0										Replicate Sample
W-4D	02/27/90	WWES	<250	<2.0	<200	<10	190000	<50	<10	<10	10	<50	80000	490	0.4*	<10	<5000	<2.0	47000	<20	<50	
W-4D	05/23/90	WWES	<200	<2.0	<50	<2.0	200000	<10	<10	<10	600	<5.0	80000	650	<0.2	<10	2900	<2.0	48000	<20	<10	
W-4D	08/29/90	WWES	<200	<2.0	50	<2.0	198000	<10	<10	<10	250	<2.0	82000	570	<0.2	10	3100	<2.0	49000	<20	<10	
W-4D	08/29/90	WWES	<200	<2.0	60	<2.0	200000	<10	<10	<10	230	<2.0	83000	570	<0.2	10	3200	<2.0	49000	<20	<10	Replicate Sample
W-4D	12/06/90	WWES				<2.0	198000	<10			250	<2.0	810000	540		<10		<2.0	47000	50		
W-4D	02/28/91	WWES				<2.0	171000	<10			70	<1.0	66000	490		<10		<2.0	56000	20		
W-4D	05/31/91	WWES				<2.0	128000	<2.0			440	<1.0	28000	730		<10		<2.0	12000	40		
W-4D	08/27/91	WWES				<2.0		<10				<5.0										
W-5	01/23/86	DAL						<5				40										Filtered
W-5	01/23/86	DAL						<5				50										Unfiltered
W-5	09/04/86	DAL		7*	180	<10		<10			110	50		1800	<0.2			5*	110000	40		
W-5	11/21/86	DAL		<5	230	6		<10			580	70		2200	<0.2			10	110000	30		
W-5	02/18/87	DAL		<5	110	<5		<10			220	<20		3400	<0.2			<5	100000	10		
W-5	03/25/87	ECI										1						6				
W-5	03/25/87	DAL										<20						13				
W-5	04/24/87	ECI										2						<1				
W-5	04/24/87	RASS										<1						<1				
W-5	05/27/87	RASS		<2	112	<10		<10			1500	<10		2810	0.3			<2	115000	107		
W-5	09/15/87	RASS						<10				<10										Filtered
W-5	09/15/87	RASS						<10				<10										Unfiltered
W-5	02/17/88	RASS		<10	114	<5.0		<10			8320	25.8		3740	<.2			<5	115000	44		
W-5	05/25/88	RASS				<5.0		<10				<5.0										
W-5	08/25/88	RASS				<5.0		<10				<5.0										

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-5	11/22/88	RASS				<5.0		<10				<5.0										
W-5	11/22/88	RASS				<5.0		<10				<5.0										Replicate Sample
W-5	03/02/89	RASS				<5.0		<10				<5.0										
W-5	05/24/89	RASS				<5.0		<10				<5.0										
W-5	08/18/89	RASS				<5.0*		<10				<5.0										
W-5	11/27/89	WWES				<0.20		<10				<5.0										
W-5	02/28/90	WWES				<0.20		<1.0				<5.0										
W-5	05/23/90	WWES				<5.0		<10*				<5.0										
W-5	08/28/90	WWES				<5.0		<10				<2.0										
W-5	11/26/90	WWES				<2.0		<10				<2.0										
W-5	02/25/91	WWES				8.7		<10				<1.0										
W-5	05/28/91	WWES				<2.0		<2.0				<1.0										
W-5	08/26/91	WWES				<2.0		<10				<5.0										
W-5D	09/04/86	DAL		9*	60	<10		<10			110	60		2200	<0.2			1*	58000	30		
W-5D	11/21/86	DAL		<5	120	<5		<10			220	70		1600	<0.2			6	60000	30		
W-5D	02/18/87	DAL		<5	30	<5		<10			<10	<20		140	<0.2			<5	58000	<10		
W-5D	03/25/87	ECI										5						4				
W-5D	03/25/87	ECI										4						4				Replicate Sample
W-5D	03/25/87	DAL										<20						8				
W-5D	03/25/87	DAL										<20						6				Replicate Sample
W-5D	04/24/87	ECI										2						<1				
W-5D	04/24/87	RASS										<1						<1				
W-5D	05/27/87	RASS		<2	74	<10		<10			62	<10		632	<0.2			<2	99200	18		
W-5D	09/15/87	RASS						<10				<10										Filtered
W-5D	09/15/87	RASS						<10				<10										Unfiltered
W-5D	02/17/88	RASS		<10	70	<5.0		14.5			600	<5.0		910	<0.2			<5.0	62700	27		
W-5D	05/25/88	RASS				<5.0		<10				<5.0										
W-5D	08/25/88	RASS				<5.0		<10				<5.0										
W-5D	11/22/88	RASS				<5.0		<10				<5.0										
W-5D	03/02/89	RASS				<5.0		<10				<5.0										
W-5D	05/24/89	RASS				<5.0		<10				<5.0										
W-5D	08/18/89	RASS				<5.0*		<10				<5.0										
W-5D	11/27/89	WWES				<0.20		<10				<5.0										
W-5D	02/28/90	WWES				0.52		<1.0				<5.0										
W-5D	05/23/90	WWES				<5.0		<10*				<5.0										
W-5D	08/28/90	WWES				<5.0		<10				<2.0										
W-5D	11/26/90	WWES				<2.0		<10				3.0										
W-5D	02/25/91	WWES				2.6		<10				<1.0										
W-5D	05/28/91	WWES				<2.0		<2.0				<1.0										
W-5D	08/26/91	WWES				<2.0		<10				<5.0										
W-6	01/23/86	DAL						<5				20										Filtered
W-6	01/23/86	DAL						20				50										Unfiltered
W-6	09/04/86	DAL		6*	80	<10		<10			40	40		1800	<0.2			3*	50000	<10		
W-6	11/21/86	DAL		<5	70	6		<10			180	50		2800	<0.2			8	35000	40		
W-6	02/18/87	DAL		<5	40	<5		<10			40	<20		3700	<0.2			<5	41000	20		
W-6	03/25/87	ECI										5						<1				
W-6	03/25/87	DAL										<20						<5				
W-6	04/24/87	ECI										2						1				
W-6	04/24/87	RASS										<1						<1				
W-6	05/25/87	RASS		<2	44	<10		<10			321	<10		2660	0.3			<2	30400	52		

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-6	09/15/87	RASS						<10				<10										Filtered
W-6	09/15/87	RASS						<10				10										Unfiltered
W-6	02/17/88	RASS		<10	38	<5.0		<10			248	<5.0		2880	0.2			<5.0	40200	<10		
W-6	05/25/88	RASS				<5.0		<10				<5.0										
W-6	08/25/88	RASS				<5.0		<10				<5.0										
W-6	11/22/88	RASS				<5.0		<10				<5.0										
W-6	03/02/89	RASS				<5.0		<10				<5.0										
W-6	05/24/89	RASS				<5.0		<10				<5.0										
W-6	08/17/89	RASS				<5.0*		<10				<5.0										
W-6	11/27/89	WWES				<0.20		<10				<5.0										
W-6	02/28/90	WWES				0.4		<1.0				<5.0										
W-6	05/23/90	WWES				<5.0		<10*				<5.0										
W-6	08/28/90	WWES				<5.0		<10				<2.0										
W-6	11/26/90	WWES				<2.0		<10				3.1										
W-6	02/25/91	WWES				6.0		<10				1.2										
W-6	05/28/91	WWES				<2.0		<2.0				<1.0										
W-6	08/26/91	WWES				<2.0		<10				<5.0										
W-7	02/17/88	RASS		<10	52	<5.0		<10			459	<5.0		1400	0.3			<5	36800	<10		
W-7	02/17/88	RASS		<10	56	<5.0		<10			190	6.4		1420	<0.2			<5	38300	384		Replicate Sample
W-7	05/25/88	RASS				<5.0		<10				<5.0										
W-7	08/24/88	RASS				<5.0		<10				<5.0										
W-7	11/22/88	RASS				<5.0		<10				<5.0										
W-7	03/02/89	RASS				<5.0		<10				<5.0										
W-7	05/24/89	RASS				<5.0		<10				<5.0										
W-7	08/18/89	RASS				<5.0*		14.7				<5.0										
W-7	11/27/89	WWES				0.45		<10				<5.0										
W-7	02/28/90	WWES				0.74		<1.0				<5.0										
W-7	05/23/90	WWES				<5.0		<10*				<5.0										
W-7	08/28/90	WWES				<5.0		<10				<2.0										
W-7	11/26/90	WWES				<2.0		<10				<2.0										
W-7	02/25/91	WWES				7.9		<10				1.2										
W-7	05/28/91	WWES				<2.0		<2.0				<1.0										
W-7	08/26/91	WWES				<2.0		<10				<5.0										
W-7	08/26/91	WWES				<2.0		<10				<5.0										Replicate Sample
W-8	02/17/88	RASS		<10	58	5.8		<10			3200	<5.0		5760	0.3			<5.0	31500	13		
W-8	05/25/88	RASS				7.6		<10				<5.0										
W-8	05/24/88	RASS				<5.0		<10				<5.0										Replicate Sample
W-8	08/24/88	RASS				<5.0		<10				<5.0										
W-8	11/22/88	RASS				<5.0		<10				<5.0										
W-8	03/01/89	RASS				<5.0		<10				<5.0										
W-8	05/23/89	RASS				<5.0		<10				<5.0										
W-8	08/18/89	RASS				<5.0*		<10				<5.0										
W-8	08/18/89	RASS				<5.0		10.4				<5.0										Replicate Sample
W-8	11/28/89	WWES				0.81		<10				<5.0										
W-8	02/27/90	WWES	<250	<2.0	30	<10	230000	<50	<10	<10	<10	<50	74000	4700	<0.2	20	<5000*	7.7	34000	<20	<50	
W-8	05/22/90	WWES	<200	<2.0	30	<2.0	210000	<10*	<10	<10	<10	<50	71000	4900	<0.2	10	1400	4.3	32000	<20	<10	
W-8	08/29/90	WWES	200	<2.0	30	<2.0	213000	<10	<10	<10	<10	<2.0	67000	3300	<0.2	20	1600	<2.0	33000	<20	<10	
W-8	11/28/90	WWES				<2	223000	<10			20	<2.0	71000	2700		20		<2.0	30000	20		
W-8	02/27/91	WWES				<2.0	229000	<10			40	<1.0	70000	3800		10		<2.0	33000	<20		
W-8	05/29/91	WWES				<2.0	213000	<2.0			320	1.4	71000	3800		10		<2.0	32000	330		

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-9	02/17/88	RASS		<10	22	6.5		<10			771	<5.0		833	0.4			<5.0	94500	44		
W-9	05/25/88	RASS				6.6		<10				<5.0										
W-9	08/24/88	RASS				<5.0		<10				9.5										
W-9	11/22/88	RASS				<5.0		<10				<5.0										
W-9	03/01/89	RASS				<5.0		<10				<5.0										
W-9	03/01/89	RASS				<5.0		<10				<5.0										Replicate Sample
W-9	05/23/89	RASS				<5.0		<10				<5.0										
W-9	08/17/89	RASS				<5.0		16.3				<5.0										
W-9	11/28/89	WWES				0.45		<10				<5.0										
W-9	02/27/90	WWES	<250	<2.0	<200	<10	200000	<50	<10	<10	210	<50	100000	780	<0.2	190	<5000	<2.0	79000	<20	<50	
W-9	05/23/90	WWES	<200	<2.0	30	<2.0	270000	<10	<10	<10	<10	<5.0	130000	680	<0.2	80	<500	<2.0	120000	<20	<10	
W-9	08/28/90	WWES	<200	<2.0	30	<2.0	388000	<10	<10	<10	40	<2.0	175000	1900	<0.2	50	<500	<2.0	200000	<20	<10	
W-9	11/27/90	WWES				<2	310000	<10			60	<2.0	152000	2300		40		<2.0	146000	<20		
W-9	02/25/91	WWES				<2.0	313000	<10			10	<1.0	138000	3000		30		<2.0	153000	<20		
W-9	05/29/91	WWES				<2.0	320000	<2.0			80	<1.0	155000	2500		20		<2.0	139000	<20		
W-9	08/26/91	WWES				<2.0		<10				<5.0										
W-10	02/17/88	RASS		<10	16	6.1		<10			386	<5.0		1000	<0.2			<5.0	132000	<10		
W-10	05/25/88	RASS				<5.0		<10				<5.0										
W-10	08/24/88	RASS				<5.0		<10				<5.0										Replicate Sample
W-10	08/24/88	RASS				<5.0		<10				<5.0										
W-10	11/22/88	RASS				<5.0		<10				<5.0										
W-10	03/02/89	RASS				<5.0		<10				<5.0										
W-10	05/23/89	RASS				<5.0		<10				<5.0										
W-10	08/17/89	RASS				<5.0		<10				<5.0										
W-10	11/28/89	WWES				0.73		<10				<5.0										
W-10	02/27/90	WWES	<250	<2.0	<200	<10	140000	<50	<10	<10	<10	<50	44000	230	<0.2	20	<5000	<2.0	130000	<20	<50	
W-10	05/23/90	WWES	<200	<2.0	40	<2.0	200000	<10	<10	<10	40	<5.0	64000	300	<0.2	60	<500	<2.0	200000	<20	<10	
W-10	08/29/90	WWES	<200	<2.0	20	<2.0	186000	<10	<10	<10	130	<2.0	61000	380	<0.2	30	<500	<2.0	170000	<20	<10	
W-10	12/06/90	WWES				<2.0	196000	<10			260	<2.0	63000	300		30		<2.0	160000	50		
W-10	02/25/91	WWES				2.6	261000	<10			120	<1.0	84000	480		40		<2.0	210000	<20		
W-10	05/30/91	WWES				<2.0	236000	<2.0			10	<1.0	67000	420		10		<2.0	232000	<20		
W-10	08/26/91	WWES				<2.0		<10				<5.0										
W-11	02/18/88	RASS		<10	14	36.1		39.8			173000	7.6		150000	<0.2			<5.0	39200	2750		
W-11	05/25/88	RASS				<5.0		<10				16.3										
W-11	08/24/88	RASS				<5.0		<10				8.6										
W-11	11/22/88	RASS				<5.0		<10				20.4										
W-11	03/02/89	RASS				<5.0		<10				19.8										
W-11	05/23/89	RASS				28.8		42.5				16.2*										
W-11	05/23/89	RASS				29.0		48.9				20.3*										Replicate Sample
W-11	08/18/89	RASS				15.6		<10				12										
W-11	11/28/89	WWES				12		54*				29										
W-11	02/27/90	WWES	5800	<2.0	<200	<10	220000	50	600	30	110000	<50.	63000	49000	<0.2	840	<5000	<2.0	45000	2400	<50.	
W-11	05/24/90	WWES	2700	<2.0	<20	240	160000	<10	430	20	120	10	48000	37000	<0.2	610	1800	<2.0	37000	1800	<10.	
W-11	08/28/90	WWES	2000	<2.0	<20	<2.0	208000	<10	570	<10.	129000	4.8	56000	43000	<0.2	710	2000	<2.0	29000	2000	<10.	
W-11	12/06/90	WWES				6.0	139000	<10			99000	5.5	37000	24000		360		<2.0	24000	1400		
W-11	02/27/91	WWES				6.0	132000	<10			101000	2.7	36000	23000		370		<2.0*	22000	1400		
W-11	05/30/91	WWES				10	205000	18			61000	3.4	57000	56000		670		<2.0	28000	1700		
W-11	08/26/91	WWES				9.0		30				<5.0										

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-12	02/18/88	RASS		<10	35	<5.0		<10			16600	<5.0		7500	<0.2			<5.0	43300	142		
W-12	02/18/88	RASS		<10	36	<5.0		12			16900	<5.0		7530	0.2			<5.0	43300	24		Replicate Sample
W-12	05/25/88	RASS				<5.0		<10				<5.0										
W-12	08/24/88	RASS				<5.0		<10				<5.0										
W-12	11/22/88	RASS				<5.0		<10				<5.0										
W-12	03/02/89	RASS				<5.0		<10				<5.0										
W-12	05/24/89	RASS				<5.0		10.5				9.5*										
W-12	08/17/89	RASS				<5.0		<10				<5.0										
W-12	11/27/89	WWES				0.26		<10				<5.0										
W-12	02/28/90	WWES				0.66		<1.0				<5.0										
W-12	05/23/90	WWES				<5.0		<10*				<5.0										
W-12	08/28/90	WWES				<5.0		<10				<2.0										
W-12	11/26/90	WWES				<2.0		<10				<2.0										
W-12	02/25/91	WWES				2.0		<10				<1.0										
W-12	05/28/91	WWES				<2.0		2.9				<1.0										
W-12	08/26/91	WWES				<2.0		<10				<5.0										
W-13	02/18/88	RASS		<10	96	<5.0		<10			3490	<5.0		13000	<0.2			<5.0	153000	26		
W-13	05/25/88	RASS				<5.0		<10				17.3										
W-13	08/24/88	RASS				<5.0		<10				<5.0										
W-13	11/22/88	RASS				<5.0		<10				<5.0										
W-13	03/02/89	RASS				<5.0		<10				<5.0										
W-13	03/02/89	RASS				<5.0		<10				<5.0										Replicate Sample
W-13	05/24/89	RASS				<5.0		14				9.7*										
W-13	08/18/89	RASS				<5.0		<10				<5.0										
W-13	11/27/89	WWES				<0.20		<10				<5.0										
W-13	02/28/90	WWES				<0.20		<1.0				<5.0										
W-13	05/23/90	WWES				<5.0		<10				<5.0										
W-13	05/23/90	WWES				<5.0		<10*				<5.0										Replicate Sample
W-13	08/28/90	WWES				<5.0		<10*				<2.0										
W-13	08/28/90	WWES				<5.0		<10				<2.0										Replicate Sample
W-13	11/26/90	WWES				<2.0		<10				<2.0										
W-13	11/26/90	WWES				<2.0		<10				<2.0										Replicate Sample
W-13	02/25/91	WWES				<2.0		<10				<1.0										
W-13	02/25/91	WWES				<2.0		<10				<1.0										Replicate Sample
W-13	05/28/91	WWES				<2.0		2.3				<1.0										
W-13	05/28/91	WWES				<2.0		2.6				<1.0										Replicate Sample
W-13	08/26/91	WWES				<2.0		<10				<5.0										
W-14	02/18/88	RASS		<10	57	<5.0		<10			112	<5.0		1650	<0.2			<5.0	36800	35		
W-14	05/25/88	RASS				<5.0		<10				<5.0										
W-14	08/24/88	RASS				<5.0		<10				<5.0										
W-14	11/22/88	RASS				<5.0		<10				<5.0										
W-14	03/02/89	RASS				<5.0		<10				<5.0										
W-14	05/24/89	RASS				<5.0		10.3				<5.0										
W-14	08/17/89	RASS				<5.0		<10				<5.0										
W-14	08/17/89	RASS				<5.0		<10				<5.0										Replicate Sample
W-14	11/27/89	WWES				0.57		<10				<5.0										
W-14	02/28/90	WWES				0.55		<1.0				<5.0										
W-14	02/28/90	WWES				0.55		<1.0				<5.0										Replicate Sample
W-14	05/23/90	WWES				<5.0		<10*				<5.0										
W-14	08/28/90	WWES				<5.0		<10				<2.0										
W-14	11/26/90	WWES				<2.0		<10				<2.0										

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
W-14	02/25/91	WWES				2.3		<10				<1.0										
W-14	05/28/91	WWES				<2.0		<2.0				<1.0										
W-14	08/26/91	WWES				<2.0		<10				<5.0										
K-14	01/16/73			72	100	4				57	2730	64		140				6		35	<1	
K-14	02/01/73			20	80	<2	112200			18	2470	19	42100	190			2130	2	27000	50	<1	
K-14	05/02/73			5	100	<2				17	1510	28		190				1		30	1	
K-14	08/20/73			8	110	3				43	2880	23		160				<1		60		
K-14	10/05/73			8	100	<1				31	1160	10		160				<1		50		
K-14	11/21/73			8	100	<5				17	2500	15		190				<1		50		
K-14	03/28/78						125000			50	217	<50	40000	180	24700		2860		27000	156		
K-14	12/04/78						124000	0.0			2240	0.0	52000	240	3000		2200		29000	10		
K-14	06/03/81				200	0.0	110000	0.0		20	2400	0.0	48300	170	3000	200	2100		28000	0.0		
K-14	03/26/85			<100	40	<10	120000			50	2400	<10	45000	130			1800	<1	34000	50		
K-14	01/23/86	DAL						<5				30										Filtered
K-14	01/23/86	DAL						<5				20										Unfiltered
K-14	09/04/86	DAL		8*	140	<10		<10			2900	30		150	<0.2			2*	29000	<10		
K-14	11/21/86	DAL		<5	180	6		<10			2400	20		340	<0.2			5	27000	20		
K-14	02/18/87	DAL		<5	140	<5		<10			2000	<20		140	<0.2			<5	26000	<10		
K-14	05/27/87	RASS		3	121	<10		<10			1910	<10		134	<0.2			<2	23100	133		
K-14	08/24/88					<5		<10				<5										
K-15	01/16/73			1	100	4				20	2620	11		210				4		40	<1	
K-15	02/01/73			1	80	<2	122400			36	2390	29	44100	270			2660	3	31000	50	<1	
K-15	05/02/73			1	90	<2				17	2380	20		270				1		30	1	
K-15	08/20/73			1	220	<1				36	2880	34		240				<1		50		
K-15	10/05/73			1	100	<1				25	1050	12		230				<1		60		
K-15	11/21/73			1	100	<5				20	2220	12		240				<1		60		
K-15	03/28/78									61	2050	<50	34000	270	18500					266		
K-15	01/23/86	DAL						<5				10										Filtered
K-15	01/23/86	DAL						<5				10										Unfiltered
K-15	09/05/86	DAL		5*	80	<10		<10			2200	40		170	<0.2			2*	36000	<10		
K-15	11/21/86	DAL		<5	150	<5		<10			2200	20		230	<0.2			5	40000	40		
K-15	02/18/87	DAL		<5	120	<5		<10			1700	<20		180	<0.2			<5	40000	10		
K-15	05/27/87	RASS		2	101	<10		<10			1810	<10		173	<0.2			<2	29100	255		
AD-1	06/04/90	WWES	<200	4.3	120	<2.0	140000	<10*	<10	<10	10	<5.0	86000	3000	<0.2	<10	3100	<2.0	48000*	<20	<10	
AD-1	08/29/90	WWES	<200	2.5	170	<2.0	131000	<10	<10	<10	40	<2.0	115000	3800	<0.2	20	1600	<2.0	46000	<20	<10	
AD-1	11/26/90	WWES				<2.0		<10				<2.0				10					<10	
AD-1	02/25/91	WWES				<2.0		<10				<1.0				10					<10	
AD-1	05/28/91	WWES				<2.0		<2.0				3.2				<10						
AD-1	08/29/91	WWES	<200				175000				460		108000	7500			<500		52000			
AD-2	06/04/90	WWES	<200	<2.0	40	<2.0	79000	<10*	<10	<10	60	<5.0	36000	1200	<0.2	10	500	<2.0	49000*	<20	<10	
AD-2	08/28/90	WWES	<200	<2.0	50	<2.0	86000	<10	<10	<10	90	<2.0	39000	1700	<0.2	20	<500	<2.0	46000	<20	<10	
AD-2	08/28/90	WWES	<200	<2.0	50	<2.0	88000	<10	<10	<10	20	<2.0	42000	1600	<0.2	20	<500	<2.0	47000	<20	<10	Replicate Sample
AD-2	11/26/90	WWES				<2.0		<10				<2.0				10					<10	
AD-2	02/25/91	WWES				<2.0		<10				<1.0				<10					<10	
AD-2	05/28/91	WWES				<2.0		<2.0				6.6				<10						
AD-2	08/29/91	WWES	<200				84000				70		40000	1600			<500		46000			
AD-3	06/04/90	WWES	410	8.4	<20	<2.0	28000	<10*	<10	<10	10	<5.0	11000	40	<0.2	<10	15000	<2.0	78000*	<20	<10	
AD-3	06/04/90	WWES	410	9.3	20	<2.0	36000	<10*	<10	<10	<10	<5.0	13000	70	<0.2	<10	14000	<2.0	76000*	<20	<10	Replicate Sample

TABLE 6-4

SUMMARY OF GROUND WATER ANALYTICAL RESULTS FOR INORGANICS (all results in ug/l)

Well #	Date	Lab	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Sodium	Zinc	Total Cyanide	Comments
AD-3	08/28/90	WWES	530	11	20	<2.0	18000	<10	<10	<10	<10	<2.0	5300	<10	<0.2	10	22000	<2.0	76000	<20	<10	
AD-3	11/26/90	WWES				<2.0		<10				<2.0				<10					<10	
AD-3	02/25/91	WWES				<2.0		<10				<1.0				<10					<10	
AD-3	05/28/91	WWES				<2.0		<2.0				<1.0				<10						
AD-3	08/29/91	WWES	430				30000				20		2300	<10			21000		67000			
AD-4	06/04/90	WWES	580	6.6	60	<2.0	87000	69*	<10	30	<10	<5.0	<500	<10	<0.2	10	42000	5.4	150000*	<20	<10	
AD-4	08/28/90	WWES	1700	3.3	340	2	238000	<10	<10	<10	<10	<2.0	<500	<10	0.2	20	68000	2.1	101000	<20	20	
AD-4	11/26/90	WWES				<2.0		<10				<2.0				<10					<10	
AD-4	11/26/90	WWES				<2.0		<10				<2.0				<10					<10	Replicate Sample
AD-4	02/25/91	WWES				<2.0		<10				<1.0				<10					<10	
AD-4	02/25/91	WWES				<2.0		<10				<1.0				<10					<10	Replicate Sample
AD-4	05/28/91	WWES				<2.0		<2.0				<1.0				<10						
AD-4	05/28/91	WWES				<2.0		<2.0				<1.0				<10						Replicate Sample
AD-4	08/29/91	WWES	710				301000				<10		<500	<10			61000		62000			
AD-4	08/29/91	WWES	740				332000				<10		<500	<10			66000		66000			Replicate Sample
AD-5	06/04/90	WWES	<200	5.8	40	<2.0	55000	<10*	<10	<10	50	<5.0	23000	140	<0.2	<10	1900	<2.0	65000*	<20	<10	
AD-5	08/28/90	WWES	<200	3.3	40	<2.0	37000	<10	<10	<10	<10	<2.0	26000	120	<2.0	<10	1600	<2.0	74000	<20	<10	
AD-5	11/26/90	WWES				<2.0		<10				<2.0				<10					<10	
AD-5	02/25/91	WWES				<2.0		<10				<1.0				<10					<10	
AD-5	05/28/91	WWES				<2.0		<2.0				<1.0				<10						
AD-5	08/29/91	WWES	<200				49000				40		31000	610			1300		74000			

Key: Less than indicates that metal was not found or was below the reported detection limit.
DAL = Daily Analytical Laboratories, Peoria, Illinois.
ECI = Environmental Consultants, Inc., Clarksville, Indiana.
RASS = Randolph & Associates, Inc., Peoria, Illinois.
WWES = WW Engineering & Science, Grand Rapids, Michigan.

Note: * Estimated value as a result of data not meeting QA/QC validation criteria.

COMMENTS:

1. K-14 = Keystone Production Well (West Well).
2. K-15 = Keystone Production Well (East Well).

Taken From:
Revised Phase 2 Closure Plan.
Dated: June 15, 1992 (ERM,WWES)

TABLE 5-1

SUMMARY OF SOIL PERMEABILITY RESULTS(1)
(Page 1 of 2)

Boring	Depth (feet)	Natural Moisture (%)	Dry Density (lb/ft3)	Permeability (cm/sec)
T-2B	52.0 - 54.0	26.6	93.4	1.0E-07
T-4B	28.0 - 30.0	22.5	102.6	1.0E-07
T-5B	52.0 - 54.0	33.0	91.9	3.0E-07
T-6B	24.0 - 26.0	26.9	98.0	4.0E-08
T-7B	20.0 - 22.0	24.0	101.0	9.0E-07
T-11B	46.0 - 48.0	20.5	101.8	2.0E-05
W-2	10.0 - 12.0	—	84.5	3.6E-07
W-5	28.0 - 30.0	—	86.4	3.5E-07
W-7	8.0 - 10.0	28.1	94.3	3.3E-07
W-8	12.0 - 14.0	25.7	101.1	8.6E-09
W-12	4.0 - 6.0	22.5	108.2	4.2E-09
W-12	22.0 - 23.0	26.5	102.1	4.5E-08
W-13	4.0 - 6.0	25.3	98.4	1.5E-08
W-13	20.0 - 22.0	37.3	87.9	7.5E-09
W-14	4.0 - 6.0	22.0	107.1	4.7E-09
B-1	8.5 - 10.5	31.9	95.3	4.3E-08
B-1	30.0 - 32.0	28.6	85.2	4.2E-07
B-2	14.0 - 16.0	29.2	97.0	1.8E-07
B-2	35.0 - 40.0	29.1	86.7	8.4E-08
B-3	8.0 - 10.0	31.7	89.9	5.0E-08
B-3	25.0 - 27.0	27.6	96.2	1.6E-07
B-4	20.0 - 22.0	29.4	98.2	1.4E-08
B-4	40.0 - 42.0	31.3	92.3	5.3E-07
B-5	11.5 - 13.5	37.0	91.4	5.3E-08
B-5	30.0 - 32.0	32.5	89.8	1.2E-07

TABLE 5-1

SUMMARY OF SOIL PERMEABILITY RESULTS(1)
(Page 2 of 2)

Boring	Depth (feet)	Natural Moisture (%)	Dry Density (lb/ft3)	Permeability (cm/sec)
B-6	40.0 - 42.0	30.0	92.8	2.0E-06
B-7	35.0 - 37.0	32.9	97.5	8.1E-08
B-8	8.0 - 10.0	41.8	78.8	4.9E-08
B-8	25.0 - 27.0	33.7	95.0	1.1E-08
B-8	25.0 - 27.0	22.8	98.5	4.2E-04
CL-1	9.0 - 11.0	44.3	77.4	2.4E-08
CL-1	18.0 - 20.0	21.3	108.2	2.8E-06
CL-2	10.0 - 12.0	25.1	100.8	1.0E-08
CL-3	15.0 - 17.0	27.0	100.3	2.7E-07
CL-4	9.0 - 11.0	42.3	77.7	2.1E-07
RETENTION RESERVOIR (Shelby tube samples obtained from top 2 feet of reservoir bottom).				
RR 2		25.6	105.0	4.0E-08
RR 5		16.6	114.7	1.5E-08
RR 10		23.3	105.3	2.0E-07
RR 13		28.1	93.0	5.0E-08
RR 15		28.9	103.1	2.0E-07

NOTE: (1) Refer to Appendix D for Test Boring Logs.

KEY: — Not analyzed.

Taken From:
Closure Documentation Report,
North Ditch Remediation,
Dated: Nov. 25, 1996 (ERM)

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number (2)			B0 (0-1) 8/9 I	B1 (0-1) 8/9 I	B2 (0-1) 8/9 I	C2 (0-1) 8/9 I	C3 (0-1) 8/9 I
Sample Type			Soil	Soil	Soil	Soil	Soil
Inorganics	IDLs (Soils)(3)	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Arsenic	0.0010	0.2	<0.0010	0.0038	<0.0010	<0.0010	0.0017
Barium	0.2	5.0	1.02	0.74	0.83	1.7	0.24
Cadmium	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	0.05	1.0	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.0010	0.1	0.0047	0.0086	0.001	0.013	0.0012
Mercury	0.0004	0.01	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Nickel	0.01	20	8.600	0.030	0.02	0.02	0.01
Selenium	0.0020	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.01	NA (4)	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number (2)			C4 (0-1) 8/9 I	C5 (0-1) 8/9 I	D5 (0-1) 8/9 I	D6 (0-1) 8/9 I	D7 (0-1) 8/9 I
Sample Type			Soil	Soil	Soil	Soil	Soil
Inorganics	IDLs (Soils)(3)	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Arsenic	0.0010	0.2	<0.0010	<0.0010	<0.0010	0.0023	0.0053
Barium	0.2	5.0	1.3	0.82	0.42	0.7	2
Cadmium	0.01	0.05	<0.01	<0.01	0.01	<0.01	<0.01
Chromium	0.05	1.0	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.0010	0.1	0.0047	0.0027	0.0026	0.015	0.0066
Mercury	0.0004	0.01	<0.0004	0.0021	<0.0004	<0.0004	<0.0004
Nickel	0.01	20	0.03	0.08	0.03	0.06	0.02
Selenium	0.0020	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.01	NA (4)	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number (2)			D8 (0-1) 8/9 I	E8 (0-1) 8/9 I	F14 (0-1) 8/9 I	F15 (0-1) 8/9 I	F16 (0-1) 8/9 I
Sample Type			Soil	Soil	Soil	Soil	Soil
Inorganics	IDLs (Soils)(3)	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Arsenic	0.0010	0.2	<0.0010	<0.0010	<0.0010	0.0012	0.0016
Barium	0.2	5.0	1.5	0.31	0.47	0.7	0.87
Cadmium	0.01	0.05	<0.01	<0.01	0.01	<0.01	<0.01
Chromium	0.05	1.0	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.0010	0.1	0.0043	0.016	<0.0010	0.0019	0.0087
Mercury	0.0004	0.01	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Nickel	0.01	20	0.01	0.02	0.01	0.01	0.02
Selenium	0.0020	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.01	NA (4)	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number (2)			B2 (0-1) FB 8/9 I	D4 (0-1) 8/13 I	D9 (0-1) 8/13 I	E10 (0-1) 8/13 I	E11 (0-1) 8/13 I
Sample Type			B2 Field Blank	Soil	Soil	Soil	Soil
Inorganics	IDLs (Soils)(3)	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Arsenic	0.0010	0.2	<0.001	<0.0010	<0.0010	<0.0010	0.0015
Barium	0.2	5.0	<0.01	0.88	1	0.43	0.34
Cadmium	0.01	0.05	<0.005	<0.01	<0.01	<0.01	<0.01
Chromium	0.05	1.0	<0.01	<0.05	<0.05	<0.05	<0.05
Lead	0.0010	0.1	<0.001	0.0067	0.003	<0.0010	<0.0010
Mercury	0.0004	0.01	<0.0002	<0.0004	<0.0004	<0.0004	0.0007
Nickel	0.01	20	<0.01	0.010	0.020	0.01	0.01
Selenium	0.0020	0.02	<0.001	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.01	NA (4)	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number (2)			E13 (0-1) 8/13 I	E14 (0-1) 8/13 I	E15 (0-1) 8/13 I	X4 (0-1) 8/13 I	E9 (0-1) 8/13 I
Sample Type			Soil	Soil	Soil	D4 Field Duplicate	Soil
Inorganics	IDLs (Soils)(3)	Closure CUOs	Results	Results	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Arsenic	0.0010	0.2	0.0016	0.001	<0.0010	0.0012	<0.0010
Barium	0.2	5.0	0.53	0.47	0.55	0.97	0.43
Cadmium	0.01	0.05	<0.01	<0.01	<0.01	0.01	<0.01
Chromium	0.05	1.0	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.0010	0.1	<0.0010	<0.0010	<0.0010	0.0084	<0.0010
Mercury	0.0004	0.01	<0.0004	<0.0004	<0.0004	0.0005	<0.0004
Nickel	0.01	20	<0.01	0.02	0.01	0.03	0.03
Selenium	0.0020	0.02	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Silver	0.01	NA (4)	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

Sample Identification Number (2)			E12 (0-1) 8/13 I	Z9 (0-1) 8/9 I	D4 (0-1) FB 8/13 I
Sample Type			Soil	E9 Field Duplicate	D4 Field Blank
Inorganics	IDLs (Soils)(3)	Closure CUOs	Results	Results	Results
Units	mg/l	mg/l	mg/l	mg/l	mg/l
Arsenic	0.0010	0.2	0.0036	0.0019	<0.001
Barium	0.2	5.0	0.75	0.77	<0.01
Cadmium	0.01	0.05	<0.01	<0.01	<0.005
Chromium	0.05	1.0	<0.05	<0.05	<0.01
Lead	0.0010	0.1	0.0036	0.0011	0.0012
Mercury	0.0004	0.01	<0.0004	<0.0004	<0.0002
Nickel	0.01	20	0.04	0.02	<0.01
Selenium	0.0020	0.02	<0.0020	<0.0020	<0.001
Silver	0.01	NA (4)	<0.01	<0.01	<0.01

TABLE 6
NORTH DITCH CLEAN CLOSURE (1) INORGANIC COMPOUNDS ANALYTICAL RESULTS
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

NOTES:

(1) Clean Closure Sampling Began on August 9, 1996 and was completed on August 13, 1996.

(2) Sample identification number:

Example: B1(0-1)8/9I
B1 = Location Code
(0-1) = Depth modifier (ft)
8/9 = Date sampled
I = Clean closure modifier

Additional modifiers include: FB = Field blank

(3) The given instrument detection limits are only applicable for soil samples.

(4) NA = Not Established.

V. Determination of Remediation Objectives

Determination of Remediation Objectives for Tier 1 Evaluation (35 IAC 742, Subpart E)
The contaminant of concern for the three sites (South Ditch, Lower South Ditch, and New SWMU) is lead as established by the 1992 Closure Plan. The remedial objectives for these sites have been determined using the Tier 1 Evaluation.

Inhalation Exposure Route (35 IAC 742.505 (a)(1)(A and B)) There is no Tier 1 soil remediation objective for lead under residential or industrial/commercial property use for the inhalation exposure route (Section 742. Appendix B: Tables A and B).

Soil Ingestion Exposure Route (35 IAC 742.505 (a)(2)(A and B)) The Tier 1 soil remediation objective for lead under residential and industrial/commercial property use is 400 mg/kg for the soil ingestion exposure route (Section 742. Appendix B: Tables A and B).

Migration to Groundwater Portion of the Groundwater Ingestion Exposure Route (35 IAC 742.505 (a)(3)(A and B)) The Tier 1 soil remediation objective for lead under residential and industrial/commercial property use of 400 mg/kg for the migration to groundwater portion of the groundwater ingestion exposure route (Section 742. Appendix B: Tables A and B).

Dermal Contact with Soil Exposure Route (35 IAC 742.505 (a)(4)) In accordance with 35 IAC 742.505 (a)(4), evaluation of the dermal contact with soil exposure route is not required under Tier 1.

Groundwater Remediation Objectives (35 IAC 742.505 (b)) The groundwater beneath the South Ditch and Lower South Ditch is classified as Class II groundwater. The groundwater remediation level for the direct ingestion of the groundwater portion of the groundwater ingestion route for lead is 0.1 mg/L TCLP (Section 742. Appendix B: Table E).

Determination of Remediation Objectives for Tier 2 Evaluation (35 IAC 742, Subpart F)
USEPA does not use oral reference dose data for determining lead remediation site cleanup objectives, only site specific modeling. Dr. Tom Hornshaw-IEPA confirmed this to Keystone during a phone conversation that Tier 2 does not apply for lead remediation sites, lead contaminated sites must be evaluated by site specific modeling under Tier 3.

Determination of Remediation Objectives for Tier 3 Evaluation (35 IAC 742, Subpart I)
The Tier 3 soil remediation objective for these sites was determined using the "risk based remediation goal" (RBRG) model contained in "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996 provided by Ms. Connie Sullinger-IEPA. The specific equation used to determine the RBRG for lead under Tier 3 was Equation 4, page 4 of the above document. The equation is as follows:

$$RBRG = PbS = \frac{(PbB_{adult,central,goal} - PbB_{adult,0}) * AT}{(BSKF * IR_s * AF_s * EF_s)}$$

where:

RBRG	=	Risk Based Remediation Goal (ug/g or mg/kg)
PbS	=	Soil lead concentration (ug/g or mg/kg)
$PbB_{adult,central,goal}$	=	Goal for central estimate of blood lead concentrations (ug/dL) in adults (ie. women of child-bearing age) that have site exposures. The goal is intended to ensure that $PbB_{fetal,0.95,goal}$ does not exceed 10 ug/dL. *For these remediation sites the goal is to not exceed the OSHA blood lead standard of **50 ug/dL** to which Keystone is already regulated by OSHA.*
$PbB_{adult,0}$	=	Typical blood lead concentration (ug/dL) in adults (ie. women of child-bearing age) in the absense of exposures to the site that is being assessed. *For these remediation sites the concentration is **2.0 ug/dL** which is the median of the range (1.7-2.2) given in the Appendix of the "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996.*
AT	=	Averaging time; the total period during which soil contact may occur; 365 days/year for continuing long term exposures. *For these remediation sites, **365 days/year** is used.*
BSKF	=	Biokinetic slope factor relating (quasi-steady state) increase in typical adult blood lead concentration to average daily uptake (ug/dL blood lead increase per ug/day lead uptake). *For these remediation sites, the default value of **0.4 ug/dL per ug/day lead uptake** is used as given in the Appendix of the "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996.*
IR_s	=	Intake rate of soil, including both outdoor soil and indoor soil-derived dust (g/day). *For these remediation sites, the default value of **0.05 ug/day** is used as given in the Appendix of the "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996.*
AF_s	=	Absolute gastrointestinal absorption fraction for ingested lead in soil and lead in dust derived from soil (dimensionless). *For these remediation sites, the default value of **0.12** is used as given in the Appendix of the "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996.*
EF_s	=	Exposure frequency for contact with assessed soils and/or dust derived in

part from these soils (days of exposure during the averaging period); may be taken as days per year for continuing long term exposures. *For these remediation sites,* ***365 days/year*** *is used. The actual exposure frequency after implementing the Remediation Plan will be reduced to approximately 52, however for the Tier 3 Evaluation 365 days will be used.*

For these remediation sites in this application, the Tier 3 soil RBRG, using the above values in the equation parameter definitions, is calculated as follows:

$$\text{RBRG} = \text{PbS} = \frac{(50 - 2.0) * 365}{(0.4 * 0.05 * 0.12 * 365)} = 20{,}000 \text{ ug/g or mg/kg}$$

Summary of Remedial Objectives

Tier 1 Remedial Objectives Based on the Tier 1 soil remediation objectives (Section 742. Appendix B: Tables A and B) and the groundwater remediation objectives (Section 742. Appendix B: Table E), the following is concluded:

- The Inhalation Exposure Route (35 IAC 742.505 (a)(1)(B)) is not considered since no remediation objective exists for lead for this exposure route.
- The Dermal Contact with Soil Exposure Route (35 IAC 742.505 (a)(4)) is not considered since no soil remediation objective exists for lead for this exposure route.
- The Groundwater Remediation Objective (35 IAC 742.505 (b)) for lead is **0.1 mg/L** TCLP for the direct ingestion of groundwater.
- The Soil Ingestion Exposure Route (35 IAC 742.505 (a)(2)(B)) and the Migration to Groundwater Portion of the Groundwater Ingestion Exposure Route (35 IAC 742.505 (a)(3)(A and B)) soil remediation objective is 400 mg/kg. This level is exceeded from the current data for the South Ditch, Lower South Ditch, and New SWMU. Tier 2 and Tier 3 remedial objectives for these exposure routes were then determined.

Tier 2 Remedial Objectives for Soil The USEPA does not use oral reference dose data for determining lead remediation site cleanup objectives. Only Tier 3 site specific modeling can be used to determine soil remediation objectives for lead.

Tier 3 Soil Remediation Objective Based on the model contained in "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996, the Tier 3 soil remediation objective is **20,000 mg/kg.**

VI. Remediation Objectives Report

Inhalation Exposure Route (35 IAC 742.505 (a)(1)(B))
Since there is no Tier 1 soil remediation objective for lead under residential or industrial/commercial property use, the inhalation exposure route is not a concern in the Tier 1 Evaluation for the South and Lower South Ditch. In accordance with 35 IAC 742.500 (a), no further evaluation of the inhalation exposure route is necessary.

Soil Ingestion Exposure Route (35 IAC 742.505 (a)(2)(B)) and Migration to Groundwater Portion of the Groundwater Ingestion Route (35 IAC 742.505 (a)(3)(A and B))
The Soil Ingestion Exposure Route (35 IAC 742.505 (a)(2)(A and B)) and the Migration to Groundwater Portion of the Groundwater Ingestion Exposure Route (35 IAC 742.505 (a)(3)(A and B)) soil remediation objective is 400 mg/kg. The current data (presented in Section IV. Focused Site Investigation) for the South Ditch, Lower South Ditch, and New SWMU shows the Tier 1 soil level has been exceeded.

The Tier 3 soil remedial objectives for these exposure routes was determined to be 20,000 mg/kg. Under Tier 3, the New SWMU meets the remediation goal and should qualify for a No Further Remediation Determination Letter at this time. The Lower South Ditch should also qualify for a No Further Remediation Determination Letter once Keystone has obtained an agreement with the Union Pacific Railroad. The South Ditch soil lead level has exceed 20,000 mg/kg in one sample (sample No. SDN-3, Table 5-3, Phase 1 - Interim Status Closure Plan; Ditches, Retention Reservoir, and Dredge Piles. Dated: Nov. 26, 1989 (ERM, Geoscience Research Assoc., Inc.)) and a Remedial Action Plan for the South Ditch is presented in the following Section.

Dermal Contact with Soil Exposure Route (35 IAC 742.505 (a)(4))
In accordance with 35 IAC 742.505 (a)(4), evaluation of the dermal contact with soil exposure route is not required under Tier 1.

Groundwater Remediation Objectives (35 IAC 742.505 (b))
The groundwater beneath the South Ditch, Lower South Ditch, and New SWMU is classified as Class II groundwater. The groundwater remediation level for the direct ingestion of the groundwater portion of the groundwater ingestion route for lead is 0.1 mg/L TCLP. The lead levels in the groundwater are below this standard in all of the monitored wells at Keystone (reference WWES data). In accordance with 35 IAC 742.500 (a), no further evaluation of the direct ingestion of the groundwater portion of groundwater ingestion route is necessary.

Summary
Based on the Tier 1 evaluation and the Tier 3 soil lead level evaluation, the following is concluded:

- The New SWMU should qualify for a No Further Remediation Letter at this time.

- The Lower South Ditch should qualify for a No Further Remediation Letter once an agreement is reached with the Union Pacific Railroad.
- The South Ditch will require further remediation and a Remedial Action Plan is presented in the next Section.

VII. Remedial Action Plan

In accordance with 35 IAC 740.440 and 35 IAC 740.445, the following Remedial Action Plan addresses the South Ditch to propose engineering barriers for reducing soil lead exposure to below the Tier 3 level of 20,000 mg/kg as determined in Section V. Determination of Remediation Objectives.

South Ditch Remedial Action Plan

The South Ditch Remedial Action Plan outline is as follows:

1. Stabilize the surface sediments (3-4 feet) to increase the weight bearing capacity.
2. Place a three (3) foot thick cap of 10^{-7} clay or soil over the stabilized sediments.
3. Construct and implement a stormwater management system.

Items 1 & 2 in the South Ditch Remedial Action Plan outline are proposed to meet the engineered barrier requirements of 35 IAC 742.1100 Subpart K. Item 3 is proposed to maintain water levels, to control the surface water drainage and stormwater at these sites, and eliminate the possibility of any future process discharges to the ditch system. The "Outline for Tasks for Water Management to achieve South Ditch Closure" and the proposed schedule spreadsheet is presented in the Appendix.

VIII. Remedial Action Completion Report

Keystone will submit a Remedial Action Completion Report in accordance with 35 IAC 740.455 at the completion of the approved Remedial Action Plan requirements.

References

The following documents are incorporated by reference in this Site Remediation Application:

- Phase 1 - Interim Status Closure Plan; Ditches, Retention Reservoir, and Dredge Piles. Dated: Nov. 26, 1989 (ERM, Geoscience Research Assoc., Inc.)

- Revised Phase 2 Closure Plan. Dated: June 15, 1992 (ERM, WWES)

- Characteristics of New SWMU, Keystone Steel & Wire Company, Bartonville, Illinois, November 1994 (ERM)

- Modification Request to the Revised Phase II Closure Plan, May 5, 1995 (ERM)

- TCSA (Temporary Container Storage Area) Baseline and Waste Pile Soil Sampling. Dated: May 24, 1994 (ERM)

- Hazardous Waste Management Units, Quarterly Ground Water Technical Memorandum for November 1996, (Annual Report 1996). Dated: January 27, 1997 (WWES)

- Closure Documentation Report, Retention Reservoir Remediation, Dated: July 29, 1994 Volume I & II (ERM)

- Closure Documentation Report, North Ditch Remediation, Dated: November 25, 1996 (ERM)

- "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil", USEPA Technical Workgroup for Lead, December 1996

B. Miller

IN THE CIRCUIT COURT OF THE TENTH JUDICIAL CIRCUIT
PEORIA COUNTY, ILLINOIS
CHANCERY DIVISION

~~ORIGINAL TO R.P.END~~
WITNESSED BY Dale Bennington
FILED BY:

Ms. M. Elizabeth Duffy
ILL. Asst. Attorney General
Envr Control Div.
312-814-3374

PEOPLE OF THE STATE OF ILLINOIS, ex rel. Roland W. Burris, Attorney General of the State of Illinois Plaintiff, -vs- KEYSTONE CONSOLIDATED INDUSTRIES, INC., a Delaware corporation, d/b/a KEYSTONE STEEL & WIRE COMPANY, Defendant.	)	No. 93 CH 000103

Filed
7/02/93
9:36AM
PEORIA Co
CKT. COURT
M. Patton

COMPLAINT FOR INJUNCTIVE RELIEF AND CIVIL PENALTIES

Plaintiff, PEOPLE OF THE STATE OF ILLINOIS, ex rel. Roland W. Burris, Attorney General of the State of Illinois, complains of the Defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., as follows:

COUNT I

FAILURE TO PROVIDE ADEQUATE CLOSURE AND POST-CLOSURE FUNDING

1. This complaint is brought on behalf of the People of the state of Illinois by Attorney General Roland W. Burris on his own motion and upon the request of the the Illinois Environmental Protection Agency ("IEPA" or "Agency") pursuant to the terms and provisions of Section 42(d) and (e) of the Illinois Environmental Protection Act ("Act"), Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1042(d) and (e).

2. The Agency is an administrative agency of the State of Illinois, created pursuant to the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1004, and charged, inter alia, with the duty of enforcing the Act.

3. Defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., ("KEYSTONE"), is a Delaware corporation qualified to conduct business in Illinois. At all times relevant to this complaint, KEYSTONE has operated a steel and wire manufacturing plant located at 7000 South Adams Street, Peoria, Peoria County, Illinois.

4. Within its facility, KEYSTONE utilized, in addition to other implements, a series of surface impoundments or units for transferring waste discharges from the plant (the "units").

5. On June 29, 1988, the United States Environmental Protection Agency ("USEPA") and KEYSTONE entered into a Consent Decree in the United States District Court for the Central District of Illinois (See exhibit A attached). The Consent Decree requires KEYSTONE to close its impoundments as required under the Resource Conservation and Recovery Act ("RCRA") 42 U.S.C. 6901, et seq., and with an IEPA approved closure plan.

6. Section 720.110 of the Illinois Pollution Control Board ("Board") Waste Disposal Regulations, 35 Ill. Adm. Code 720.110, provides, in pertinent part, the following definitions:

> "Disposal" means the discharge, deposit, injection, dumping, spilling, leaking or placing of any solid waste or hazardous waste into or on any land or water so that such

solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

"Facility" means all contiguous land and structures, other appurtenances and improvements on the land used for treating, storing or disposing of hazardous waste. A facility may consist of several treatment, storage or disposal operational units (e.g., one or more landfills, surface impoundments or combinations of them).

"Hazardous waste management unit" is a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system and a container storage area. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.

"Management" or "Hazardous Waste Management" means the systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery and disposal of hazardous waste.

"Operator" means the person responsible for the overall operation of a facility.

"Owner" means the person who owns a facility or part of a facility.

7. The units are part of a "facility" and a "hazardous waste management unit" as those terms are defined in Section 720.110 of the Board Waste Disposal Regulations.

8. KEYSTONE is an operator and an owner as those terms are defined in Section 720.110 of the Board Waste Disposal Regulations.

9. Section 21(f) of the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1021(f), provides, in pertinent part, as follows:

> No person shall:
>
> f. Conduct any hazardous waste-storage, hazardous waste-treatment or hazardous waste-disposal operation:
>
> 1. Without a RCRA permit for the site issued by the Agency under subsection (d) of Section 39 of this Act . . . ; or
>
> 2. In violation of any regulations or standards adopted by the Board under this Act;

10. Section 725.243 of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.243, provides, in pertinent part, as follows:

> Financial Assurance for Closure
>
> An owner or operator of each facility shall establish financial assurance for closure of the facility. The owner or operator shall choose from the options as specified in subsections (a) through (e).
>
> * * *

The specified options in each subsection are: a) closure trust fund; b) surety bond guaranteeing payment into a closure trust fund; (c) closure letter of credit; d) closure insurance; e) financial test and corporate guarantee for closure.

11. On July 1, 1991, KEYSTONE determined that its closure costs would be approximately $2.85 million ($2,850,000.00) (See exhibit B attached).

12. On August 12, 1991, KEYSTONE submitted a letter of credit worth $2.85 million to the Agency for the purpose of establishing financial assurance for closure coverage.

13. At some time on or after July 1, 1991, the Agency determined that KEYSTONE'S July 1, 1991 closure cost estimate was inadequate because it did not represent the cost of final closure when closure costs would be the most expensive, it did not include the costs for the entire closure project and it did not include all data used to prepare the cost estimate or the proper justification to support the data used to prepare the estimate.

14. On February 1, 1992, KEYSTONE estimated that is closure costs would be approximately $30.27 million ($30,270,000.00).

15. At all times prior to the filing of this complaint, KEYSTONE'S financial assurance for closure has been underfunded by at least $27.42 million ($27,420,000.00) and KEYSTONE has failed to properly fund its financial assurance for closure.

16. KEYSTONE, by its conduct described herein, violated Section 21(f) of the Act and 35 Ill. Adm. Code 725.243.

17. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.243;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.243;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to properly fund its closure/post-closure coverage as required under the Act and associated regulations;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT II

FAILURE TO PROVIDE ADEQUATE LIABILITY COVERAGE

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count II.

10. Sections 725.247(a) and (b) of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.247(a) and (b), provide, in pertinent part, as follows:

> Liability Requirements
>
> a) Coverage for sudden accidental occurrences. An owner or operator of a hazardous waste treatment, storage or disposal facility, or a group of such facilities, shall demonstrate financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility or group of facilities. The owner or operator shall have and maintain liability coverage for sudden accidental occurrences in the amount of at least $1 million per occurrence with an annual aggregate of at least $2 million, exclusive of legal defense costs. . . .
>
> * * *
>
> b) Coverage for nonsudden accidental occurrences. An owner or operator of a surface impoundment, landfill or land treatment facility which is used to manage hazardous waste, or a group of such facilities, shall demonstrate financial responsibility for bodily injury and property damage to third parties caused by nonsudden accidental occurrences arising from operations of the facility or group of facilities. The owner or operator shall have and maintain liability coverage for nonsudden accidental occurrences in the amount of at least $3 million per occurrence with an annual aggregate of at least $6 million, exclusive of legal defense costs. . . .

11. From at least June 29, 1988, until the present, KEYSTONE has failed to provide coverage for sudden or non-sudden accidental occurrences.

12. KEYSTONE, by its conduct described herein, violated Section 21(f) of the Act and 35 Ill. Adm. Code 725.247.

13. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.247;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.247;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to provide full coverage for sudden and nonsudden accidental occurrences as required under the Act and associated regulations;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT III

OPERATION WITHOUT A RCRA PERMIT

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count III.

10. Sections 703.121(a) and (b) of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 703.121(a) and (b), provide, in pertinent part, as follows:

> RCRA Permits
>
> a. No person shall conduct any hazardous waste storage, hazardous waste treatment or hazardous waste disposal operation:
>
> 1) Without a RCRA permit for the HWM (hazardous waste management) facility; or
>
> 2) In violation of any condition imposed by a RCRA permit;
>
> b. Owners and operators of HWM units must have permits during the active life (including closure period) of the unit . . . .

11. Section 703.150(a) of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 703.150(a), provides as follows:

Application by Existing HWM Facilities and Interim Status Qualifications

a. The owner or operator of an existing HWM facility or of an HWM facility in existence on the effective date of statutory or regulatory amendments that render the facility subject to the requirements to have an RCRA permit must submit part A of the permit application to the Agency no later than the following times, whichever comes first:

1. Six months after the date of publication of regulations which first require the owner or operator to comply with standards in 35 Ill. Adm. Code 725; or

2. Thirty days after the date the owner or operator first becomes subject to the standards in 35 Ill. Adm. Code 725;

3. For generators which generate greater than 100 kilograms but less than 1000 kilograms of hazardous waste in a calendar month and treat, store or dispose of these wastes on-site, by March 24, 1987.

12. At all times relevant to this complaint, up to the present, Keystone has operated its facility without a RCRA permit granted by the Agency.

13. On November 18, 1980, Keystone filed a Part A RCRA permit application with the Agency. On February 15, 1983, Keystone withdrew its Part A RCRA permit application.

14. From February 15, 1983, up to the present, Keystone has failed to submit a RCRA Part A permit application.

15. Keystone, by its conduct described herein, violated Section 21(f) of the Act, 35 Ill. Adm. Code 703.121 and 35 Ill. Adm. Code 703.150.

16. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act, 35 Ill. Adm. Code 703.121 and 35 Ill. Adm. Code 703.150;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 703.121 and 35 Ill. Adm. Code 703.150;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to obtain from IEPA a RCRA permit;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT IV

FAILURE TO KEEP AND MAINTAIN INSPECTION SCHEDULE AND LOG

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count IV.

10. Section 725.115 of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.115, provides, in pertinent part as follows:

> General Inspection Requirements
>
> * * *
>
> b) 1) The owner or operator shall develop and follow a written schedule for inspecting all monitoring equipment, safety and emergency equipment, security devices and operating and structural equipment (such as dikes and sump pumps) that are important to preventing, detecting or responding to environmental or human health hazards.
>
> 2) The owner or operator shall keep this schedule at the facility.
>
> 3) The schedule must identify the types of problems (e.g., malfunctions or deterioration) which are to be looked for during the inspection (e.g., inoperative sump pump, leaking fitting, eroding dike, etc.).
>
> 4) The frequency of inspection may vary for the items on the schedule. However, it should be based on the rate of possible deterioration of the equipment and the probability

of an environmental or human health incident if the deterioration or malfunction or any operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, must be inspected daily when in use. At a minimum the inspection schedule must include the items and frequencies called for in Sections 725.274, 725.293, 725.295, 725.326, 725.447, 725.477 and 725.503.

* * *

d) The owner or operator shall record inspections in an inspection log or summary. The owner or operator shall keep these records for at least three years from the date of inspection. At a minimum, these records must include the date and time of the inspection, the name of the inspector, a notation of the observations made and the date and nature of any repairs or other remedial actions.

11. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the present, Keystone has failed to maintain and follow a written schedule for inspection of its facility as required.

12. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the present, Keystone has failed to maintain a log or summary of inspections of its facility as required.

13. Keystone, by its conduct described herein, has and continues to violate Section 21(f) of the Act and 35 Ill. Adm. Code 725.115.

14. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.115;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.115;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to create, maintain and follow a written schedule for inspection as well as a log or summary of inspections;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT V

FAILURE TO PROVIDE ADEQUATE TRAINING

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count V.

10. Section 725.116 of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.116, provides, in pertinent part as follows:

> Personnel Training
>
> a) 1) Facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of this Part. The owner or operator must ensure that this program includes all the elements described in the document required under paragraph (d)(3) of this Section.
>
> * * *
>
> b) Facility personnel must successfully complete the program required in paragraph (a) of this Section upon the effective date of these regulations or six months after the date of their employment or assignment to a facility or to a new position at a facility, whichever is later. Employees hired after the effective date of these regulations must not work in unsupervised positions until they have completed the training requirements of paragraph (a) of this Section.
>
> c) Facility personnel must take part in an annual review of the initial training required in paragraph (a) of this Section.

d) The owner or operator must maintain the following documents and records at the facility:

1) The job title for each position at the facility related to hazardous waste management and the name of the employee filling each job;

2) A written job description for each position listed under paragraph (d)(1) of this Section. This description may be consistent in its degree of specificity with descriptions for other similar positions in the same company location or bargaining unit, but must include the requisite skill, education or other qualifications and duties of facility personnel assigned to each position;

3) A written description of the type and amount of both introductory and continuing training that will be given to each person filling a position listed under paragraph (d)(1) of this Section;

4) Records that document that the training or job experience required under paragraphs (a), (b) and (c) of this Section has been given to and completed by facility personnel.

11. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the present, Keystone has failed to ensure that facility personnel involved in hazardous waste management have successfully completed instruction and training as required.

12. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the

present, Keystone has failed to ensure that facility personnel involved in hazardous waste management have been part of an annual review as required.

13. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the present, Keystone has failed to maintain documents and records at the facility as required.

14. Keystone, by its conduct described herein, has and continues to violate Section 21(f) of the Act and 35 Ill. Adm. Code 725.116.

15. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.116;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.116;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to provide instruction, training and annual reviews for facility personnel involved in hazardous waste management, as well as maintaining documents as required;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT VI

FAILURE TO KEEP AND MAINTAIN AN ADEQUATE CONTINGENCY PLAN

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count VI.

10. Section 725.152 of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.152, provides, in pertinent part as follows:

> Content of Contingency Plan
>
> a) The contingency plan must describe the actions facility personnel must take to comply with Sections 725.151 and 725.156 in response to fires, explosions or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste

constituents to air, soil or surface water at the facility.

* * *

c) The plan must describe arrangements agreed to by local police departments, fire departments, hospitals, contractors and state and local emergency response teams to coordinate emergency services, pursuant to Section 725.137.

* * *

e) The plan must include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm system (internal and external) and decontamination equipment) where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list and a brief outline of its capabilities.

11. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the present, Keystone has failed to keep and maintain a contingency plan which describes actions required to respond to possible releases of spent pickle liquor, arrangements agreed to by local agencies or capabilities and descriptions of emergency equipment.

12. Keystone, by its conduct described herein, has and continues to violate Section 21(f) of the Act and 35 Ill. Adm. Code 725.152.

13. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and

until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.152;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.152;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to keep and maintain a contingency plan as required under the Act and associated regulations;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.153;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.153;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to submit a copy of its contingency plan to local response agencies as required under the Act and associated regulations;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT VIII

FAILURE TO KEEP AND MAINTAIN OPERATING RECORD

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count VIII.

10. Section 725.173 of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.173, provides, in pertinent part, as follows:

> Operating Record
>
> a) The owner or operator shall keep a written operating record at the facility.
>
> b) The following information must be recorded as it becomes available and maintained in the operating record until closure of the facility.
>
> 1) A description and the quantity of each hazardous waste received and the method or methods and date or dates of its treatment, storage, or disposal at the facility as required by Appendix A;
>
> 2) The location of each hazardous waste within the facility and the quantity at each location. For disposal facilities the location and quantity of each hazardous waste must be recorded on a map or diagram of each cell or disposal area. For all facilities this information must include cross-references to specific manifest document numbers if the waste was accompanied by a manifest;
>
> 3) Records and results of waste analysis and trail tests performed as specified in Sections 725.113, 725.293, 725.325, 725.352, 725.373, 725.414, 725.441, 725.475 and 725.502, and 35 Ill. Adm. Code 728.104(a) and 728.107;

4) Summary reports and details of all incidents that require implementing the contingency plan as specified in Section 725.156(j);

5) Records and results of inspections as required by Section 725.115(d) (except these data need be kept only three years);

11. From on or before February 22, 1985, the exact dates best known only to Keystone, including but not limited to February 22, 1985 and November 22, 1991, and continuing up to the present, Keystone has failed to keep and maintain a facility operating record which contained inspection records or schedules and the location and amount of hazardous waste at the site.

12. Keystone, by its conduct described herein, has and continues to violate Section 21(f) of the Act, and 35 Ill. Adm. Code 725.173.

13. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.173;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.173;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to keep and maintain an operating record which contains inspection records or schedules and the location and amount of hazardous waste at the site, as required under the Act and associated regulations;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

COUNT IX

FAILURE TO FURNISH RECORDS UPON REQUEST

1-9. Plaintiff realleges and incorporates by reference herein paragraphs 1 through 9 of Count I as paragraphs 1 through 9 of this Count IX.

10. Section 725.174 of the Board Waste Disposal Regulations, 35 Ill. Adm. Code 725.174, provides, in pertinent part as follows:

Availability, Retention and Disposition of Records

a) All records, including plans, required under this Part must be furnished upon request and made available at all reasonable times for inspection by any officer, employee or representative of the Agency who is duly designated by the Director.

11. On at least March 29, 1989 and November 22, 1991, Keystone failed to make available to an employee of the Agency a waste analysis plan, inspection records and training records.

12. Keystone, by its conduct described herein, violated Section 21(f) of the Act and Ill. Adm. Code 725.174.

13. Plaintiff is without an adequate remedy at law. Plaintiff will be irreparably injured and violations of the pertinent environmental statutes and regulations will continue unless and until this court grants equitable relief in the form of preliminary, and, after a trial, a permanent injunctive relief.

WHEREFORE, Plaintiff prays that this Court grant a preliminary injunction, and, after a trial, a permanent injunction:

1. Finding that defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., has caused or allowed violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.174;

2. Enjoining defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., from further violations of Section 21(f) of the Act and 35 Ill. Adm. Code 725.174;

3. Ordering defendant, KEYSTONE CONSOLIDATED INDUSTRIES, INC., to produce to any employee of the Agency, a waste analysis plan, inspection records and inspection records and training records, as required under the Act and associated regulations;

4. Assessing against Defendant a civil penalty of Twenty-five Thousand Dollars ($25,000.00) for each day of violation of the Act;

5. Taxing all costs of this action, including reasonable attorney, expert witness and consultant fees expended by the State in its pursuit of this action, against the defendant; and

6. Granting such other relief as this Court deems appropriate and just.

PEOPLE OF THE STATE OF ILLINOIS,
ex rel. ROLAND W. BURRIS
Attorney General of the
State of Illinois

BY:
MATTHEW J. DUNN, Chief
Environmental Control Division
Assistant Attorney General

OF COUNSEL:

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DATED:

mfco35v

B. Miller

ORIGINAL TO R.P. END
WITNESSED BY Dale Bennington
Filed By Ms M. Elizabeth Duffy - Ill Asst. Att. Gen.
Envv Control Div. 312-814-3374

IN THE CIRCUIT COURT OF THE TENTH JUDICIAL CIRCUIT
PEORIA COUNTY, ILLINOIS
CHANCERY DIVISION

PEOPLE OF THE STATE OF ILLINOIS ex rel. Roland W. Burris, Attorney General of the State of Illinois,	)	
Plaintiff,	)	No. 93 CH 000103
vs.	)	
KEYSTONE CONSOLIDATED INDUSTRIES, INC., a Delaware corporation, d/b/a KEYSTONE STEEL & WIRE COMPANY,	)	
Defendant.	)	

Filed 7/02/93
9:36AM
Peoria Co Court
M. Pa Hon

JUL 2 9 36 AM
CLERK OF THE CIRCUIT COURT PEORIA COUNTY, IL

CONSENT ORDER

This action was commenced by ROLAND W. BURRIS, Attorney General of the State of Illinois, on behalf of the People of the State of Illinois, on his own motion and at the request of the Illinois Environmental Protection Agency, against KEYSTONE CONSOLIDATED INDUSTRIES, INC., a Delaware corporation, d/b/a KEYSTONE STEEL & WIRE COMPANY. The Parties have agreed to this Consent Order and submit it to this Court for approval.

I. DEFINITIONS

1. Whenever the following terms are used in this Consent Order and the Exhibits attached hereto, the following definitions specified in this Paragraph shall apply:

A. "Act" means the Illinois Environmental Protection Act, Ill. Rev. Stat. 1991, ch. 111-1/2, pars. 1001-1056.6.

B. "Agency" means the Illinois Environmental Protection Agency.

C. "Closure Plan" means the Resource Conservation and Recovery Act ("RCRA") closure plan for the Units at the Keystone Facility entitled "Revised Phase 2 Closure Plan For Keystone Steel & Wire Company, Bartonville, Illinois, dated June 15, 1992" and the Agency Closure Plan Approval Letter.

D. "Closure Plan Approval Letter" means the Agency issued letter, dated September 30, 1992, approving the Keystone closure plan, attached as exhibit A.

E. "Consent Order" means this Order, all exhibits attached hereto, and any documents incorporated herein.

F. "Disposal" shall have the meaning provided in Section 3.08 of the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1003.08.

G. "Facility" shall have the meaning provided in Section 720.110 of the IPCB Waste Disposal Regulations, 35 Ill. Adm. Code 720.110.

H. "Hazardous Substance" shall have the meaning provided in Section 3.14 of the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1003.14.

I. "Hazardous Waste" shall have the meaning provided in Section 3.15 of the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1003.15, and Section 721.103 of the IPCB Waste Disposal Regulations, 35 Ill. Adm. Code 721.103.

J. "Hazardous waste management unit" shall have the meaning provided in Section 720.110 of the IPCB Waste Disposal Regulations, 35 Ill. Adm. Code 720.110.

K. "IPCB" means the Illinois Pollution Control Board.

L. "Keystone" means Keystone Consolidated

Industries,Inc., a Delaware corporation, d/b/a Keystone Steel & Wire Company.

M. "NPDES" means the National Pollutant discharge Elimination System.

N. "Operator" shall have the meaning provided in Section 720.110 of the IPCB Waste Disposal Regulations, 35 Ill. Adm. Code 720.110.

O. "Owner" shall have the meaning provided in Section 720.110 of the IPCB Waste Disposal Regulations, 35 Ill. Adm. Code 720.110.

P. "Parties" means the State of Illinois and Keystone.

Q. "Property" means that certain parcel of real property located in the County of Peoria, State of Illinois, being part of Sections 25 and 36, Township 8 North, Range 7 East of the Fourth Principal Meridian containing approximately 103 acres more or less and more particularly described in Exhibit C attached hereto.

R. "State" means the State of Illinois, its Attorney General, and the Agency.

S. "Unit" or "Units" mean any one or more of the following: (1) North Ditch; (2) Mid-Mill Ditch; (3) South Ditch (north half); (4) South Ditch (south half); (5) Surface Drainage Ditch; (6) 24 Hour Retention Reservoir; (7) North Dredge Pile; (8) South Dredge Pile; and (9) Lower South Ditch, all of which are located at the Keystone Facility and identified on Figure 3-1 of the Closure Plan (Exhibit B attached).

T. "USEPA" means the United States Ervironmental Protection Agency.

U. Any term not otherwise defined herein has the meaning provided in the Act and applicable regulations.

II. BACKGROUND

2. The Attorney General of the State of Illinois brings this action on his own motion as well as at the request of the Agency pursuant to the statutory authority vested in him under Section 42 of the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1042.

3. The Agency is an agency of the State of Illinois created pursuant to Section 4 of the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, par. 1004, and charged, inter alia, with the duty of enforcing the Act.

4. At all times herein mentioned, Keystone was and now is a Delaware corporation qualified to conduct business in the State of Illinois. At all times relevant to this Consent Order, Keystone has owned and operated a steel and wire manufacturing plant located in Bartonville, Peoria County, Illinois, with a mailing address of 7000 S.W. Adams Street, Peoria, Illinois.

5. Within its plant, Keystone utilized the Units (excluding the 24 Hour Retention Reservoir) for transfer of waste discharges from the plant, and beginning on or around August 14, 1968, for the transfer of waste discharges to its wastewater treatment plant, which has been permitted pursuant to the NPDES regulations.

trust fund; c) closure letter of credit; d) closure insurance; e) financial test and corporate guarantee for closure.

10. Sections 725.247(a) and (b) of the IPCB Waste Disposal Regulations, 35 Ill. Adm. Code 725.247(a) and (b), provide, in pertinent part, as follows:

> Liability Requirements
>
> a) Coverage for sudden accidental occurrences. An owner or operator of a hazardous waste treatment, storage or disposal facility, or a group of such facilities, shall demonstrate financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility or group of facilities. The owner or operator shall have and maintain liability coverage for sudden accidental occurrences in the amount of at least $1 million per occurrence with an annual aggregate of at least $2 million, exclusive of legal defense costs.
>
> * * *
>
> b) Coverage for nonsudden accidental occurrences... An owner or operator of a surface impoundment, landfill or land treatment facility which is used to manage hazardous waste, or a group of such facilities, shall demonstrate financial responsibility for bodily injury and property damage to third parties caused by nonsudden accidental occurrences arising from operation of the facility or group of facilities. The owner or operator shall have and maintain liability coverage for nonsudden accidental occurrences in the amount of at least $3 million per occurrence with an annual aggregate of at least $6 million, exclusive of legal defense costs.

11. On July 1, 1991, Keystone determined the total estimated cost of phase one of the closure plan, as it was

submitted at that time, was approximately $2.85 million ($2,850,000.00).

12. The Agency deemed Keystone's July 1, 1991 closure cost estimate to be inadequate because the Agency asserted it did not represent the cost of final closure assuming the sediments to be treated and removed would be disposed of as hazardous, rather than delisted wastes; it did not include the costs for the entire closure project; and it did not include all data used to prepare the cost estimate or the proper justification to support the data used to prepare the estimate. Keystone disputed these findings in its January 30, 1992 letter to Mr. Lawrence Eastep, Manager, Division of Land Pollution Control, Permit Section, of the Agency. Keystone formally requested that the Agency modify its September 24, 1991 decision rejecting Keystone's July 1, 1991 closure cost estimate.

13. On July 1, 1991, Keystone submitted a letter of credit worth $2.85 million ($2,850,000.00) to the Agency for the purpose of establishing financial assurance for closure coverage. Keystone's July 1, 1991 submission was returned by the Agency on August 5, 1991 because it was not on the proper State form. The corrected letter of credit was received by the Agency on August 12, 1991.

14. On February 1, 1992, pursuant to an Agency directive, Keystone estimated that its closure costs would be approximately $26.803 million ($26,803,000.00) if the sediments to be treated and removed from the Units subject to closure were disposed of as a hazardous, rather than a delisted, waste.

15. The Plaintiff contends, and Keystone denies, that at all times prior to the date of filing of this Consent Order, Keystone's financial assurance for closure has been underfunded by at least $23.953 million ($23,953,000.00) and Keystone has failed to properly fund its financial assurance for closure.

16. The Plaintiff contends, and Keystone denies, that Keystone, by its conduct described herein, has violated Section 21(f) of the Act and 35 Ill. Adm. Code 725.243.

17. From at least June 29, 1988, Keystone has failed to provide coverage for sudden or non-sudden accidental occurrences. On August 7, 1991, Keystone filed a modification request asking the Agency to waive or reduce to zero the required liability coverage for sudden or non-sudden accidental occurrences because the nature of the Units assured there was no risk requiring or justifying such insurance. On January 23, 1992, the Agency denied this request without prejudice to a refiling. Negotiations for this Consent Decree intervened prior to Keystone's refiling of its modification request.

18. The Plaintiff contends, and Keystone denies, that Keystone, by its conduct described in paragraph 17 herein, violated Section 21(f) of the Act and 35 Ill. Adm. Code 725.247.

19. As to all of the foregoing, the Parties agree that it is in their interests, the public interest, and the interest of protecting the environment that the pending dispute between the Agency and Keystone be settled in accordance with the following provisions.

Pursuant to the stipulation of fact and law by the parties, this Court having jurisdiction over the parties and subject

matter, the parties having appeared, due notice being given, the Court having considered the stipulated facts and being advised in the premises, the court finds the following relief appropriate:

IT IS HEREBY ORDERED, ADJUDGED AND DECREED:

III. JURISDICTION

20. This court has jurisdiction over the subject matter herein and over the Parties consenting hereto pursuant to the Act, Ill. Rev. Stat. 1991, ch. 111-1/2, pars. 1001-1056.6.

IV. PARTIES BOUND

21. This Consent Order shall apply to and be binding upon the undersigned Parties and their officers, employees and agents, as well as the successors and assigns of each and any officer, director, agent, employee or servant of the Parties. The undersigned representatives of each Party to this Consent Order certifies that he or she is fully authorized by the Party or Parties whom he or she represents to enter into the terms and conditions of the Consent Order and to execute and legally bind that Party to it. Keystone shall not raise as a defense to any enforcement action taken pursuant to this Consent Order the failure of its agents, servants or employees to take such action as shall be required to comply with the provisions of this settlement.

V. GENERAL PROVISIONS

22. Commitments of Keystone:

Keystone shall finance and perform the work as specified in and required by the Agency approved Closure Plan for the Units at the Facility, and has established and will fund a trust fund as specified in paragraph 45 to establish adequate financial assurance and liability insurance for the closure of the Units. Keystone shall also establish a Groundwater Management Zone and waste minimization program as described in paragraphs 28 and 29.

23. Compliance with Other Laws and Regulations.

By no later than six months after the entry of this Consent Order, Keystone shall amend its March 3, 1992 Contingency Plan and Personnel Training Program to include the Units and the activities performed under the Closure Plan. On or Before the end of the six month period, Keystone shall submit its amended Contingency Plan and Personnel Training Program to the Agency. The Agency shall have forty-five days from the receipt of the submittal to review, comment, and approve, approve with conditions, or disapprove the submittal. If the Agency should disapprove the submittal, Keystone shall have thirty days to amend the submittal in accordance with the Agency's comments and resubmit the Contingency Plan and Personnel Training Program to the Agency. Except for this paragraph and paragraph 47 below, this Consent Order in no way affects the responsibility of Keystone to comply with any federal, state or local statutes, regulations, or ordinances, including but not limited to the Act and the Board regulations, 35 Ill. Adm. Code Subtitles A through G.

to evaluate the effectiveness of the corrective measure.

B. In order to cease groundwater remediation at the Keystone Property, Keystone must demonstrate that Class I groundwater standards have been met within the GMZ unless relief from the groundwater quality standards of 35 Ill. Adm. Code 620.410 has been granted pursuant to 35 Ill. Adm. Code 620.260 or 620.450(a)(4).

C. Keystone has completed a pilot study and aquifer test for the groundwater remediation system to gain the data necessary to develop a full-scale remediation system capable of achieving Class I groundwater quality standards. The pilot study report, conceptual design and permit application were submitted to the Agency on November 6, 1992. The detailed design, work-plan, and expected performance capability for the groundwater remediation system shall be submitted for Agency review seventeen (17) days after receipt of Agency air and water permits or on February 22, 1993, whichever is later. Upon approval by the Agency, the final design shall become a part of the Consent Order and shall be initiated within 90 days of such approval.

D. Keystone shall note any changes or adjustments made to the final design for the groundwater remediation system and include them with the quarterly reports required in Section 28(A)(vi) above.

29. On May 11, 1992, Keystone initiated the waste minimization plan (described in Exhibit E attached).

30. On July 15, 1992, remedial work at the Facility was initiated by Itex Corp. (contractor for Keystone) pursuant to the Closure Plan.

31. If for any reason Keystone should decide to change contractors or select additional contractors to conduct the work for the Closure Plan, Keystone shall provide the Agency with an opportunity to review and approve the selection of the contractor prior to the awarding of a contract for work to any new or additional contractors. Additionally, Keystone shall:

A. provide the bidding contractors with all technical information necessary for the implementation of the work to be completed;

B. require each contractor submitting a bid to provide a written description of its process and related control procedures;

C. where appropriate, require each bidding contractor to specify the treatment levels which can be achieved through the treatment process or other process which the contractor intends to use;

D. provide the Agency an opportunity to review the request for bids prepared by Keystone and all bids received by Keystone; and

E. allow the Agency to provide Keystone with comments regarding the request for bids and the bids prior to the awarding of the contract.

VII. DELISTING

32. Keystone shall file a single delisting petition with the IPCB requesting the delisting of the sediments and contaminated soils in the Units in accordance with the Closure Plan.

The delisting petition shall be based upon the treated sediments in the 24-Hour Retention Reservoir. If the IPCB grants the delisting, no other delisting petition need be submitted so long as the conditions imposed by the IPCB are met.

33. A. The delisting petition shall be based upon procedures contained in the USEPA guidance manual Petition to Delist Hazardous Waste and the proposed USEPA Composite Model for Landfills, 56 Fed. Reg. 32993, July 18, 1991. Keystone shall certify that the procedures used for the delisting are in conformance with the USEPA delisting criteria and guidance.

B. All calculations provided in Appendix I of the Closure Plan shall be certified by an independent Illinois Registered Professional Engineer. The Agency shall either join Keystone as co-petitioner in the delisting petition or file a recommendation with the IPCB stating that the delisting procedures in Appendix I are in conformance with USEPA criteria and guidance documents.

34. If the IPCB grants Keystone's delisting petition, Keystone shall implement the remaining phases of the approved Closure Plan for the remaining Units. If the IPCB denies Keystone's delisting petition, Keystone shall, within sixty (60) days of the IPCB's final opinion, submit for Agency approval a request to modify the RCRA Closure Plan describing an alternative remediation plan for the Units. The alternative remediation plan shall either propose an alternative treatment method for the remediation of the contaminated sediments and soils or propose to excavate the sediments and soils without conducting further treatment, and manage the materials as hazardous wastes.

VIII. SAMPLING

35. Keystone shall develop sampling and analytical plans for four (4) separate sampling phases: Quality Assurance/Quality Control ("QA/QC") Performance Sampling Phase; Delisting Sampling Phase; Delisting Verification Sampling Phase; and, Clean Closure Verification Sampling Phase. These sampling and analytical plans shall be submitted to the Agency for review and approval prior to their implementation. These sampling and analytical plans shall be incorporated into the Closure Plan and shall be made enforceable as part of this Consent Order.

36. Keystone shall use quality assurance, quality control, and chain of custody procedures in the manner acceptable to the Agency when collecting samples pursuant to this Consent Order. Upon request, the Agency shall provide Keystone with such written guidance, review checklists, and references to guidance documents which the Agency will require for these procedures.

37. In order to provide quality assurance and maintain quality control with respect to all samples collected pursuant to this Consent Order, Keystone shall:

A. Ensure that all sampling and analyses are performed according to the Closure Plan or as otherwise approved by the Agency; and

B. Ensure that any laboratories utilized by Keystone for sample analyses participate in a quality assurance/quality control program in accordance with "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, 3rd Edition (November, 1986).

38. At the request of the Agency, Keystone shall allow split or duplicate samples to be taken by the Agency and/or its authorized representatives of any samples collected by Keystone pursuant to the implementation of this Consent Order. Keystone shall notify the Agency not less than ten (10) days in advance of any sample collection activity unless circumstances make such notice impossible. In addition, the Agency shall have the right to take any additional samples that it deems necessary.

IX. REPORTING REQUIREMENTS

39. Keystone shall provide the Agency and the Attorney General's Office with written monthly progress reports regarding the waste minimization plan in accordance with Exhibit E. The progress reports shall be submitted to the Agency and the Attorney General's Office by the fifteenth day of each month following the month of the effective date of this Consent Order.

40. The date of any submission or notification will be determined by the date of the postmark. If the date for submission of any item or notification required by this Consent Order falls upon a weekend or state or federal holiday, the time period for submission of that item or notification is extended to the next working day following the weekend or holiday.

X. RECORD PRESERVATION

41. Keystone shall make available to the Agency and the Attorney General's Office, and shall retain during the pendency of this Consent Order and for a period of one (1) year after the termination of this Consent Order, all records and documents in

Keystone's possession, custody, or control that relate to the performance of this Consent Order, including, but not limited to, documents reflecting the results of any sampling, testing or other data or information generated or acquired by Keystone, or on its behalf, with respect to the facility.

XI. FORCE MAJEURE

42. Should Keystone be unable to meet any one of the following Schedule Milestones in paragraph 46 as a result of circumstances completely beyond its control, or the control of any entity controlled by Keystone, including its contractors or consultants, Keystone shall notify the Agency and the Attorney General's office of the circumstances. The notification shall be submitted as soon as practicable, but no later than fifteen (15) calendar days after the date Keystone becomes aware of its inability to meet the scheduled milestones or fifteen (15) calendar days after the date it should have become aware by the exercise of due diligence. Such notification shall be in writing, specifically referencing this section of the Consent Order and describing in detail the circumstances involved, the anticipated length of time the circumstances may persist, the precise cause or causes of the circumstances, the measures taken or to be taken by Keystone to prevent or minimize any noncompliance as well as to prevent future noncompliance, the timetable by which those measures will be implemented and a proposed revised timetable to reflect the anticipated delay. Keystone shall adopt all reasonable measures to avoid or minimize any such noncompliance.

Keystone shall have the burden of demonstrating that the delay or anticipated delay has been or will be caused by a Force Majeure event and that the duration of this delay was or will be warranted under the circumstances. If the Parties agree that a delay is or was attributable to a Force Majeure event, the Parties shall modify the relevant Schedule Milestones in the Consent Order in writing to provide such additional time as may be necessary to allow the completion of work to be performed or the timely submission of any reports, documents, plans or submittals to the Agency pursuant to this Consent Order. Failure by Keystone to comply with the notice requirements of this Section shall constitute a waiver of Keystone's right to obtain an extension of time for its obligations based on such circumstances.

XII. STIPULATED PENALTIES

43. Subject to section XI above, in the event Keystone should be late or miss any Schedule Milestone set out in this Consent Order, Keystone shall to pay a stipulated penalty of one thousand dollars ($1,000.00) per day for each such event. The State shall not be required to give notice to Keystone for lateness or missing of any deadline. Subject to notice by Keystone and establishment of a Force Majeure event, stipulated penalties shall accrue from the date or deadline, through and including the final date on which the late or missed action is fulfilled.

These stipulated penalties shall be in addition to any other rights or remedies the State may have including, but not limited

to, any rights under federal, state, municipal, or common law or judicial decisions, however, any stipulated penalties paid by Keystone may be used as an offset against any civil fine or penalty assessed against Keystone in an enforcement action for the same act(s), arising out of the same facts, for which the above mentioned stipulated penalties were paid.

44. Following any failure by Keystone to comply with a Schedule Milestone as set out in paragraph 46 below, the State may give Keystone written notification of the same and describe the noncompliance. This notice shall also indicate the amount of penalties due as of the date of the notice. Penalties shall accrue from the initial date of violation(s).

45. All penalties owed to the State under this Consent Order shall be payable within thirty (30) calendar days of receipt of the notification of non-compliance. Such penalties owed to the State shall be paid by certified check to the "Treasurer, State of Illinois, for deposit in the Hazardous Waste Fund" and shall be mailed to:

Illinois Environmental Protection Agency
Division of Administration
Fiscal Services Section
Post Office Box 19276
Springfield, Illinois 62794-9276.

The checks shall contain Keystone's complete and correct address, the Site name, federal employer identification number, and the civil action number.

46. Schedule of Milestones:

A. Groundwater Remediation Program Milestones

i. Submit remediation design to Agency: Seventeen (17) days after receipt of Agency

air and water permits or February 22, 1993, whichever is later.

ii. Start-up of air stripper system operation: Eight (8) months after receipt of Agency air and water permits and Agency's approval of the remediation design.

B. Revised Phase 2 Closure Plan Milestones

i. May 1, 1993: Complete treatment of Retention Reservoir.

ii. August 1, 1993: Submit delisting petition to IPCB for approval.

iii. February 1, 1994: Assumed date of IPCB's approval of a comprehensive delisting petition for the treated waste in all impoundments. Any delay in receipt of approval for Keystone's delisting petition beyond this date results in a day-for-day slippage in the following schedule milestones, or of a delay until the next spring-fall construction season if applicable, whichever is greater.

iv. May 15, 1994: Complete removal of treated waste in Retention Reservoir.

v. July 15, 1994: Submit closure report for Retention Reservoir to Agency.

vi. September 15, 1994: Assumed date for approval of closure report by Agency. Any delay in receipt of approval for Keystone's closure report beyond this date results in a day-for-day slippage in the following schedule milestones, or of a delay until the next spring-fall construction season if applicable, whichever is greater.

vii. August 15, 1996: Complete closure of North Ditch. Any delay in receipt of approval for Keystone's closure report beyond this date results in a day-for-day slippage in the following schedule milestones, or of a delay until the next spring-fall construction season if applicable, whichever is greater.

viii. July 15, 1997: Complete closure of Mid-Mill Ditch. Any delay in receipt of approval for Keystone's closure report beyond this date results in a day-for-day slippage in the following schedule milestones, or of a delay

until the next spring-fall construction season if applicable, whichever is greater.

ix. December 15, 1997: Complete closure of Dredge Piles and Surface Ditch. Any delay in receipt of approval for Keystone's closure report beyond this date results in a day-for-day slippage in the following schedule milestones, or of a delay until the next spring-fall construction season if applicable, whichever is greater.

x. July 15, 1998: Complete closure of South Ditch. Any delay in receipt of approval for Keystone's closure report beyond this date results in a day-for-day slippage in the following schedule milestones, or of a delay until the next spring-fall construction season if applicable, whichever is greater.

xi. July 15, 1999: Complete closure of Lower South Ditch.

C. Financial Milestones: Keystone shall make deposits to the Trust Fund as set out in the schedule in Paragraph 47 of this Consent Order.

XIII. FINANCIAL ASSURANCE

47. Keystone shall implement and commit to, and the Agency shall accept, the following financial assurance arrangements in satisfaction of and, where different, in lieu of the financial assurance and liability insurance requirements of 35 Ill. Adm. Code 725, Subpart H, for the closure of the Units at the Keystone Facility.

A. Keystone has established a trust agreement ("Trust Fund") as specified in 35 Ill. Adm. Code 724.251, and has deposited $500,000 into the Trust Fund.

B. Keystone shall make ten (10) additional deposits of $175,000 each into the Trust Fund. The first of these

deposits shall be made by the first day of the month following the entry of this Consent Order. The remaining payments shall be made quarterly thereafter until all ten (10) payments have been made.

C. Keystone shall make ten (10) additional deposits of $75,000 each into the Trust Fund. These deposits shall be made beginning the quarter following the last $175,000 payment, specified in paragraph XIII 47 B above, and shall be made quarterly thereafter until all ten (10) payments have been made.

D. Earnings on the Trust Fund deposits shall remain in the Trust Fund pursuant to the terms of sub-paragraph E below, but shall be returned to Keystone if and when allowed by the terms of sub-paragraph E.

E. Starting in 1997, and for so long as closure/post closure funding is required, by July 1 of each year, Keystone shall make the following evaluation:

i. Keystone shall compare the Trust Fund balance ("A") to the sum of $2 million plus the then estimated value of the remaining closure cost ("B").

ii. If "A" exceeds "B," Keystone may discontinue making deposits into the Trust Fund until the next evaluation is due to be made. In addition, Keystone may submit a written request to the Agency for the release of the amount in which "A" is in excess of "B," the release of which shall not be withheld unreasonably.

iii. If "B" exceeds "A," Keystone shall continue making quarterly deposits of $75,000 into the Trust Fund until such time as this annual comparison reveals that "A" exceeds "B." Keystone shall

then make its yearly evaluations as required above.

iv. Within sixty (60) days of the Agency's approval of the certification of closure of all units pursuant to the Agency approved plan, the Agency shall authorize the Trustee to disburse all funds in the Trust Fund in excess of the amount of the $2 Million Liability Coverage for Sudden Accidental Occurrences provided that all of the requirements of the approved closure plan have been met.

v. Upon the Agency's approval of the certification of closure of the surface impoundments pursuant to the Agency approved closure plan, Keystone may request the disbursement of the funds for the $2 Million Liability Coverage for Sudden Accidental Occurrences from the Trust Fund. If the Agency's final RCRA closure inspection for the surface impoundments does not identify any RCRA units for which there is a liability coverage deficiency, then the Agency shall consent to the release of the $2 million retained in the Trust Fund for purposes of liability coverage. (The groundwater monitoring and remediation commitments under the Groundwater Management Zone Proposal shall not constitute a RCRA unit for the purpose of the disbursement of the $2 Million Liability Coverage.)

vi. In the event that Keystone is unable to complete closure of the surface impoundments pursuant to the requirements of the Agency approved Closure Plan (not including noncompliance with schedule deadlines), or becomes an owner or operator of any additional surface impoundments, landfills, or land treatment facilities which are used to manage hazardous waste, "B" shall become the sum of $2 Million Liability Coverage for Sudden Accidental Occurrences plus the then-estimated value of the remaining closure cost plus the required amount for Liability Coverage for Non-Sudden Accidental Occurrences.

F. Keystone, at its discretion, may make deposits into the Trust Fund in amounts larger than the amounts required above.

XIV. RIGHT OF ENTRY

48. In addition to any other authority, the Agency, its employees and representatives, and the Illinois Attorney General, his agents and representatives, shall have right of entry to defendant's facility at all reasonable times, for the purposes of conducting inspections. In conducting any inspection of defendant's facility, the Agency, its employees and representatives, and the Attorney General, his agents and representatives, may take any photographs or samples as they deem necessary in order to conduct their inspection.

XV. CEASE AND DESIST

49. Except as provided in this Consent Order, Keystone shall cease and desist from violations of the Act and Regulations promulgated thereunder.

XVI. RELEASE FROM LIABILITY

50. In consideration for Keystone's agreement to follow the above compliance program and commitment to refrain from further violations of the Act, and the Board Regulations, the plaintiff releases, waives and discharges defendant from any further liability or penalties from violations of the Act which were the subject matter of the complaint herein. However, nothing in this Consent Order shall be construed as a waiver by plaintiff of the

right to redress future violations or obtain penalties with respect thereto.

XVII. ENFORCEMENT OF CONSENT ORDER

51. Upon the entry of this Consent Order, any party hereto, upon motion, may reinstate these proceedings solely for purposes of enforcing the terms and conditions of this Consent Order. This Consent Order is a binding and enforceable order of the Court and may be enforced as such through any and all available means.

XVIII. EFFECTIVE AND TERMINATION DATE

52. This Consent Order shall be effective upon the date of its entry by this court.

53. TERMINATION

Upon the issuing of the Certification of Closure by the Agency for all Units which are the subject of the Closure Plan and upon a showing to the Agency that all other terms of this Consent Order, including payment of all stipulated penalties due hereunder, have been complied with, Keystone shall, upon the motion of any Party, be relieved of all obligations and responsibilities under this Consent Order except that the provisions of Sections IV, X, XIII, XIV, XV and XVI shall survive and Keystone shall continue to be obligated and responsible in accordance with the terms of the aforementioned Sections.

XIX. NOTICES

54. Whenever, under the terms of this Consent Order, notice is required to be given or a report or other document is required to be forwarded by one Party to another, such correspondence shall be directed to the following individuals at the addresses specified below:

As to the State of Illinois:

Michael K. Franklin
Attorney General, State of Illinois
Environmental Control Division
State of Illinois Center
100 W. Randolph Street, 12th Floor
Chicago, Illinois 60601

As to the Agency:

Illinois Environmental Protection Agency
Lawrence W. Eastep, P.E.
Manager, Permit Section
Division of Land Pollution Control, #33
2200 Churchill Road
P.O. Box 19276
Springfield, Illinois 62794-9276

Joseph E. Svoboda
General Counsel
Division of Legal Counsel
Illinois Environmental Protection Agency
2200 Churchill Road
P.O. Box 19276
Springfield, Illinois 62794-9276

As to Keystone:

Ralph P. End, Esq.
Vice President and General Counsel
Keystone Consolidated Industries, Inc.
Three Lincoln Centre
5430 LBJ Freeway
Suite 1440
Dallas, Texas 75240

Dale L. Bennington, P.E.
Manager, Energy and Environmental Engineering
Keystone Steel & Wire Co.
7000 S.W. Adams Street
Peoria, Illinois 61641

All submissions to the Agency under the terms of this Consent Order shall be by Certified mail, return receipt requested and postage fully prepaid. All notices to and from the Agency under the terms of this Consent Order shall be by Certified mail, return receipt requested and postage fully prepaid.

XX. SUBSEQUENT AMENDMENTS

55. In addition to the procedures set forth elsewhere in this Consent Order, this Consent Order may be amended by mutual agreement of the Parties. Any amendment of this Consent Order shall be in writing, signed by the Illinois Attorney General, Agency and Keystone and shall be effective upon the date of its entry by the Court.

XXI. SEVERABILITY

56. It is the intent of the parties hereto that the provisions of this Consent Order shall be severable and should any provisions be declared by a court of competent jurisdiction to be inconsistent with state or federal law, and therefore unenforceable, the remaining clauses shall remain in full force and effect.

WHEREFORE, the Parties enter into this Consent Order and submit it to the Court that it may be approved and entered.

PEOPLE OF THE STATE OF ILLINOIS,
ex rel. ROLAND W. BURRIS,
Attorney General of the
State of Illinois

By: _____ Dated: 6/3/93
Matthew J. Dunn, Chief
Environmental Control Division
Assistant Attorney General

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

By: _____ Date: 5/28/93
JOSEPH E. SVOBODA
General Counsel
Division of Legal Counsel

KEYSTONE CONSOLIDATED INDUSTRIES, INC.,
a Delaware corporation, d/b/a
KEYSTONE STEEL & WIRE COMPANY

By: _____ Date: May 21, 1993
HAROLD M. CURDY

Title: Vice President, Finance, & Treasurer

FEIN: 37-0364250

Entered this 2nd day of _____, 1993

_____
Judge

keystol0.co

Part of Consent Order

CLOSURE PLAN APPROVAL LETTER

EXHIBIT

A

ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

217/524-3300

September 30, 1992

Keystone Steel & Wire
Attn: Dale L. Bennington, P.E.
7000 S.W. Adams Street
Peoria, Illinois 61641

Re: LPC #1430050001 -- Peoria County
Keystone Steel & Wire
ILD000714881
RCRA-Closure
Log No. C-521-M-6
Received: July 13, 1992

Dear Mr. Bennington:

This is in response to the partial closure plan modification request submitted by yourself, prepared by W.W. Engineering and Science, Inc. and dated July 10, 1992. The referenced document was submitted in response to the closure plan approval letter dated June 30, 1992. This submittal contained responses to Conditions 8 and 9 of the June 30 letter.

Your request to modify the partial closure plan for the seven surface impoundments (S04), identified by Keystone as the North Ditch, Mid-Mill Ditch, South Ditch-North Half, South Ditch-South Half, Lower South Ditch, Twenty-Four Hour Retention Reservoir and Surface Drainage Ditch; and two waste piles (S03), identified by Keystone as the North Dredge Pile and the South Dredge Pile is hereby approved subject to the conditions and modifications listed below. Please note that Conditions 8 and 9 of the June 30, 1992 partial closure plan approval letter have been changed in response to the referenced submittal.

1. This letter supercedes all previous closure plan approval letters. Except as noted in the conditions below, all closure activities carried out at the site after the date of this letter must be conducted in accordance with the modification requests dated June 12 and July 10, 1992.

2. Please note that although Keystone asserts that the Lower South Ditch does not constitute a Hazardous Waste Management Unit, the material contained in this unit is a mixture containing spent pickle liquor generated by steel finishing operations of a facility within the iron and steel industry (K062). Therefore, by 35 IAC 721.103(a)(D), this mixture is a listed hazardous waste (K062) and is subject to the same delisting requirements as the material to be removed from the other units.

3. Until a delisting for the treated K062 sludges is granted, the currently approved closure cost estimate is the estimate based on disposal of contaminated material as a listed hazardous waste, i.e. $23,321,000. This approved closure cost estimate must be updated annually. These updated

closure cost estimates must account for (a) inflation, (b) any unplanned events or operational changes that affect the cost of closure, (c) better knowledge of actual project costs gained from work completed to date, (d) success (or lack of success) in obtaining a delisting from the Illinois Pollution Control Board, and (e) the amount of work remaining. The updated cost estimates must be submitted for Agency approval along with the annual reports described in Section 13.2 of the June 12, 1992 submittal on or before April 1 of each year.

4. The clean closure verification sampling program included in Section 8 of the June 12, 1992 submittal is not approved. Prior to initiating clean closure verification sampling, a scaled drawing showing the unit to be sampled, along with sampling locations must be submitted for each unit going through closure. These sampling diagrams are subject to Agency approval. Please note that upon establishment of a sampling grid through the use of the equations contained in the Agency's closure plan instruction package, clean closure verification samples must be taken from the intersections of all grid lines, including those on the outer edges of the grid.

5. Page 18 of Section 8 of the June 12, 1992 submittal indicates that the Lower South Ditch will be connected to the South Ditch-South Half. Such a connection would allow the movement of hazardous waste into the Lower South Ditch and would therefore subject the Lower South Ditch to regulation as a Hazardous Waste Management Unit.

6. Page 9 of Appendix L of the June 12, 1992 submittal provides for deletion of indicator parameters from the delisting verification sampling program. Such deletions are subject to prior Agency approval.

7. The provision for statistical comparison of data collected during the four sampling phases (Appendix L, Page 14) is not approved. Any such proposal may be submitted as a modification request <u>only after</u> the required data has been obtained.

8. Groundwater within 10 feet of land surface must meet Class II groundwater quality standards set forth in 35 IAC 620.420. However, pursuant to a Board Note in 35 IAC 620.210: Any portion of the thickness associated with the geologic materials as described in Sections 620.210(a)(2), (a)(3) or (a)(4) should be designated as Class I if located 10 feet or more below the land surface. Therefore, groundwater located less than 10 feet below land surface may not degrade Class I groundwater beyond applicable groundwater quality standards set forth in 35 IAC 620.410.

9. The groundwater sampling and analysis plan presented in Section 10 of the Closure Plan is hereby modified to include in changes proposed in the July 10, 1992 letter. Any changes to the sampling and analysis plan, as modified and approved in this letter, must be in the form of a closure plan modification request.

10. All samples shall be analyzed individually (i.e., no compositing except for samples obtained for metals analysis during the delisting sampling phase). Sampling and analytical procedures shall be conducted in accordance with the latest edition of SW-846 and Attachment I (Soil Volatile Sample Procedures) of this letter. When visually discolored or contaminated material exists within an area to be sampled, horizontal placement of sampling locations shall be adjusted to include such visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of any contamination. Apparent visually contaminated material within a sampling interval shall be included in the sample portion of the interval to be analyzed. To demonstrate a parameter is not present in a sample, analysis results must show a detection limit at least as low as the PQL for that parameter in the latest edition of SW-846. For inorganic parameters, the detection limit must be at least as low as the RCRA Groundwater Detection Limits as referenced in SW-846 (Third Edition) Volume 1A, pages TWO-29 and TWO-30, Table 2-15.

11. Closure activities must be completed in accordance with the closure schedule presented in Figure 8-16 of the June 12, 1992 submittal. When closure of each unit is complete the owner or operator must submit to the Agency certification both by the owner or operator and by an independent registered professional engineer that the unit has been closed in accordance with the specifications in the approved closure plan. This certification must be received at the Agency within sixty (60) days after closure activities are complete for each unit (by May 31, 1994 for the 24-Hour Retention Reservoir).

    The attached closure certification form (Attachment 2) must be used. Signatures must meet the requirements of 35 Ill. Adm. Code Section 702.126. The independent engineer should be present at all critical, major points (activities) during the closure. These might include soil sampling, soil removal, backfilling, final cover placement, etc. The frequency of inspections by the independent engineer must be sufficient to determine the adequacy of each critical activity.

    The Illinois Professional Engineering Act (Ill. Rev. Stat., Ch. 111, par. 5101 et. seq.) requires that any person who practices professional engineering in the State of Illinois or implies that he (she) is a professional engineer must be registered under the Illinois Professional Engineering Act (par. 5101, Sec. 1). Therefore, any certification or engineering services which are performed for a closure plan in the State of Illinois must be done by an Illinois P.E.

    Plans and specifications, designs, drawings, reports, and other documents rendered as professional engineering services, and revisions of the above must be sealed and signed by a professional engineer in accordance with par. 5119, sec. 13.1 of the Illinois Professional Engineering Act.

As part of the closure certification, to document the closure activities at your facility, please submit a Closure Documentation Report which includes the items detailed in Section 13.1 of the June 12, 1992 submittal and the following:

a. The volume of waste and waste residue removed. The term waste includes wastes resulting from decontamination activities.

b. A description of the method of waste handling and transport.

c. The waste manifest numbers.

d. Copies of the waste manifests.

e. A description of the sampling and analytical methods used.

f. A chronological summary of closure activities and the cost involved.

g. Color photo documentation of closure. The color photographs must document conditions before, during and after closure.

h. Tests performed, methods and results.

The original and two (2) copies of all certifications, logs, or reports which are required to be submitted to the Agency by the facility should be mailed to the following address:

Illinois Environmental Protection Agency
Division of Land Pollution Control -- #24
Permit Section
2200 Churchill Road
Post Office Box 19276
Springfield, Illinois 62794-9276

12. The approval of this partial closure plan does not relieve Keystone Steel & Wire of the responsibility of providing financial assurance for any other units at the Keystone site which is subject to closure, in accordance with 35 IAC Section 725.243.

13. Owners and operators of waste management units which received wastes after July 26, 1982 or that certified closure according to 35 IAC 725.215 after January 26, 1983 are required to submit an application for a Post-Closure Permit meeting the requirements of 35 IAC, Part 724 upon request from the IEPA unless it is demonstrated that closure by removal has been achieved. (35 IAC Section 703.121(b))

14. If the Agency determines that implementation of this closure plan fails to satisfy the requirements of 35 Ill. Adm. Code, Section 725.211, the Agency reserves the right to amend the closure plan. Revisions of closure plans are subject to the appeal provisions of Section 40 of the Illinois Environmental Protection Act.

15. The approval of this closure plan does not resolve this facility's violations of 35 Ill. Adm. Code, Part 725, Subpart H (Financial Requirements). These violations will not be resolved (and the facility will remain out of compliance) until adequate financial assurance is established or the Agency approves the certification of closure of all units.

16. Under the provisions of 29 CFR 1910 (51 FR 15,654, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination and training. General site workers engaged in activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hours of safety and health training off site plus a minimum of three days of actual field experience under the direct supervision of a trained experienced supervisor. Managers and supervisors at the cleanup site must have at least an additional eight hours of specialized training on managing hazardous waste operations.

17. If clean closure cannot be achieved pursuant to 35 IAC Section 725.328(a)(1) and/or 35 IAC Section 725.358(a) then a modified closure plan and a post-closure plan prepared pursuant to 35 IAC Section 725.328(a)(2) and/or 35 IAC Section 725.358(b) must be submitted to the Agency for review and approval within 60 days of such a determination.

18. To avoid creating another regulated storage unit during closure, obtain any necessary permits for waste disposal prior to initiating excavation activities. If it is necessary to store excavated material on-site prior to off-site disposal, do so only in containers or tanks for less than ninety (90) days. Do not create regulated waste pile units by storing the excavated material in piles. The ninety (90) day accumulation time exemption (35 IAC 722.134) only applies to containers and tanks.

19. Please be advised that the requirements of the Responsible Property Transfer Act (Public Act 85-1228) may apply to your facility due to the management of RCRA hazardous waste. In addition, please be advised that if you store or treat on-site generated hazardous waste in containers or tanks pursuant to 35 IAC 722.134, those units are subject to the closure requirements identified in 35 IAC 722.134(a)(1).

20. All hazardous wastes that result from this project are subject to annual reporting as required in 35 IAC 722.141 and shall be reported to the Agency by March 1 of the following year for wastes treated and left on-site or shipped off-site for storage, treatment and/or disposal during any calendar year. Additional information and appropriate report forms may be obtained from the Agency by contacting:

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

Administrative Compliance Unit
Division of Land Pollution Control
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, Illinois 62794-9276

Should you have any questions regarding this matter, please contact Mark L. Crites or Ken Lovett at 217/524-3300.

Very truly yours,

Lawrence W. Eastep

Lawrence W. Eastep, P.E., Manager
Permit Section
Division of Land Pollution Control
Bureau of Land

LWE:MC/sf/spl088r/1-6

Attachment VR

cc: USEPA Region V -- George Hamper

bcc: Division File
Peoria Region
Jim Moore
Jerry Kuhn
Mark Crites
DLC, Mark Gurnik

RECEIVED
DIVISION OF LEGAL COUNSEL
OCT 01 1992
ENVIRONMENTAL PROTECTION AGENCY

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

ATTACHMENT 1

Soil Volatile Sampling Procedures

Procedure:

A. PREPARATION AND DECONTAMINATION OF STAINLESS STEEL SOIL SAMPLER

*1. Wash tubing or sampler with hot water and a nonfoaming detergent.

2. Rinse with hot water.

*3. Rinse with a pesticide grade solvent, such as hexane.

4. Rinse with very hot water to drive off solvent.

5. Rinse with deionized water.

6. Store the sampler in aluminum foil until ready to use.

*Consult the laboratory for specific recommendations.

B. SOIL SAMPLING FOR VOLATILE ORGANICS

1. Using a properly decontaminated and stored stainless steel sampler (refer to preparation and decontamination instructions), take a core sample of soil.

2. Add additional clay to the ends of the sample, if necessary, to eliminate head space. DO NOT remove sample from sample tube in the field. The laboratory should remove the sample from the sampling tube.

3. Cover both ends of the sampler with aluminum foil. Cover the aluminum foil with a plastic cap, such as a thread protector.

4. Put the sample on ice immediately.

5. Transport the samples to the laboratory as soon as possible. Most laboratories require delivery within 24 hours of sampling.

NOTE: Soil samples which will be tested for volatile organic constituents cannot be composited because of the volatilization which would result from any compositing method.

State of Illinois
ENVIRONMENTAL PROTECTION AGENCY

Mary A. Gade, Director

2200 Churchill Road, Springfield, IL 62794-9276

ATTACHMENT 2

This statement is to be completed by both the responsible officer and by the registered professional engineer upon completion of closure. Submit one copy of the certification with original signatures and three additional copies.

Closure Certification Statement

Closure Log C-521-M-6

The hazardous waste management unit(s) described in this document has (have) been closed in accordance with the specifications in the approved closure plan. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

USEPA ID Number

Facility Name

Signature of Owner/Operator

Name and Title

Signature of Registered P.E.

Name of Registered P.E. and Illinois Registration Number

Date

MC:sf/sp/1088r,7-8

Printed on Recycled Paper

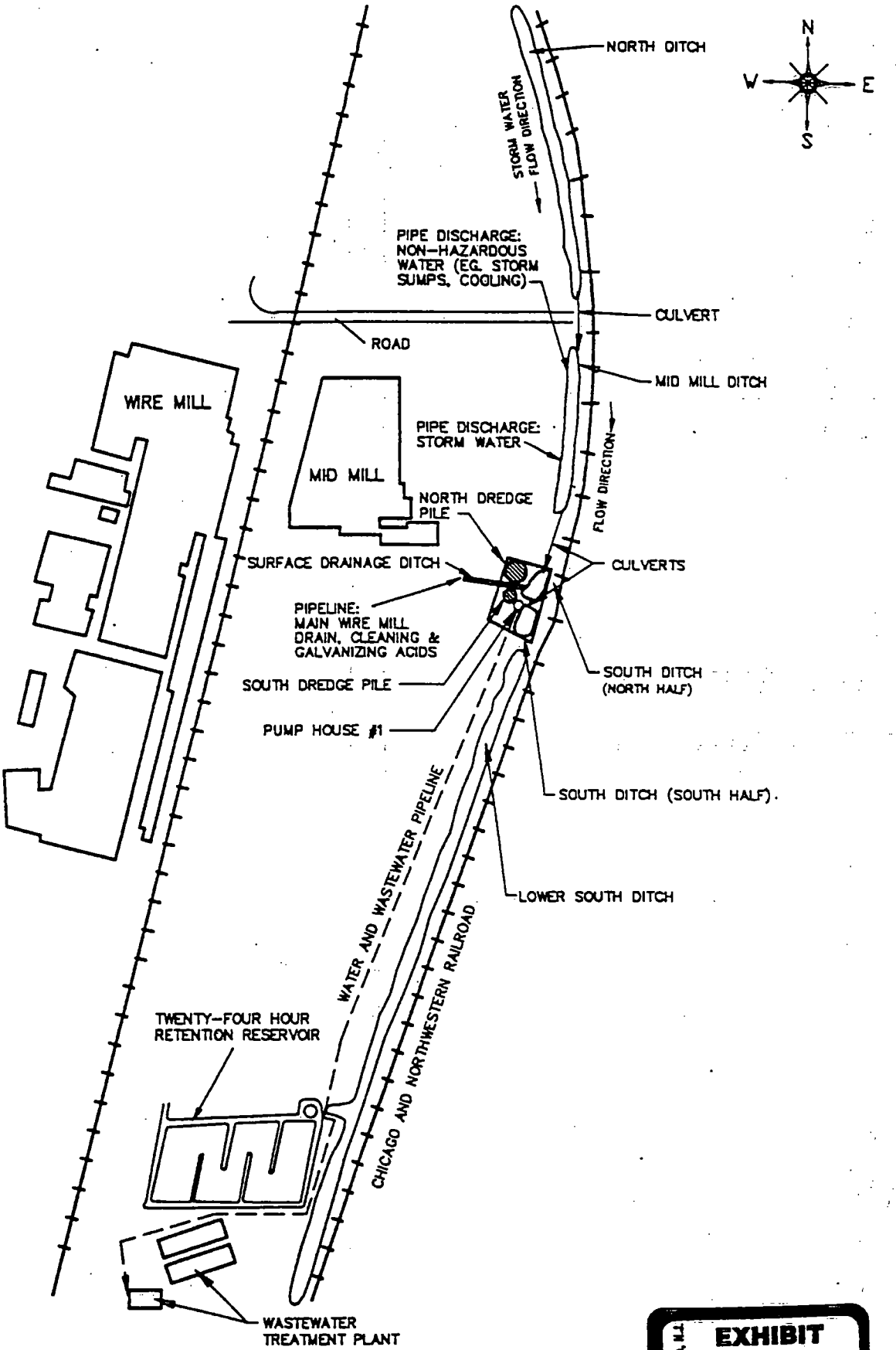


FIGURE 3-1

SITE FEATURES MAP
KEYSTONE STEEL AND WIRE COMPANY
BARTONVILLE, ILLINOIS

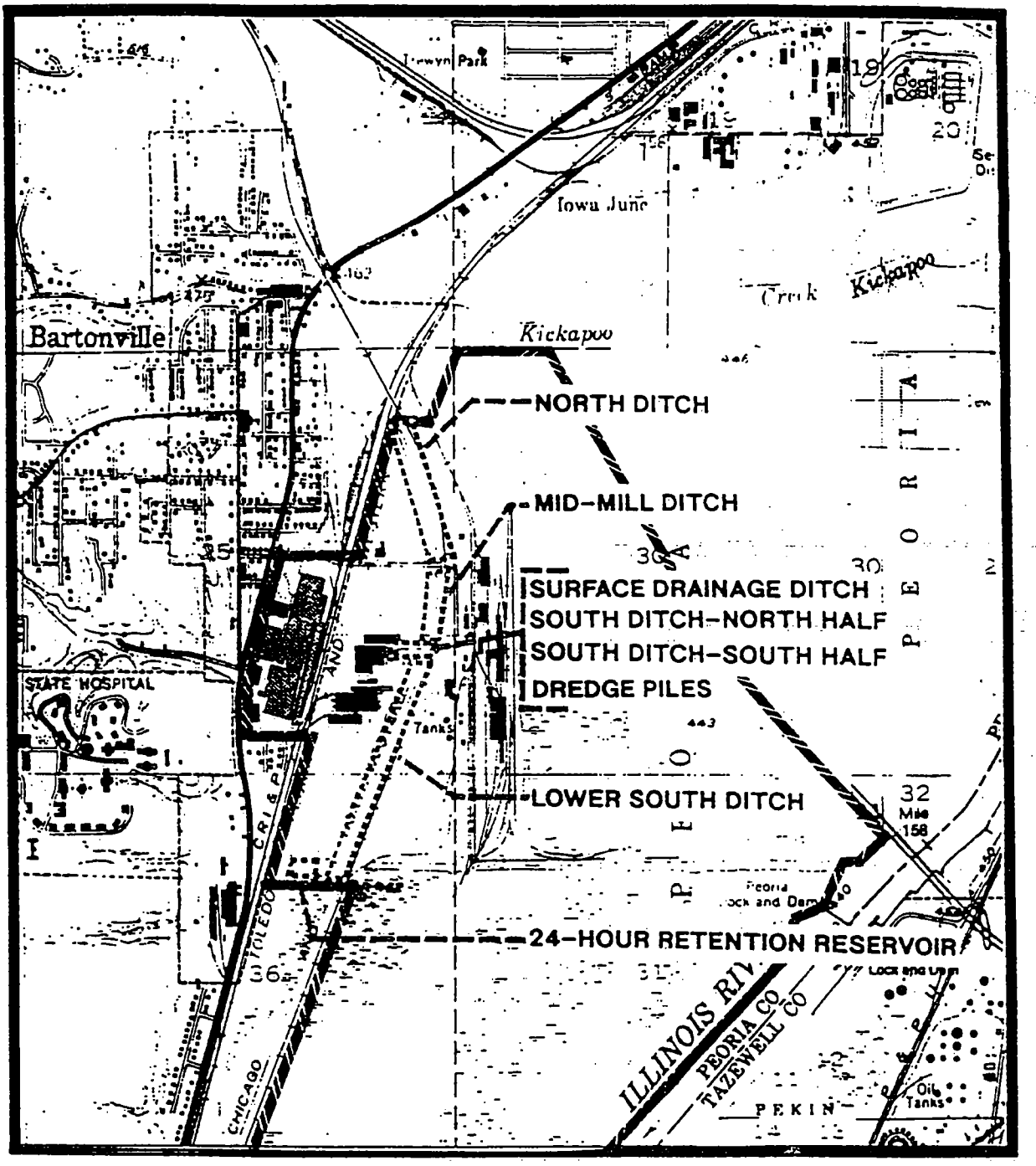
APPROX. SCALE (ft.)
0 600

EXHIBIT
B

ERM

CLIENT NAME	KEYSTONE STEEL AND WIRE COMPANY
APPROVED	
DATE	5/20/92
CHECKED	
DRAWN	BLAS-
REPORT	PH2CL
JOB/TASK	0178-1

PEORIA WEST QUADRANGLE
ILLINOIS
7.5 MINUTE SERIES (TOPOGRAPHIC)
1949
PHOTOREVISED 1967



SCALE 1:24000

1 .5 0 1 MILE

CONTOUR INTERVAL 10 FEET

EXHIBIT C

EXHIBIT

LOCATION AND IDENTIFICATION OF THE
6 HAZARDOUS WASTE SURFACE IMPOUNDMENTS,
2 HAZARDOUS WASTE PILES, AND
1 SOLID WASTE MANAGEMENT UNIT
(THE "KEYSTONE FACILITY")

QUADRANGLE LOCATION

ERM

CLIENT NAME: KEYSTONE STEEL AND WIRE COMPANY
APPROVED
DATE: 5/20/02
DRAWN: LU
PROJECT: 0178-4

PEORIA CTY - 1430050C
BARTONVILLE/KEYST.

FILED

JUN 29 1988

JOHN M. WATERS, Clerk
U. S. DISTRICT COURT
CENTRAL DISTRICT OF ILLINO

IN THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF ILLINOIS

UNITED STATES OF AMERICA, Plaintiff, v. KEYSTONE CONSOLIDATED INDUSTRIES, INC., Defendant.	)	Civil Action No. 86-1212 Judge Mihm

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ENFORCEMENT PROGRA

JUL 06 1988

Environmental Protection Age

CONSENT DECREE

Plaintiff, the United States of America, on behalf of the United States Environmental Protection Agency ("United States"), and the defendant, Keystone Consolidated Industries, Inc., have jointly moved the Court for entry of this consent decree.

THEREFORE, it is ORDERED, ADJUDGED and DECREED as follows:

I. JURISDICTION

1. This Court has jurisdiction of the subject matter of this action and of the parties to this consent decree.

II. APPLICABILITY

2. This consent decree applies to and binds the parties hereto and their successors.

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EXHIBIT
D

III. BACKGROUND

3. The United States filed the complaint in this action on July 18, 1986 alleging that defendant Keystone Consolidated Industries, Inc. ("Keystone") was violating the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, et seq. ("RCRA") at Keystone's plant in Peoria, Illinois known as the Bartonville Plant. The United states sought injunctive relief and civil penalties. Keystone denied the principal allegations of the complaint.

4. The United States moved for a preliminary injunction. A hearing on the motion was held on July 24 and 28, 1986. At the hearing and in a written order dated September 24, 1986 the Court ordered Keystone to cease placing certain wastes in certain impoundments and other structures at the Bartonville Plant by October 1, 1986. Keystone complied with the order.

5. Under RCRA Keystone must close the impoundments and other structures according to an approved closure plan. The United States asserts that the Illinois Environmental Protection Agency ("IEPA") has authority to approve RCRA closure plans in Illinois, including any plan submitted by Keystone. Keystone asserts that this Court has authority to determine the nature and sufficiency of RCRA closure measures.

6. In an effort to avoid unnecessary and costly litigation, Keystone has submitted a proposed closure plan to IEPA. At the time of this partial consent decree there is a

substantial likelihood that Keystone and IEPA will agree on a closure plan, and that Keystone then will implement it.

CLOSURE PLAN APPROVAL AND IMPLEMENTATION

7. Keystone shall close its impoundments and other structures as required by RCRA and consistent with the following provisions of this consent decree.

8. Keystone shall continue in good faith to seek approval of a closure plan from IEPA.

9. Keystone shall implement the closure plan approved or issued by IEPA according to the schedule set forth in the approved plan unless, within 30 days of such approval or issuance, Keystone petitions the Court for alternative closure requirements under paragraph 21 of this consent decree and the Court ultimately grants such relief. In the latter case Keystone shall close subject to terms and according to a schedule imposed by the Court.

10. The parties reserve their respective positions concerning whether this Court has authority to review RCRA closure plans or to authorize closure on terms other than those required by a State-approved plan. This consent decree does not confer such authority on the Court.

CIVIL PENALTY

11. Keystone shall pay a civil penalty totalling $280,000 plus interest as specified below.

12. Keystone shall pay the $280,000 principal amount according to the following schedule:

a. $30,000 shall be paid within 30 days after entry of this consent decree.

b. $125,000 shall be paid one year after entry of this consent decree or 30 days after IEPA approval of a closure plan, whichever is later, but in any event no later than two years after entry of this consent decree;

c. $125,000 shall be paid two years after entry of this consent decree.

13. Except as is specifically stated in paragraph 12.b, payment of the above civil penalty is not contingent on Keystone receiving approval of a closure plan, or on any determination the Court may make on closure plan approval authority.

14. Keystone shall pay no interest on the principal amount due under the first payment ($30,000) if the payment is made on time. If the payment is late, Keystone shall pay interest on it which shall begin to accrue on the date the payment is due.

15. Keystone shall pay interest on the principal amounts due under the second and third payments ($125,000 each) which shall began to accrue on the date of entry of this consent decree.

16. Interest shall accrue on the declining principal balance at the rate provided in 28 U.S.C. §1961(a), that is, a rate equal to the coupon issue yield equivalent (as determined by

the Secretary of the Treasury) of the average accepted auction price for the last auction of 52-week U.S. Treasury bills settled 30 days prior to the time of each payment. Interest shall be compounded annually.

17. Accrued interest on a principal amount shall be due when payment of the principal amount is due.

18. Keystone shall pay civil penalty amounts and interest by certified check payable to "Treasurer, United States of America." Keystone shall send checks, with a transmittal letter stating the caption and number of this action and the paragraph of this consent decree under which payment is being made, to:

U.S. Environmental Protection Agency
Region V
P.O. Box 70753
Chicago, Illinois 60673

Keystone shall send a copy of the transmittal letter to:

U.S. EPA, Region V
Waste Management Division
RCRA Enforcement Branch, 5HS-12
230 South Dearborn Street
Chicago, Illinois 60604

GENERAL PROVISIONS

19. Approval and entry of this consent decree by the Court, and compliance with it by Keystone, shall satisfy all of Keystone's civil liability for the violations alleged in the complaint.

20. Keystone shall make no claim against the United States or the Hazardous Substance Superfund established by

Section 221 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. §9631, for any costs incurred by Keystone in complying with this consent decree.

21. The Court shall retain jurisdiction to enforce and modify this consent decree and to resolve disputes arising under it.

22. This consent decree does not eliminate or affect Keystone's responsibility to comply with RCRA and other federal and state environmental laws, including any responsibility Keystone may have under the corrective action authority established by Sections 3004(u), 3004(v), and 3008(h) of RCRA, 42 U.S.C. §6924(u), 6924(v), and 6928(h).

23. Approval by the Court and entry of this consent decree is subject to 28 C.F.R. §50.7, which requires that notice of proposed consent decrees in certain environmental actions be given to the public, and that the public shall have at least thirty days to submit comments on the proposed consent decree.

By their undersigned counsel the parties enter into this consent decree and submit it to the Court for approval and entry.

IT IS SO ORDERED.

June 29, 1988
Date

Michael M. Mihm
HONORABLE MICHAEL M. MIHM
United States District Judge

FOR KEYSTONE CONSOLIDATED INDUSTRIES, INC.

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President
Keystone Consolidated
Industries, Inc.

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Central District of Illinois

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U.S. Environmental Protection
Agency

for THOMAS L. ADAMS, JR.
Assistant Administrator
Office of Enforcement and
Compliance Monitoring
U.S. Environmental Protection
Agency

Mark E. Grummer by B.R.

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Attorney, Environmental
Enforcement Section
Land and Natural Resources
Division
U.S. Department of Justice

Marc M. Radell

MARC RADELL
Assistant Regional Counsel
U.S. Environmental Protection
Agency - Region V

WASTE MINIMIZATION PLAN

One high volume waste stream at the Keystone Steel & Wire Company Bartonville plant is from the 1,1,1 Trichloroethane (TCA) that is used in nail cleaning and coating. The still bottoms from the cleaning process and sludge from the coating process are shipped out for recovery of the residual TCA and disposal of the sludges.

HISTORY

Keystone has been cleaning and cement coating nails at this facility for many years. Nails must be cleaned before cement coating or galvanizing to remove grease, drawing compound and other surface contaminants that may interfere with the finishing processes. In addition, some nails are cleaned before packaging because of the aesthetic nature of their application. Cement coating is applied to nails to increase their pull-out resistance so that finer nails can be used for certain applications, rather than risking splitting the wood with larger diameter nails.

In the 1960's the cleaning was accomplished with Detrex vibratory spiral vapor degreasers utilizing Trichloroethylene (TCE) and the cement coating was done by a vibratory spiral dip process utilizing resin coating thinned with TCE. In the 1970's, the processes were slightly modified to use TCA as the degreasing agent and resin thinner. In the late 1980's, Keystone replaced the resin coating with a vinyl acrylic but retained TCA as the thinner. At that time, there were four vapor degreasing cabinets and two cement coating cabinets utilizing TCA.

EXPERIMENTATION

Water-based cleaners had been looked at several times in the past, but in 1989, Keystone started more intensive development of a water-based cleaning and coating system to eliminate the TCA. The South Complex, where one coater and one cleaner operate, was selected for production testing of this concept.

It was determined that the vibratory spiral vapor degreaser would function adequately as a dip type degreaser with a water-based cleaning agent. When operation commenced with the water-based cleaner, it soon became evident that the cleaned nails did not have adequate drying time when the unit was run at previous production rates. Discharge of wet nails from the cleaner resulted in product rusting while awaiting further processing and contamination of the solvent based coating (since nails to be coated are first cleaned and then fed directly into the coater).

EXHIBIT E

The throughput rate of the cleaner was substantially reduced while alternative drying methods were investigated. Ultimately adequate blow-off and drying equipment were applied to the system and throughput rates have returned to those possible with the TCA cleaner. This system has been operating satisfactorily as a pilot for some time now.

The next step of the experimentation, and the work Keystone proposes for the minimization effort, is to implement a full scale pilot operation utilizing water-based coating in the existing coater at the South Complex. Contacts with the manufacturer of the coater and with several coating vendors have not revealed anyone that is currently using water-based coating in this equipment. Primary questions to be answered by the pilot study are as follows:

1) Can a suitable quality product be produced?

2) Can current production rates be maintained?

3) How is drying of the coated product best accomplished?

4) How will use of the water-based material impact maintenance of the coater?

Major steps in the pilot study will be as follows:

1) Design coater discharge and drying equipment utilizing as much existing equipment as possible.

2) Implement changeover to water-based coating over a weekend.

3) Run initial production trial on first shift Monday.

4) Convert system back to existing coating material.

5) Have Sales and Marketing evaluate product quality and market acceptance before running additional trials.

6) Run additional one shift trials as necessary to achieve acceptable quality and operating characteristics. This process will be continued until such time that the new process is proven to be or not be viable. Viability will be determined for the new process by meeting quality, cost and capacity standards.

7) If viable results are obtained, an entire week or more production will be scheduled to determine long term reliability and performance.

Once this longer trial of Item 7 has been completed, upper management will evaluate performance and quality of water-based coated product, logistics of implementing water-based coating in Wire Mill areas, costs of this conversion versus other options and market conditions affecting nail production. Based on this evaluation, a decision will be made as to what, if anything, the next step will be.

REPORTING

Keystone will submit monthly progress reports on this project. These reports will be submitted by the fifteenth of each month detailing activities which occurred the prior calendar month. The first report will be submitted by June 15, 1992 for activities during May.

These reports will be addressed as follows:

Mr. Mike Hayes
Illinois Environmental Protection Agency
Office of Pollution Prevention #31
2200 Churchill Road
P. O. Box 19276
Springfield, IL 62794-9276

Bob Miller
5/11/92

Keystone Steel & Wire

Illinois Environmental Protection Agency
Division of Land Pollution Control
Permits Section
2200 Churchill Road
P. O. Box 19276
Springfield, IL 62794-9276
Attn: Mark V. Gurnik

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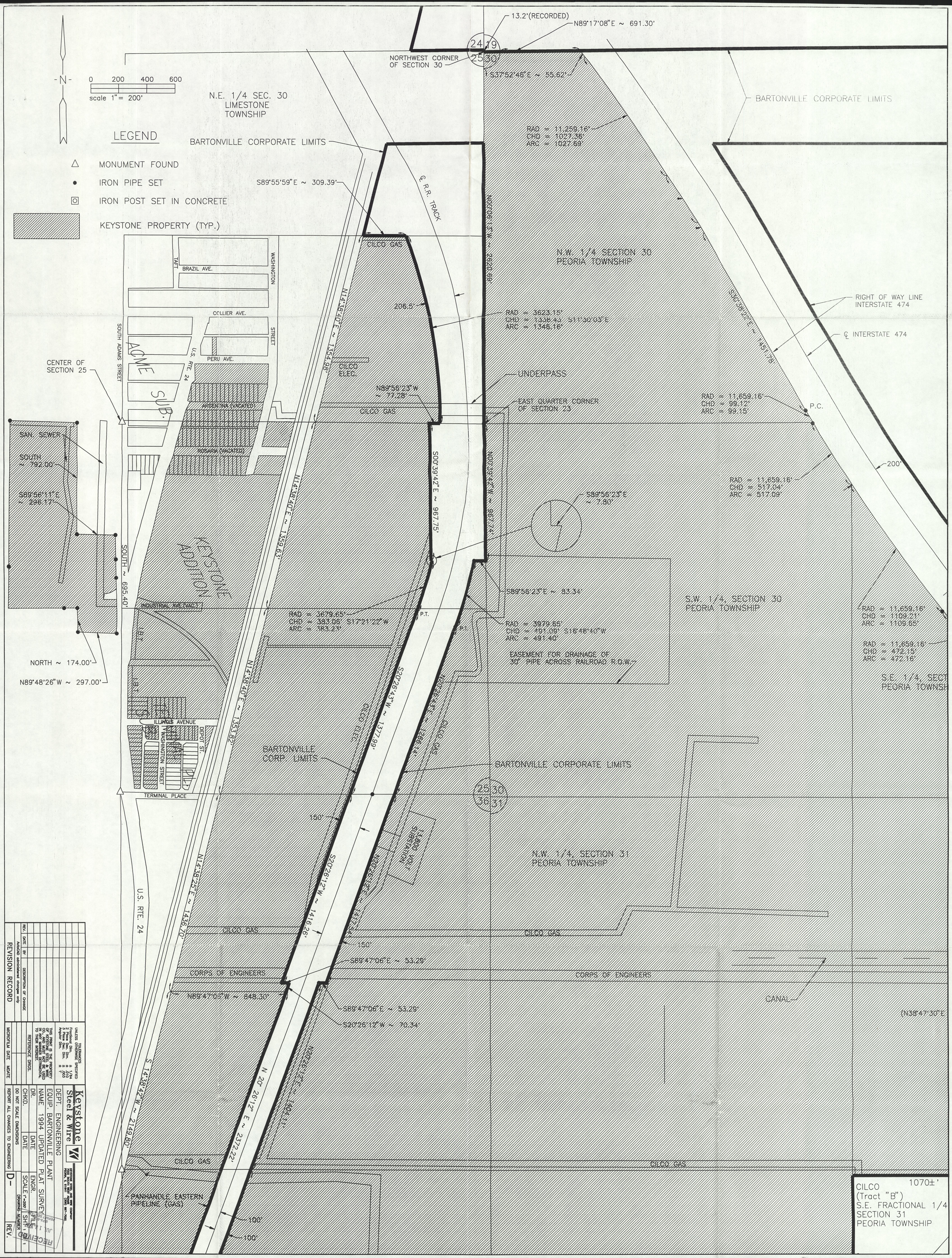
IDEM
PERMIT SECTION


- N -
0 200 400 600
scale 1" = 200'
N.E. 1/4 SEC. 30
LIMESTONE
TOWNSHIP
LEGEND
MONUMENT FOUND
IRON PIPE SET
IRON POST SET IN CONCRETE
KEYSTONE PROPERTY (TYP.)
BARTONVILLE CORPORATE LIMITS
S89°55'59"E ~ 309.39'
13.2'(RECORDED)
N89°17'08"E ~ 691.30'
NORTHWEST CORNER OF SECTION 30
24 19
25 30
S37°52'46"E ~ 55.62'
BARTONVILLE CORPORATE LIMITS
RAD = 11,259.16'
CHD = 1027.36'
ARC = 1027.69'
℄ R.R. TRACK
N00°06'13"W ~ 2620.68'
N.W. 1/4 SECTION 30
PEORIA TOWNSHIP
CILCO GAS
206.5'
N14°38'40"E ~ 1354.98'
RAD = 3623.15'
CHD = 1338.43' S11°30'03"E
ARC = 1346.16'
S30°38'22"E ~ 1451.78'
RIGHT OF WAY LINE
INTERSTATE 474
℄ INTERSTATE 474
CILCO ELEC.
UNDERPASS
N89°56'23"W ~ 77.28'
EAST QUARTER CORNER OF SECTION 23
RAD = 11,659.16'
CHD = 99.12'
ARC = 99.15'
P.C.
CILCO GAS
ARGENTINA (VACATED)
ROSARIA (VACATED)
TAFT
BRAZIL AVE.
WASHINGTON
COLLIER AVE.
STREET
PERU AVE.
U.S. RTE. 24
SOUTH ADAMS STREET
ACME SUB.
CENTER OF SECTION 25
SAN. SEWER
SOUTH ~ 792.00'
S89°56'11"E ~ 296.17'
S00°39'42"E ~ 967.75'
N00°39'42"W ~ 967.74'
N14°38'40"E ~ 1359.63'
200'
RAD = 11,659.16'
CHD = 517.04'
ARC = 517.09'
S89°56'23"E ~ 7.80'
KEYSTONE ADDITION
SOUTH ~ 695.40'
INDUSTRIAL AVE.(VAC.)
S89°56'23"E ~ 83.34'
S.W. 1/4, SECTION 30
PEORIA TOWNSHIP
RAD = 3679.65'
CHD = 383.06' S17°21'22"W
ARC = 383.23'
P.T.
RAD = 3979.65'
CHD = 491.09' S16°48'40"W
ARC = 491.40'
RAD = 11,659.16'
CHD = 1109.21'
ARC = 1109.65'
EASEMENT FOR DRAINAGE OF
30" PIPE ACROSS RAILROAD R.O.W.
RAD = 11,659.16'
CHD = 472.15'
ARC = 472.16'
S.E. 1/4, SECT
PEORIA TOWNSH
NORTH ~ 174.00'
N89°48'26"W ~ 297.00'
N14°38'40"E ~ 1353.82'
S20°26'43"W ~ 1377.99'
N20°26'43"E ~ 1386.14'
CILCO ELEC.
CILCO GAS
ILLINOIS AVENUE
DEPOT ST.
WASHINGTON STREET
BARTONVILLE CORP. LIMITS
BARTONVILLE CORPORATE LIMITS
25 30
36 31
TERMINAL PLACE
150'
FT.800 VOLT SUBSTATION
N.W. 1/4, SECTION 31
PEORIA TOWNSHIP
N14°38'25"E ~ 1436.70'
S20°26'12"W ~ 1416.26'
N20°26'12"E ~ 1405.11'
U.S. RTE. 24
CILCO GAS
150'
S89°47'06"E ~ 53.29'
CORPS OF ENGINEERS
CORPS OF ENGINEERS
N89°47'06"W ~ 848.30'
S89°47'06"E ~ 53.29'
S20°26'12"W ~ 70.34'
CANAL
(N38°47'30"E
S 14°38'42"W ~ 2149.80'
N 20° 26'12" E ~ 2372.22'
N20°26'12"E ~ 1404.11'
CILCO GAS
CILCO GAS
PANHANDLE EASTERN PIPELINE (GAS)
100'
100'
CILCO 1070±'
(Tract "B")
S.E. FRACTIONAL 1/4
SECTION 31
PEORIA TOWNSHIP
TOLERANCES UNLESS OTHERWISE SPECIFIED
Fractional Dim. ± 1/64
2 Place Dec. Dim. ± .010
3 Place Dec. Dim. ± .003
Angular Dim. ± 1°
THIS PRINT IS THE PROPERTY OF KEYSTONE STEEL & WIRE CO. AND MUST NOT BE USED IN ANY MANNER DETRIMENTAL TO THEIR INTEREST.
REFERENCE DRGS.
MICROFILM DATE MDATE
REVISION RECORD
REV. DATE BY DESCRIPTION OF CHANGE
AutoCAD administered changes only
Keystone Steel & Wire
KEYSTONE STEEL AND WIRE COMPANY
7000 S. ADAMS ROAD
PEORIA, ILL. 61641 (309) 697-7020
DEPT. ENGINEERING
EQUIP. BARTONVILLE PLANT
NAME 1994 UPDATED PLAT SURVEY
DR. DATE ENGR.
CHKD. DATE
DO NOT SCALE DIMENSIONS
REPORT ALL CHANGES TO ENGINEERING
SCALE 1"=200'
DRAWING NUMBER D-
SHT. 1 OF 1
REV.
RECEIVED
JUL 1 1994
Keystone Steel & Wire

Lenne Salinger
IEPA (217) 785-0830

Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Preface

This report includes a fact sheet, *Technical Review Workgroup for Lead (TRW) Recommendations for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil* along with an Appendix, *Equations and Rationale for Default Values Assigned to Parameters in the Slope Factor Approach and Exposure Model for Assessing Risk Associated with Adult Exposures to Lead in Soil*, which discusses in greater detail the equations and parameters used in the methodology.

U.S. Environmental Protection Agency

Technical Review Workgroup for Lead

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Region 5
Chicago, IL

Paul White
Office of Research and Development
Washington, DC

MEMBERS

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1. INTRODUCTION

This report describes a methodology for assessing risks associated with non-residential adult exposures to lead in soil. The methodology focuses on estimating fetal blood lead concentration in women exposed to lead contaminated soils. This approach also provides tools that can be used for evaluating risks of elevated blood lead concentrations among exposed adults. The methodology is the product of extensive evaluations by the Technical Review Workgroup for Lead (TRW) which began considering methodologies to evaluate nonresidential adult exposure in 1994 (Balbus-Kornfeld, 1994; U.S. EPA, 1994a). In 1995, the TRW reviewed a methodology developed by EPA Region 8 for deriving risk-based remediation goals (RBRGs) for nonresidential soil at the California Gulch NPL site (U.S. EPA, 1995). A TRW committee on adult lead risk assessment was formed in January, 1996 to further develop the ideas and information gathered as part of these previous efforts into a generic methodology that could be adapted for use in site-specific assessments.

This report provides technical recommendations of the TRW for the assessment of adult lead risks using this methodology. An overriding objective in the development of this methodology was the immediate need for a scientifically defensible approach for assessing adult lead risks associated with nonresidential exposure scenarios. The TRW recognizes that other adult lead models may provide useful information. In particular, models providing more detailed representations of lead kinetics may be useful in supporting more detailed predictions about the time course of blood lead concentrations among individuals who receive brief acute exposures to lead or whose exposures otherwise change markedly with time. The methodology presented here uses a simplified representation of lead biokinetics to predict quasi-steady state blood lead concentrations among adults who have relatively steady patterns of site exposures (as described in this report). The TRW believes that this approach will prove useful for assessing most sites where places of employment are (or will be) situated on lead contaminated soils. This information is expected to promote consistency in assessments of adult lead risks. The methodology described in this report is an interim approach that is recommended for use pending further development and evaluation of integrated exposure biokinetic models for adults. The TRW is undertaking review of other models and will provide reviews on other approaches as appropriate. The Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children (U.S. EPA, 1994b,c) is the recommended approach for assessing residential lead risks.

The recommended approach for assessing nonresidential adult risks utilizes a methodology to relate soil lead intake to blood lead concentrations in women of child-bearing age. It is conceptually similar to a slope factor approach for deriving RBRGs that had been proposed by Bowers et al. (1994) and which was adapted for use at the California Gulch NPL site in Region 8 (U.S. EPA, 1995). This report describes the basic algorithms that are used in the methodology and provides a set of default parameter values that can be used in cases where high quality data are not available to support site-specific estimates. The rationale for each parameter default value is provided in the Appendix.

2. OVERVIEW OF THE APPROACH

The methodology described in this report relates soil lead concentrations to blood lead concentrations in the exposed population according to the algorithms described below. Note that the algorithms may consist of variables that include superscripts and/or subscripts. The convention adopted in this report is to use superscripts as exponents (i.e., a mathematical operation), whereas subscripts represent key words that provide additional information to distinguish between similar variables. The basis for the calculation of the blood lead concentration in women of child-bearing age is the algorithm given by Equation 1:

$$PbB_{adult,central} = PbB_{adult,0} + \frac{PbS \cdot BKSF \cdot IR_S \cdot AF_S \cdot EF_S}{AT} \qquad \text{(Equation 1)}$$

where:

$PbB_{adult,\ central}$ = Central estimate of blood lead concentrations (µg/dL) in adults (i.e., women of child-bearing age) that have site exposures to soil lead at concentration, PbS.

$PbB_{adult,\ 0}$ = Typical blood lead concentration (µg/dL) in adults (i.e., women of child-bearing age) in the absence of exposures to the site that is being assessed.

PbS = Soil lead concentration (µg/g) (appropriate average concentration for individual).

BKSF = Biokinetic slope factor relating (quasi-steady state) increase in typical adult blood lead concentration to average daily lead uptake (µg/dL blood lead increase per µg/day lead uptake).

IR_S = Intake rate of soil, including both outdoor soil and indoor soil-derived dust (g/day).

AF_S = Absolute gastrointestinal absorption fraction for ingested lead in soil and lead in dust derived from soil (dimensionless).

EF_S = Exposure frequency for contact with assessed soils and/or dust derived in part from these soils (days of exposure during the averaging period); may be taken as days per year for continuing, long term exposure.

AT = Averaging time; the total period during which soil contact may occur; 365 days/year for continuing long term exposures.

The basis for the RBRG calculation is the relationship between the soil lead concentration and the blood lead concentration in the developing fetus of adult women that have site exposures. As a health-based goal, EPA has sought to limit the risk to young children of having elevated blood lead concentrations. Current Office of Solid Waste and Emergency Response (OSWER) guidance calls

for the establishment of cleanup goals to limit childhood risk of exceeding 10 µg/dL to 5% (U.S. EPA, 1994a). Equation 2 describes the estimated relationship between the blood lead concentration in adult women and the corresponding 95th percentile fetal blood lead concentration ($PbB_{fetal,\,0.95}$), assuming that $PbB_{adult,\,central}$ reflects the geometric mean of a lognormal distribution of blood lead concentrations in women of child-bearing age. If a similar 95th percentile goal is applied to the protection of fetuses carried by women who experience nonresidential exposures, Equation 2 can be rearranged to reflect a risk-based goal for the central estimate of blood lead concentrations in adult women using Equation 3:

$$PbB_{fetal,0.95} = PbB_{adult,central} \cdot GSD_{i,adult}^{1.645} \cdot R_{fetal/maternal} \qquad \text{(Equation 2)}$$

$$PbB_{adult,central,goal} = \frac{PbB_{fetal,0.95,goal}}{GSD_{i,adult}^{1.645} \cdot R_{fetal/maternal}} \qquad \text{(Equation 3)}$$

where:

$PbB_{adult,\,central,\,goal}$ = Goal for central estimate of blood lead concentration (µg/dL) in adults (i.e., women of child-bearing age) that have site exposures. The goal is intended to ensure that $PbB_{fetal,\,0.95,\,goal}$ does not exceed 10 µg/dL.

$PbB_{fetal,\,0.95,\,goal}$ = Goal for the 95th percentile blood lead concentration (µg/dL) among fetuses born to women having exposures to the specified site soil concentration. This is interpreted to mean that there is a 95% likelihood that a fetus, in a woman who experiences such exposures, would have a blood lead concentration no greater than $PbB_{fetal,\,0.95,\,goal}$ (i.e., the likelihood of a blood lead concentration greater than 10 µg/dL would be less than 5%,for the approach described in this report).

$GSD_{i,\,adult}$ = Estimated value of the individual geometric standard deviation (dimensionless); the GSD among adults (i.e., women of child-bearing age) that have exposures to similar on-site lead concentrations, but that have non-uniform response (intake, biokinetics) to site lead and non-uniform off-site lead exposures. The exponent, 1.645, is the value of the standard normal deviate used to calculate the 95th percentile from a lognormal distribution of blood lead concentration.

$R_{fetal/maternal}$ = Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless).

The soil lead concentration associated with a given exposure scenario and $PbB_{adult,central,goal}$ can be calculated by rearranging Equation 1 and substituting $PbB_{adult,central,goal}$ for $PbB_{adult,central}$:

$$RBRG = PbS = \frac{(PbB_{adult,central,goal} - PbB_{adult,0}) \cdot AT}{(BKSF \cdot IR_S \cdot AF_S \cdot EF_S)} \qquad \text{(Equation 4)}$$

It is this form of the algorithm that can be used to calculate a RBRG where the RBRG represents the soil lead concentration (PbS) that would be expected to result in a specified adult blood lead concentration ($PbB_{adult,central,goal}$) and corresponding 95th percentile fetal blood lead concentration ($PbB_{fetal,0.95,goal}$).

Equations 1-4 are based on the following assumptions:

1. Blood lead concentrations for exposed adults can be estimated as the sum of an expected starting blood lead concentration in the absence of site exposure ($PbB_{adult,0}$) and an expected site-related increase.

2. The site-related increase in blood lead concentrations can be estimated using a linear biokinetic slope factor (BKSF) which is multiplied by the estimated lead uptake.

3. Lead uptake can be related to soil lead levels using the estimated soil lead concentration (PbS), the overall rate of daily soil ingestion (IR_S), and the estimated fractional absorption of ingested lead (AF_S). The term "soil" is used throughout this document to refer to that portion of the soil to which adults are most likely to be exposed In most cases, exposure is assumed to be predominantly to the top layers of the soil which gives rise to transportable soil-derived dust. Exposure to soil-derived dust occurs both in outdoor and indoor environments, the latter occurring where soil-derived dust has been transported indoors. Other types of dust, in addition to soil-derived dust, can contribute to adult lead exposure and may even predominate in the occupational setting; these include dust generated from manufacturing processes (e.g., grinding, milling, packaging of lead-containing material), road dust, pavement dust, and paint dust. This methodology, as represented in Equations 1 and 4, does not specifically account for site exposure to dusts that are not derived from soil. However, the methodology can be modified to include separate variables that represent exposure to lead in various types of dust. This approach is discussed in greater detail in the Appendix.

4. As noted above, exposure to lead in soil may occur by ingesting soil-derived dust in the outdoor and/or indoor environments. The default value recommended for IR_S (0.05 g/day) is intended for occupational exposures that occur predominantly indoors. More intensive soil contact would be expected for predominantly outdoor activities such as construction, excavation, yard work, and gardening.

5. A lognormal model can be used to estimate the inter-individual variability in blood lead concentrations (i.e., the distribution of blood lead concentrations in a population of individuals who contact similar environmental lead levels).

6. Expected fetal blood lead concentrations are proportional to maternal blood lead concentrations.

The primary basis for using Equation 4 to calculate a RBRG is that fetuses and neonates are a highly sensitive population with respect to the adverse effects of lead on development and that 10 µg/dL is considered to be a blood lead level of concern from the standpoint of protecting the health of sensitive populations (U.S. EPA, 1986, 1990; NRC, 1993). Therefore, risk to the fetus can be estimated from the probability distribution of fetal blood lead concentrations (i.e., the probability of exceeding 10 µg/dL), as has been the approach taken for estimating risks to children (U.S. EPA, 1994a,c). Equation 4 can be used to estimate the soil lead concentration at which the probability of blood lead concentrations exceeding a given value (e.g., 10 µg/dL) in fetuses of women exposed to environmental lead is no greater than a specified value (e.g., 0.05).

The methodology can be modified to accommodate different assumptions or to estimate RBRGs for different risk categories. For example, a RBRG could be estimated for risks to adults (e.g., hypertension) by substituting an appropriate adult blood lead concentration benchmark. Similarly, other exposure scenarios can be incorporated into the assessment. Alternative methods for estimating soil lead risk by partitioning soil into outdoor soil and indoor dust components are discussed in the Appendix.

Recommended default values for each of the parameters in Equations 1 - 4 are presented in Table 1. These defaults should not be casually replaced with other values unless the alternatives are supported by high quality site-specific data to which appropriate statistical analyses have been applied and that have undergone thorough scientific review. Examples of the output from the methodology are presented in Figures 1 and 2, which show plots of the calculated $PbB_{fetal,\ 0.95}$ as a function of PbS when different combinations of default parameter values are used. The rationale for each default value listed in Table 1 is summarized in the Appendix.

Table 1. Summary of Default Parameter Values for the Risk Estimation Algorithm (Equations 1 - 4)

Parameter	Unit	Value	Comment
$PbB_{fetal,\,0.95,goal}$	µg/dL	10	For estimating RBRGs based on risk to the developing fetus.
$GSD_{i,adult}$	--	1.8 2.1	Value of 1.8 is recommended for a homogeneous population while 2.1 is recommended for a more heterogeneous population.
$R_{fetal/maternal}$	--	0.9	Based on Goyer (1990) and Graziano et al. (1990).
$PbB_{adult,0}$	µg/dL	1.7-2.2	Plausible range based on NHANES III phase 1 for Mexican American and non-Hispanic black, and white women of child bearing age (Brody et al. 1994). Point estimate should be selected based on site-specific demographics.
BKSF	µg/dL per µg/day	0.4	Based on analysis of Pocock et al. (1983) and Sherlock et al. (1984) data.
IR_S	g/day	0.05	Predominantly occupational exposures to indoor soil-derived dust rather than outdoor soil; (0.05 g/day = 50 mg/day).
EF_S	day/yr	219	Based on U.S. EPA (1993) guidance for average time spent at work by both full-time and part-time workers (see Appendix for recommendations on minimum exposure frequency and duration).
AF_S	--	0.12	Based on an absorption factor for soluble lead of 0.20 and a relative bioavailability of 0.6 (soil/soluble).

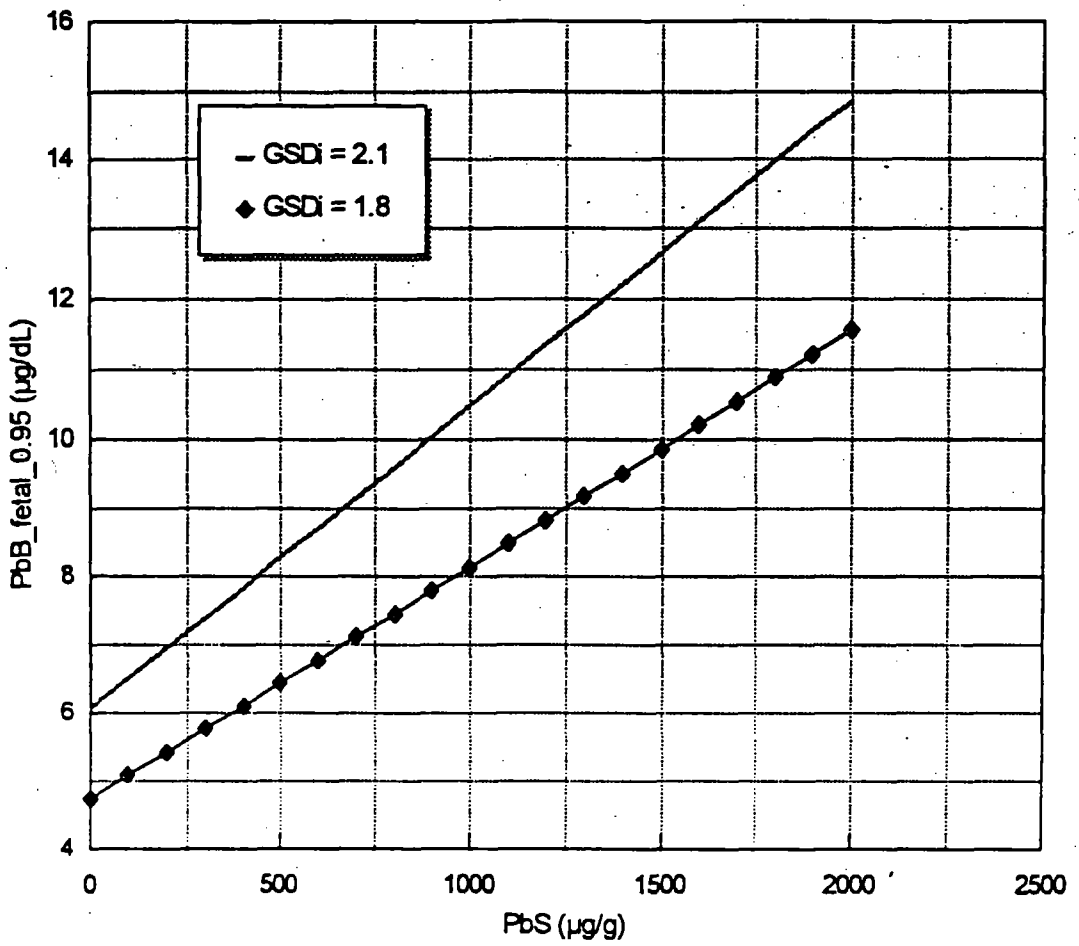

Figure 1. Example output of risk estimation algorithm (Equation 4) assuming a $PbB_{adult,0}$ of 2.0 µg/dL (mixed racial) and a $GSD_{i,adult}$ of either 1.8 (homogeneous population) or 2.1 (heterogeneous urban population).

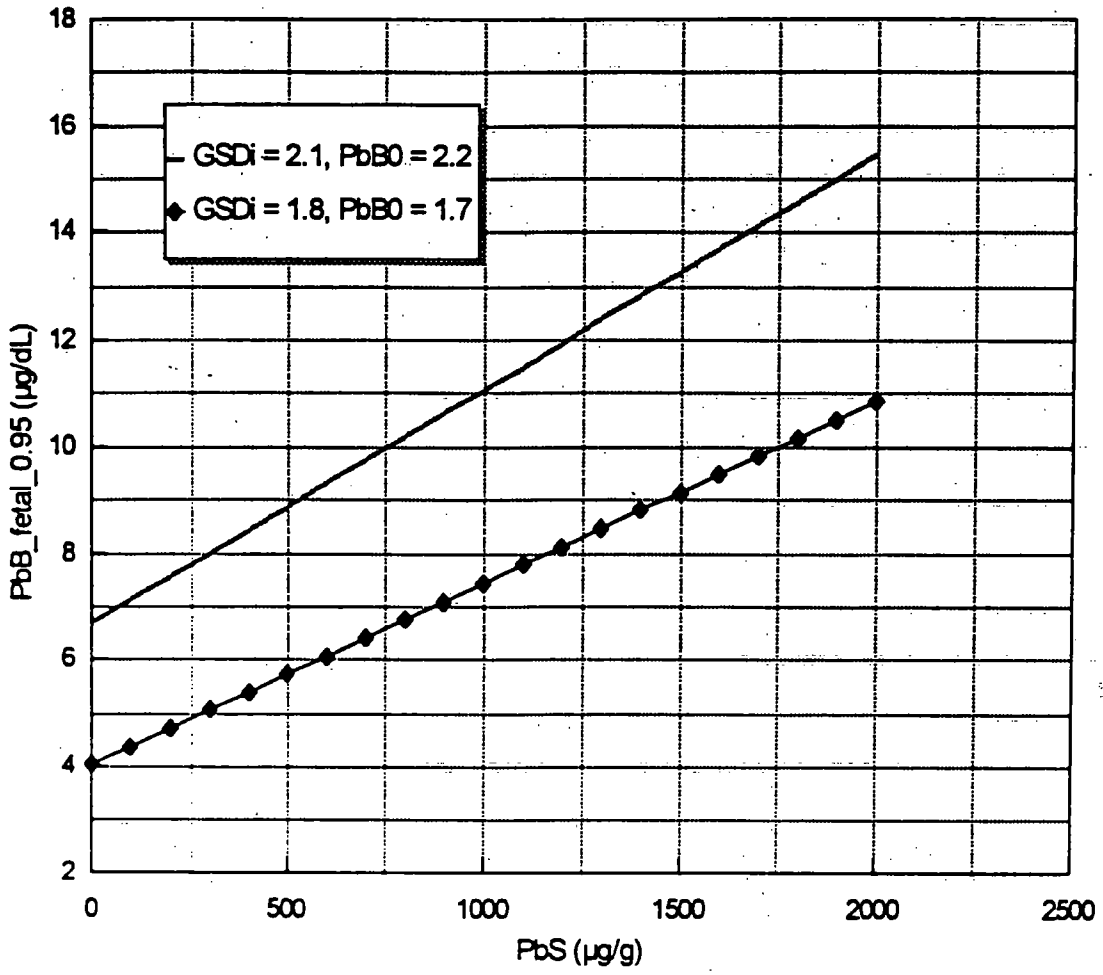

Figure 2. Example output of risk estimation algorithm (Equation 4) assuming plausible default minimum and maximum values of $PbB_{adult,0}$ (1.7 and 2.2 µg/dL) and $GSD_{i,adult}$ (1.8 and 2.1).

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APPENDIX

Equations and Rationale for Default Values Assigned to Parameters in the Slope Factor Approach and Exposure Model for Assessing Risk Associated with Adult Exposures to Lead in Soil

Equations and Rationale for Default Values Assigned to Parameters in the Slope Factor Approach and Exposure Model for Assessing Risk Associated with Adult Exposures to Lead in Soil

1. Equations for the Adult Lead Model A-3

2. Individual Blood Lead Geometric Standard Deviation (GSD_i) A-6

3. Fetal/Maternal Blood Lead Concentration Ratio ($R_{fetal/maternal}$) A-8

4. Baseline Blood Lead Concentration ($PbB_{adult,0}$) A-8

5. Biokinetic Slope Factor (BKSF) A-10

6. Soil Lead Absorption Factor (AF_S) A-15

7. Daily Soil Ingestion Rate (IR_S) A-19

8. Exposure Frequency (EF_S) A-22

9. Applying Monte Carlo Analysis to the Adult Lead Methodology A-23

10. References A-25

1. Equations for the Adult Lead Model

The format of the equations used in the adult lead methodology follows the approach used in the IEUBK Model for Lead in Children (IEUBK Model). Note that the equations may consist of variables that include superscripts and/or subscripts. The convention adopted in this report is to use superscripts as exponents (i.e., a mathematical operation), whereas subscripts represent key words that provide additional information to distinguish between similar variables. The term "soil" refers to that portion of the soil to which adults are most likely to be exposed. In most cases, exposure is assumed to be predominantly to the top layers of the soil which gives rise to transportable soil-derived dust. Exposure to soil-derived dust occurs both in outdoor and indoor environments, the latter occurring where soil-derived dust has been transported indoors. Other types of dust, in addition to soil-derived dust, can contribute to adult lead exposure and may even predominate in some occupational settings; these include dust generated from manufacturing processes (e.g., grinding, milling, packaging of lead-containing material), road dust, pavement dust, and paint dust.

Exposure to lead from soil (direct and through indoor soil-derived dust) and lead intake:

$$INTAKE = \frac{PbS \cdot IR_S \cdot EF_S}{AT} \qquad \text{(Equation A-1)}$$

INTAKE = Daily average intake (ingestion) of lead from soil taken over averaging time AT (µg/day).

PbS = Soil lead concentration (µg/g) (appropriate average concentration for individual).

IR_S = Intake rate of soil, including outdoor soil and indoor soil-derived dust (g/day).

EF_S = Exposure frequency for contact with assessed soils and/or dust derived in part from these soils (days of exposure during the averaging period); may be taken as days per year for continuing, long term exposures.

AT = Averaging time; the total period during which soil contact may occur; 365 days/year for continuing long term exposures.

Lead uptake:

$$UPTAKE = AF_S \cdot INTAKE \qquad \text{(Equation A-2)}$$

UPTAKE = Daily average uptake of lead from the gastrointestinal tract into the systemic circulation (µg/day).

AF_S = Absolute gastrointestinal absorption fraction for ingested lead in soil and lead in dust derived from soil (dimensionless).

Central estimate of adult blood lead concentration:

$$PbB_{adult,central} = PbB_{adult,0} + BKSF \cdot UPTAKE \qquad \text{(Equation A-3)}$$

$PbB_{adult,central}$ = Central estimate of blood lead concentrations (µg/dL) in adults (i.e., women of child-bearing age) that have site exposures to soil lead at concentration, PbS.

$PbB_{adult,0}$ = Typical blood lead concentration (µg/dL) in adults (i.e., women of child-bearing age) in the absence of exposures to the site that is being assessed.

BKSF = Biokinetic slope factor relating (quasi-steady state) increase in typical adult blood lead concentration to average daily lead uptake (µg/dL blood lead increase per µg/day lead uptake).

Distributional model for adult blood lead:

In this methodology, variability in blood lead concentrations among a population is mathematically described by a lognormal distribution defined by two parameters, the geometric mean (GM) and the geometric standard deviation (GSD):

$$PbB_{adult} \sim Lognormal(GM, GSD)$$

PbB_{adult} = Adult blood lead concentration (which is a variable quantity having the specified probability distribution).

GM = Geometric mean blood lead concentration (µg/dL) for adults having site exposure. The central estimate of adult blood lead, $PbB_{adult,central}$, constructed in Equation A-3 is treated as a plausible estimate of the geometric mean.

GSD = Geometric standard deviation for blood lead concentrations among adults having exposures to similar on-site lead concentrations, but having non-uniform response (intake, biokinetics) to site lead and non-uniform off-site lead exposures. The individual blood lead concentration geometric standard deviation, GSD_i, is substituted for GSD. As described below (Section 2 of the Appendix), GSD_i is assumed to

address sources of variability in blood lead concentrations among the exposed population.

Parameter estimates for the geometric mean (GM) and geometric standard deviation (GSD) of the lognormal distribution are described below. Note that blood lead concentrations for site exposures can be quantified at any percentile of the population using these parameters. For example, the 95th percentile blood lead concentration can be calculated by Equation A-4:

$$PbB_{adult,0.95} = PbB_{adult,central} \cdot GSD_l^{1.645} \qquad \text{(Equation A-4)}$$

$PbB_{adult,\,0.95}$ = 95th percentile blood lead concentration (µg/dL) among individuals having exposures to the specified site soil lead concentrations. This is interpreted to mean that there is a 95% likelihood that an adult exposed to the specified soil lead concentrations would have a blood lead concentration less than or equal to $PbB_{adult,0.95}$.

Distributional model for fetal blood lead:

$$PbB_{fetal} = R_{fetal/maternal} \cdot PbB_{adult} \qquad \text{(Equation A-5)}$$

PbB_{fetal} = Fetal blood lead concentration (µg/dL) (which, like PbB_{adult}, is a variable quantity having the specified probability distribution).

$R_{fetal/maternal}$ = Constant of proportionality between fetal and maternal blood lead concentrations.

PbB_{adult} = Adult blood lead concentration (µg/dL), estimated with parameters appropriate to women of child bearing age.

Note that this relationship implies a deterministic (non-random) relationship between maternal and fetal blood lead concentrations. This assumption omits a source of variability (varying individual-specific ratios of fetal to maternal blood lead) that would tend to increase the variance of fetal blood lead concentrations. The assumption of proportionality implies that fetal blood lead concentrations also are lognormally distributed:

$$PbB_{fetal} \sim Lognormal(GM, GSD)$$

GM = Geometric mean blood lead concentration (µg/dL) for fetuses, equal to $R_{fetal/maternal}$ multiplied by $PbB_{adult,central}$.

GSD = Geometric standard deviation of blood lead concentration among adults, GSD_i (Section 2 of the Appendix).

Similarly, percentiles of the fetal blood lead distribution can be estimated (for fetuses carried by women exposed to the specified concentration of lead at the assessed site). For example:

$$PbB_{fetal,0.95} = R_{fetal/maternal} \cdot PbB_{adult,central} \cdot GSD_{i,adult}^{1.645} \qquad \text{(Equation A-6)}$$

$PbB_{fetal,0.95}$ = 95th percentile blood lead concentration (µg/dL) among fetuses born to women having exposures to the specified site soil lead concentrations. This is interpreted to mean that there is a 95% likelihood that a fetus born, in a woman who experiences such exposures, would have a blood lead concentration no greater than $PbB_{fetal,0.95}$.

Note that when the expressions for $PbB_{adult,central}$, INTAKE, and UPTAKE (Equations A-1, A-2 and A-3) are substituted into Equation A-6, we obtain the complete expression for $PbB_{fetal,0.95}$ that is presented in the fact sheet (Overview of the Approach, Equations 1 and 2):

$$PbB_{fetal,0.95} = R_{fetal/maternal} \cdot GSD_i^{1.645} \cdot \left[\frac{(PbS \cdot BKSF \cdot IR_S \cdot AF_S \cdot EF_S)}{AT} + PbB_{adult,0}\right] \qquad \text{(Equation A-7)}$$

Equation A-7 represents variability in blood lead concentration arising from two main factors: 1) exposure variables, including inter-individual variability in activity-weighted ingestion rates, and 2) inter-individual variability in physiology, including factors affecting lead biokinetics.

2. Individual Blood Lead Geometric Standard Deviation (GSD_i)

The GSD_i is a measure of the inter-individual variability in blood lead concentrations in a population whose members are exposed to the same nonresidential environmental lead levels. Ideally, the value(s) for GSD_i used in the methodology should be estimated in the population of concern at the site. This requires data on blood lead concentration and exposure in a representative sample of sufficient size to yield statistically meaningful estimates of GSD in subsamples stratified by nonresidential exposure level. In the absence of high quality data for the site, GSD_i may be extrapolated from estimates for other surrogate populations. In making such extrapolations, factors that might contribute to higher or lower variability in the surrogate population than among similarly exposed individuals in the population of concern, should be evaluated. These factors include variability in exposure (level and pathways), and biokinetics (see Section 6 of Appendix), socioeconomic and ethnic characteristics, degree of urbanization and geographical location. Such extrapolations, therefore, are site-specific and are a potentially important source of uncertainty in the methodology.

GSD values measured in populations (GSD_p) reflect the combined effect of 1) variability in environmental concentration levels; and 2) activity-weighted exposures and lead biokinetics. Thus, estimates of GSD_p can be considered a surrogate for estimating the GSD_i. Site data on blood lead concentrations collected from populations of varying homogeneity may be useful for establishing a plausible range of values of GSD_i, provided that the data are of adequate quality and can be stratified by nonresidential exposure level. The lowest values of GSD_p are expected among homogeneous populations (e.g., individuals with similar socioeconomic and ethnic characteristics living within a relatively small geographic area) exposed to a single, dominant source of lead (e.g., lead mining or smelter sites). For example, a GSD_p of 1.8 was recently calculated among adult women living in Leadville, CO (U.S. EPA, 1995). This relatively low GSD is consistent with an analysis of blood lead concentration data in mining communities in the United States and Canada, which suggest that GSD_p ranges from 1.6 - 1.8 at active mining sites where blood lead concentrations are less than 15 µg/dL (U.S. EPA, 1992). By contrast, higher values of GSD_p might be expected from a national survey. Although lead exposures among the general population are likely to be more greatly impacted by diet than soil (e.g., compared with populations exposed at a waste site), the national population is very heterogeneous, in that it includes individuals with different socioeconomic and ethnic characteristics living in distinct geographic areas.

The TRW has conducted a preliminary analysis of blood lead concentration data collected in NHANES III Phase 1 from 1988 to 1991 and found that the GSD_p for women ages 17 to 45 years may range from 1.9 - 2.1 (Table A-1). Because of the complex survey design used in NHANES III (e.g., large oversampling of young children, older persons, black persons, and Mexican-Americans), this analysis used sampling weights included in the NHANES III Phase 1 data file to produce population estimates for blood lead concentration. The weighting factor "WTPEXMH1" was used to reflect the non-random sampling of individuals in both the mobile examination units (MEC) and the home examinations. The analysis did not account for the design effects associated with the selection of strata and primary sampling units (PSUs), which may result in an underestimation of sampling variance. Since this bias is not likely to greatly impact the GSD_p (Brody, personal communication), the amount of underestimation of the GSD_p by the values given in Table A-1 is likely to be small. Geometric mean blood lead concentrations listed in Table A-1 are within 0.2 µg/dL of these reported in Brody et al. (1994).

The TRW estimates that 1.8 - 2.1 is a plausible range for GSD_i, based on an evaluation of available blood lead concentration data for different types of populations. In cases where site-specific data are not available, a value within this range should be selected based on an assessment as to whether the population at the site would be expected to be more or less heterogeneous than the U.S. population with respect to racial, ethnic, cultural and socioeconomic factors that may affect exposure.

Table A-1. NHANES III Phase 1 Summary Statistics for Blood Lead Concentration Among U.S. Women by Age and Ethnic/Racial Characteristics[a].

Age Group	Non-Hispanic White			Non-Hispanic Black			Mexican American		
(years)	No.	GM	GSD	No.	GM	GSD	No.	GM	GSD
20 - 49	728	1.9	1.90	622	2.3	2.01	729	2.1	2.10
50 - 69	476	3.2	1.88	256	4.2	1.80	255	3.3	2.12
> 69	562	3.5	1.82	135	4.1	1.86	75	2.9	2.03
20 +	1,766	2.4	2.01	1,013	2.7	2.07	1,059	2.3	2.14
17 - 45	**742**	**1.7**	**1.89**	**658**	**2.1**	**1.98**	**763**	**2.0**	**2.10**

[a]Analysis of data weighted by MEC and home weighting factor (WTPEXMH1), excluding samples missing data on blood lead concentration or age. GM PbB (μg/dL) = $\exp(\mu_{ln})$; GSD PbB = $\exp(\sigma_{ln})$.

3. Fetal/Maternal Blood Lead Concentration Ratio ($R_{fetal/maternal}$)

The TRW recommends a default value of 0.9 based on studies that have explored the relationship between umbilical cord and maternal blood lead concentrations (Goyer, 1990; Graziano et al., 1990). The Goyer (1990) estimate of an average fetal/maternal blood lead concentration ratio of 0.9 is supported by a large body of data that has been summarized in Agency documents (U.S. EPA, 1986, 1990). Graziano et al. (1990) compared maternal and umbilical cord blood lead concentrations at delivery in 888 mother-infant pairs who were between 28 and 44 weeks of gestation. The relationship was linear with a slope of 0.93 μg/dL cord blood per μg/dL maternal blood; the correlation coefficient was 0.92. The slope of 0.93 from the Graziano et al. (1990) study supports 0.9 as a point estimate for $R_{fetal/maternal}$.

Although average fetal/maternal blood lead concentration ratios, as reflected in cord blood, tend to show consistent trends (Goyer, 1990; Graziano et al., 1990), the trends may not reflect significant inter-individual variability in maternal and possibly fetal blood lead concentrations due to physiological changes associated with pregnancy. For example, mobilization of bone lead stores during pregnancy may be more substantial in some women, and iron and calcium deficiency associated with poor nutritional status, as well as pregnancy, may enhance gastrointestinal absorption of lead (U.S. EPA, 1990; Franklin et al., 1995). Conversely, maternal blood lead concentration may decrease during the later stages of pregnancy because of the dilution effect associated with a 30% rise in plasma volume, as well as an increased rate of transfer of lead to the placenta or to fetal tissues (Alexander and Delves, 1981). These changes may give rise to fetal/maternal blood lead concentration ratios that are different from 0.9.

4. Baseline Blood Lead Concentration ($PbB_{adult,0}$)

The baseline blood lead concentration ($PbB_{adult,0}$) is intended to represent the best estimate of a reasonable central value of blood lead concentration in women of child-bearing age who are not exposed to lead-contaminated nonresidential soil or dust at the site. In this analysis, geometric mean blood lead concentrations are used for this purpose. Ideally, the value(s) for $PbB_{adult,0}$ used in the

methodology should be estimated in the population of concern at the site. This requires data on blood lead concentrations in a representative sample of adult women who are not exposed to nonresidential soil or soil-derived dust at the site, but who may experience exposures to other environmental sources of lead that are similar in magnitude to exposures experienced by the population of concern. This would include exposure to lead in food and drinking water as well as residential soil and dust (dust derived from soil and all other non-site related sources). The sample must be of sufficient size to yield statistically meaningful estimates of $PbB_{adult,0}$.

In the absence of high quality data for the site, $PbB_{adult,0}$ may be extrapolated from estimates for other surrogate populations that would be expected to have a similar $PbB_{adult,0}$ distribution as that of the population of concern. In making such extrapolations, factors that might contribute to differences between the geometric mean $PbB_{adult,0}$ in the surrogate population and population of concern should be evaluated. These factors include differences in the residential exposure (level and pathways), socioeconomic, ethnic and racial demographics, housing stock, degree of urbanization, and geographical location. Such extrapolations, therefore, are site-specific.

In cases where site-specific extrapolations from surrogate populations are not feasible, the TRW recommends 1.7 - 2.2 µg/dL as a plausible range, based on the results of Phase 1 of the NHANES III as reported by Brody et al. (1994). Table A-2 summarizes the analysis of blood lead concentrations from a sample of 2,083 women ages 20 - 49, and stratified into the three ethnic and racial categories.

Table A-2. NHANES III Phase 1 Summary Statistics for Blood Lead Concentration Among Different Populations of U.S. Women Ages 20 - 49 (Brody et al., 1994).

Population	No.	GM (95% CI)
Mexican American women	732	2.0 (1.7 - 2.5)
non-Hispanic black women	623	2.2 (2.0 - 2.5)
non-Hispanic white women	728	1.7 (1.6 - 1.9)
Total	2,083	

The TRW recommends that the estimates from Table A-2 be used in combination with data on the ethnic and racial demographics of the population of concern to select the most appropriate point estimate from within the plausible range of 1.7 - 2.2 µg/dL. For example, if the population at the site was predominantly Mexican American, 2.0 µg/dL might be selected as the point estimate. The plausible range is based on surveys of large samples of the national population and may not encompass central tendencies estimated from smaller regional or site-specific surveys, either because of bias associated with the smaller sample or because of real differences between the surveyed population and the national population. This needs to be evaluated in deciding whether or not to use data from small surveys that yield point estimates for $PbB_{adult,0}$ that fall outside of the plausible range.

5. Biokinetic Slope Factor (BKSF)

The BKSF parameter relates the blood lead concentration (µg Pb/dL) to lead uptake (µg Pb/day). The TRW recommends a default value of 0.4 µg Pb/dL blood per µg Pb absorbed/day for the BKSF parameter based on data reported by Pocock et al. (1983) on the relationship between tap water lead concentrations and blood lead concentrations for a sample of adult males, and on estimates of the bioavailability of lead in tap water (see Section 6 of the Appendix).

Pocock et al. (1983) analyzed data on lead concentrations in first draw tap water and blood lead concentrations in a population of 910 adult males. A linear model imposed on the data yielded a slope of 0.06 (µg/dL per µg/L first draw water) for water lead concentrations equal to or less than 100 µg/L (a lower slope was applied to the data for higher water concentrations). Pocock et al. (1983) also obtained data on lead concentrations in flushed water (and "random daytime") samples, in addition to first draw samples. Given the following assumptions, it is possible to derive a slope factor for ingested water lead (INGSF) from the Pocock et al. (1983) data:

- The lead concentration of flushed water was 25% of the concentration of first draw water ($C_{f1st} = 0.25$) (U.S. EPA, 1995).
- Daily water intake consisted of 30% first draw and 70% flushed ($F_{1st} = 0.3$, $F_f = 0.7$) (U.S. EPA, 1992).
- Daily water ingestion (including tap water and beverages made with tap water) was 1.4 L/day ($IR_w = 1.4$) (U.S. EPA, 1989).

Based on the above assumptions, a INGSF of 0.09 µg/dL per µg intake/day is estimated as follows:

$$INGSF = \frac{0.06}{IR_W \cdot (F_{1st} + (C_{f1st} \cdot F_f))} \qquad \text{(Equation A-8)}$$

$$INGSF = \frac{0.06}{1.4 \cdot (0.3 + (0.25 \cdot 0.7))}$$

$$INGSF = 0.09$$

This suggests that the product of the BKSF, reflecting the slope for absorbed rather than ingested lead, and the absorption factor for lead in drinking water (AF_w) should be approximately 0.09 if it is to match the estimate of INGSF based on the Pocock et al. (1983) study:

$$INGSF = BKSF \cdot AF_w \qquad \text{(Equation A-9)}$$

Values of AF_w within the range 0.20 - 0.25 would correspond to a range for BKSF of 0.36 - 0.45, or approximately 0.4 µg/dL per µg/day (rounded to one significant figure). A range of 0.20 - 0.25 for AF_w is supported by data from numerous lead bioavailability studies (see Section 6 of the Appendix for a more detailed discussion of these studies).

The above estimate of 0.4 µg/dL per µg/day for the BKSF can be compared with the approach described by Bowers et al. (1994), who used the same data set along with different assumptions and arrived at essentially the same estimate of the BKSF, 0.375 or approximately 0.4 µg/dL per µg/day. Bowers et al. (1994) assumed a daily tap water intake of 2 L/day and 8% absorption of lead ingested in tap water, and did not make adjustments for a mixture of first draw and flushed water intake in the Pocock et al. (1983) study.

Several uncertainties should be considered in applying the default value of 0.4 µg/dL per µg/day to any specific population. Since it is based on the Pocock et al. (1983) data, it represents an extrapolation from adult men to women of child bearing age. Physiological changes associated with pregnancy may affect the value of the BKSF (see Section 6 of the Appendix); therefore, some uncertainty is associated with applying the default value to populations of pregnant women.

An additional uncertainty concerns the assumption of linearity of the relationship between lead intake and blood lead concentration. The Pocock et al. (1983) study provides data on a large sample population of adult men whose members were exposed to relatively low drinking water lead levels; 898 subjects (97%) were exposed to first draw water lead concentrations less than 100 µg/L and 473 (52%) to 6 µg/L or less. A smaller study of adult women exposed to higher concentrations was reported by Sherlock et al. (1982, 1984); out of 114 subjects, 32 (28%) had flush drinking water lead concentrations less than 100 µg/L and only 13 (11%) less than 10 µg/L. Sherlock et al. (1982, 1984) used a cube root regression model, rather than a linear model, to describe the relationship between drinking water and blood lead concentration. Given the much larger sample size in the Pocock et al. (1983) study, particularly towards the low end of the distribution for water lead concentration, greater confidence can be placed in the estimated slope of the linear regression model from the Pocock et al (1983) study than in the cube root regression model of Sherlock et al. (1982, 1984). Nevertheless, it is useful to compare the output of the two models because they were applied to the different sexes and because they differ so fundamentally in the treatment of the blood lead - water lead slope; the slope is constant in the linear model and decreases in the cube root model as water lead concentration increases. Figure A-1 compares the output of the two models and shows the output of a linear regression of the unweighted output of the Sherlock et al. (1984) model. Three observations can be made from this comparison that are relevant to the BKSF:

1. Both the Pocock et al. (1983) and Sherlock et al. (1984) models predict higher blood lead concentrations than would be expected in the average U.S. population today as suggested from NHANES III. This is indicative of higher lead intakes in the study populations which may have contributed to the apparent nonlinearities observed (e.g. above 100 µg/L in Pocock et al.(1983) and at lower concentrations in Sherlock et al. (1984).

2. The cube root regression model of Sherlock et al. (1984) predicts lower blood lead

concentrations than the linear model of Pocock et al. (1983). This may reflect greater lead intakes from sources other than drinking water in the Pocock et al. (1983) population (see Section 6 of the Appendix for further discussion).

3. The linear approximation of the Sherlock et al. (1984) and the linear model from Pocock et al. (1983) have similar slopes; 0.08 and 0.06 µg/dL per µg/L, respectively. Thus, although the Sherlock et al. (1984) study casts some degree of uncertainty on the assumption of linearity of the blood lead - drinking water lead relationship both at low (<10 µg/L) and high (> 100 µg/L) tap water lead concentrations, a linear model with a constant slope of 0.06 µg/dL per µg/L appears to approximate the output of the nonlinear model of Sherlock et al. (1984) reasonably well for water lead concentrations less than100 µg/L.

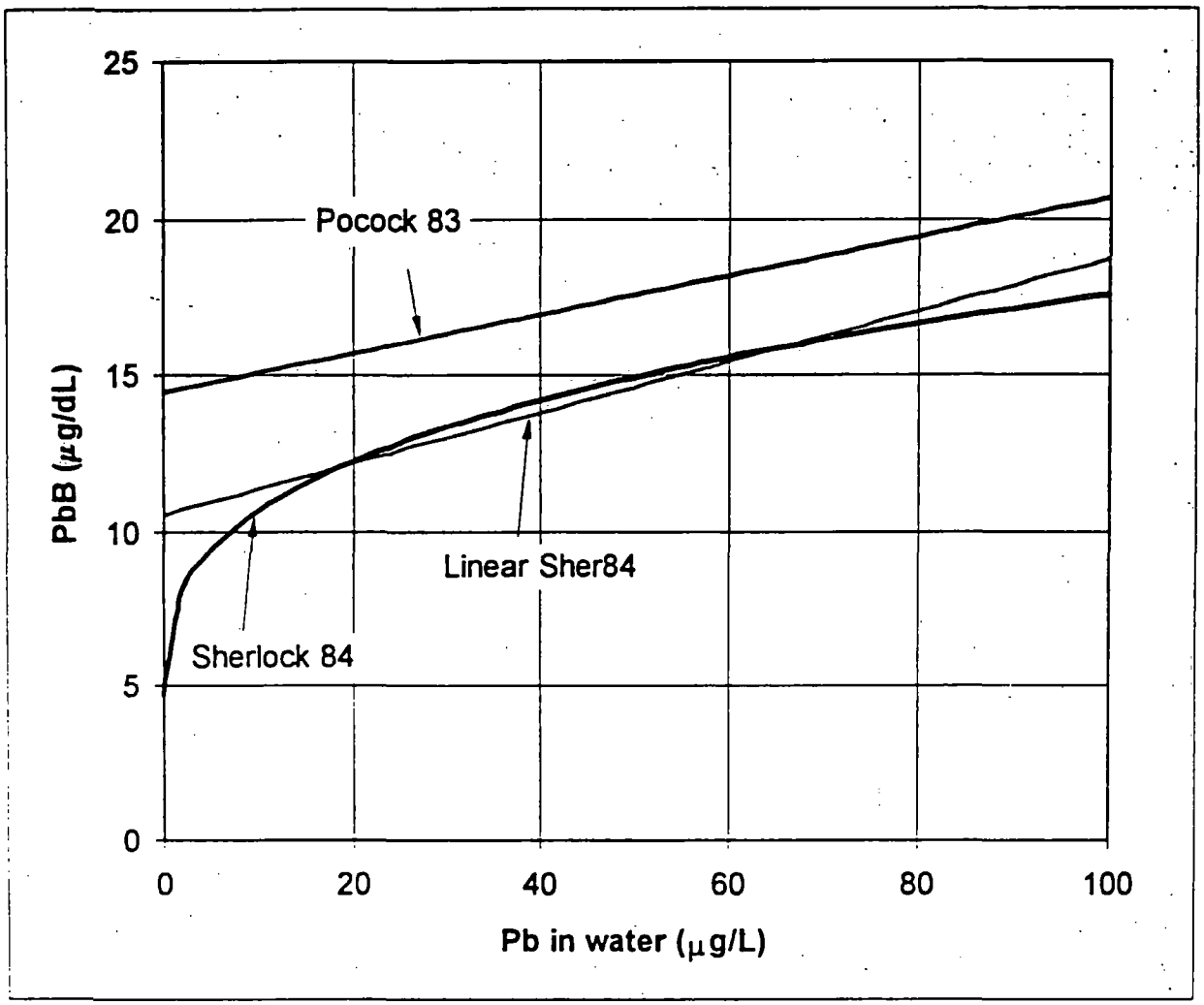

Figure A-1. Comparison of linear model of Pocock et al. (1983) with cube root model of Sherlock et al. (1984) and a linear model imposed on the unweighted output of the Sherlock model over the water lead range 0 - 100 µg/L (linear Sher84). The slope of the linear Sher84 model is 0.08 µg/dL per µg/L. The slope of the Pocock et al. (1983) model is 0.06 µg/dL per µg/L.

Experimental data on the pharmacokinetics of lead in adult humans support the default value of 0.4 (µg/dL per µg/day absorbed lead) for BKSF estimated from Pocock et al. (1983). Several distinct kinetic pools of lead are evident from observations of the rate of change of blood lead isotope with time after a period of daily dosing in which lead is abruptly terminated (Rabinowitz et al., 1976). A rapid exchange pool, denoted pool 1, includes the blood and a portion of the extracellular fluid, and is the physiological pool from which urinary and hepatobiliary excretion of blood lead occurs. Several estimates of the size of pool 1 (V_1) and the residence times for lead in pool 1 (T_1) have been derived from experiments in which human subjects were administered tracer doses of stable isotopes of lead from which pool 1 clearances (C_1) have been estimated; these estimates are summarized in Table A-3.

Table A-3. Summary of Experimental Studies with Humans to Assess Clearance Rates of Lead from Blood and Extracellular Fluid.

Subject	V_1[a] (dL)	T_1[b] (day)	$T_{½}$[c] (day)	C_1[d] (dL/day)	Reference
A	77	34	24	2.3	Rabinowitz et al., 1974
B	115	50	35	2.3	
A	74	34	24	2.2	Rabinowitz et al., 1976
B	100	40	28	2.5	
C	101	37	26	2.7	
D	99	40	28	2.5	
E	113	27	19	4.2	
ACC	70[e]	29	20	2.4	Chamberlain et al., 1978
DN	94[e]	39	27	2.4	
PL	85[e]	40	28	2.1	
ACW	94[e]	48	33	2.0	
MJH	97[e]	41	28	2.4	
ANB	95[e]	40	28	2.4	
Mean ± SD	93 ± 14	38 ± 6	27 ± 4	2.5 ± 0.5	

[a]The reported volume of pool 1, which refers to blood and rapidly exchangeable extracellular fluid compartment.
[b]The reported residence time for lead in pool 1.
[c]The half life of lead in pool 1; $T_{½} = (T_1) \times \ln(2)$.
[d]Clearance of lead from pool 1; $C_1 = V_1/T_1$.
[e]Estimated assuming $V_1 = V_{blood} \times 1.7$ (Rabinowitz et al., 1976).

The above experiments support a value for C_1 of 2.5 dL/day. At steady state, the clearance is equivalent to the rate of uptake of lead into pool 1 per unit of blood lead concentration (µg/day per µg/dL). Theoretically, this should correspond to a slope factor of 0.40 µg/dL per µg/day absorbed lead (i.e., the reciprocal of the clearance estimate). Thus, the default value for the BKSF parameter of 0.4 µg/dL per µg/day absorbed lead derived from the population survey data of Pocock et al. (1983) is consistent with the clearance estimates from experimental studies.

6. Soil Lead Absorption Factor (AF_S)

The AF_S parameter is the fraction of lead in soil ingested daily that is absorbed from the gastrointestinal tract. The TRW recommends a default value of 0.12 based on the assumption that the absorption factor for soluble lead ($AF_{soluble}$) is 0.2 and that the relative bioavailability of lead in soil compared to soluble lead ($RBF_{soil/soluble}$) is 0.6:

$$AF_S = AF_{soluble} \cdot RBF_{soil/soluble} \qquad \text{(Equation A-10)}$$

$$AF_S = 0.2 \cdot 0.6 = 0.12$$

The default value of 0.2 for $AF_{soluble}$ in adults represents a weight of evidence determination based on experimental estimates of the bioavailability of ingested lead in adult humans with consideration of three major sources of variability that are likely to be present in populations, but are not always represented in experimental studies; these are variability in food intake, lead intake, and lead form and particle size.

Effect of food on lead bioavailability. The bioavailability of ingested soluble lead in adults has been found to vary from less than 10% when ingested with a meal to 60 - 80% when ingested after a fast (Blake, 1976; Blake et al., 1983; Blake and Mann, 1983; Graziano et al., 1995; Heard and Chamberlain, 1982; James et al., 1985; Rabinowitz et al., 1976, 1980). The general consensus is that constituents of food in the gastrointestinal tract decrease absorption of ingested lead, although the exact mechanisms by which this occurs are not entirely understood. Lead intake within a population would be expected to occur at various times with respect to meals. Therefore, the central tendency for lead absorption would be expected to reflect, in part, meal patterns within the population and to have a value between the experimentally determined estimate for fasted and fed subjects.

An estimate of a "meal-weighted" $AF_{soluble}$ can be obtained from the data reported by James et.al. (1985) and certain simplifying assumptions. James et al. (1985) assessed the effects of food on lead bioavailability by measuring the fraction retained in the whole body of adult subjects 7 days after they ingested a dose of radioactive lead either after a fast or at various times before or after a meal. The total lead dose was approximately 50 µg (fasted) - 100 µg (with food). Lead retention was 61 ± 8.2 (SD)% when lead was ingested on the 12th hour of a 19-hour fast and decreased to 4% - 16% when lead was ingested between 0 and 3 hours after a meal; retention was further reduced (3.5 ± 2.9%) when lead was ingested with a meal (breakfast) (the bioavailability may have been more than these retention estimates since some absorbed lead would have been excreted during the 7 day

interval between dosing and measurement of whole-body lead). Since ingested material may be retained in the human stomach or at least 1 hour (Hunt and Spurrel, 1951; Davenport, 1971), lead bioavailability also may be reduced when lead is ingested 1 hour before a meal. The average "meal-weighted" bioavailability can be estimated based on the average number of waking hours during the day, the number of meals eaten, the bioavailability of lead ingested within 1 hour before a meal, the bioavailability of lead ingested within 0 to 3 hours after a meal, and the bioavailability of lead at other times during the day. For example, if it is assumed that people eat three meals each day and, based on the James et al. (1985) study, the bioavailability of lead ingested within 1 hour before a meal or 0 to 3 hours after a meal is approximately 0.1, and the bioavailability of lead ingested at all other times in a 16 hour day is 0.6, then the average "meal-weighted" bioavailability during a 16 hour day is approximately 0.2:

$$\frac{(0.1 \cdot 12\ hrs) + (0.6 \cdot 4\ hrs)}{16\ hrs} = 0.23$$

This example suggests that the use of 0.2 as a default value for $AF_{soluble}$ is plausible for populations in which soil lead intake occurs throughout the day, interspersed with meals. This may not apply to all members of a population. For example, the average bioavailability would be higher if less than three meals were consumed each day (e.g., using a similar calculation it can be shown that the average bioavailability for one meal each day would be 0.5). Average bioavailability also may be greater than 0.2 if lead intake was to occur predominantly in the early morning, before the first meal of the day.

Although lead bioavailability may be lower in individuals whose soil lead ingestion coincides with meals, the TRW cautions against the use of a value less than 0.2 for several reasons. Iron and calcium deficiency associated with poor nutritional status may enhance absorption (U.S. EPA, 1990). In addition, numerous factors may affect the absorption, distribution, excretion, and mobilization of lead during pregnancy: increased plasma volume (i.e., hemodilution); decreased hematocrit; previous exposure history of the mother (i.e., bone lead sequestration); changes in nutritional status; significant loss of body weight or depletion of fat stores; hormonal modulation; age; race; administration of drugs; and illness (Silbergeld, 1991). There is likely to be significant inter-individual variability in these factors, and studies of women at different stages of pregnancy have not shown clear trends in effects on blood lead concentration (Gershanik et al., 1974; Alexander and Delves, 1981; Baghurst et al., 1987; Silbergeld, 1991). While there is evidence to support 0.2 as a reasonable estimate of $AF_{soluble}$ for women of child-bearing age, there is still some basis for concern regarding potentially elevated absorption during pregnancy. However, a potential increase in lead absorption during pregnancy would be expected to occur dynamically with changes in bone mobilization, blood volume and glomerular filtration rate. Thus, the TRW cautions against adjusting the value for $AF_{soluble}$ (or BKSF) based on assumptions regarding the effects of pregnancy on blood lead concentration.

Nonlinearity in blood lead concentration. Another reason for caution in adopting values for $AF_{soluble}$ less than 0.2 derives from uncertainty about the relationship between blood lead concentration, lead intake, and lead absorption. Several studies have shown that the relationship between environmental lead levels (e.g., drinking water lead concentration) and blood lead concentration is nonlinear and suggest the possibility that fractional absorption of ingested lead is

dose-dependent, and decreases as lead intake (and blood lead concentration) increases. Pocock et al. (1983) reported a nonlinear relationship between blood lead concentration and water lead that could be approximated by two linear equations: a slope of 0.06 µg/dL per µg/L was estimated for water lead concentrations equal to or less than 100 µg/L and a slope of 0.01 was estimated for water lead concentrations above 100 µg/L. Sherlock et al. (1982, 1984) used a cube root regression model to relate blood and water lead concentrations; however, over the range of water lead concentrations of 100 µg/L or less, the slope of 0.06 µg/dL per µg/L water lead from Pocock et al. (1983) approximates the relationship observed in the Sherlock et al. (1982, 1984) study (Figure A-1). The linear relationship between water lead and blood lead in the Pocock et al. (1983) study extends from a blood lead concentration range of 14 to 20 µg/dL. Based on these data, the value of $AF_{soluble}$ of 0.2 may be considered a reasonable default estimate if applied to exposure scenarios in which the estimates of blood lead concentration do not exceed 20 µg/dL. At blood lead concentrations greater than this, absorption of soluble lead may be less than the default value.

An appropriate value of $AF_{soluble}$ also can be supported by estimating the range of daily lead intake that is likely to result in a linear relationship between intake and blood lead concentration. Data represented in Figure A-1 suggest that if water lead concentrations are less than 100 µg/L, the blood lead - water lead relationship is approximately linear. If assumptions regarding the magnitude of first draw and flushed water intakes and lead concentrations are applied (see Equations A-8 and A-9 and discussion of BKSF), a first draw water lead concentration of 100 µg/L in the Pocock et al. (1983) study represents a water lead intake of approximately 70 µg/day:

$$100 \cdot 1.4 \cdot (0.3 + (0.25 \cdot 0.7)) \approx 70$$

We do not know with certainty the total lead intake in the Pocock et al. (1983) population, although we can be certain that it exceeded the above estimated intake from drinking water since intake from diet and other sources, including occupational, would have occurred; this is consistent with the higher blood lead concentrations that were observed in the male population. Sherlock et al. (1982) estimated that, in their study population of adult women, the dietary contribution to total lead intake was equal to that from drinking water when the water lead concentration was 100 µg/L, and that the contribution of lead from sources other than diet and water was very small. If the same assumption is applied to the Pocock et al. (1983) study, it is likely that total lead intake in the male population was at least 140 µg/day (70 µg/day from drinking water and 70 µg/day from diet; the Pocock et al., 1983 study included 40 households from the Sherlock et al., 1982 study site), and may have been higher because of occupational exposure in the male population. A crude estimate of the relative magnitudes of the non-water lead intakes in the two studies can be obtained by comparing the predicted water lead concentration required to achieve the same blood lead concentration in the two populations. For example, a water lead concentration of 100 µg/L corresponded to a predicted blood lead concentration of approximately 18 µg/dL in the female population (Sherlock et al., 1984); the same blood lead concentration corresponded to a water lead concentration of 50 µg/L in the male population (Pocock et al., 1983). Therefore, the non-water lead intakes in the male population may have been twice that in the female population. If it is assumed that drinking water and diet contributed equally to lead intake in both studies, then a drinking water lead concentration of 100 µg/L in the Pocock et al. (1983) study translates to a total lead intake of approximately 300 µg/day:

$$I_{total} = I_{water} + I_{diet} + I_{other} \qquad \text{(Equation A-11)}$$

$$I_{total} = 70 + 70 + 140 \approx 300\ \mu g/day$$

Thus, the departure from linearity observed in the Pocock et al. (1983) study may have occurred at lead intakes at or above 300 µg/day. In the various experimental assessments of lead bioavailability, subjects ingested lead in amounts that varied among the studies but were all within the range 100 - 300 µg (Blake, 1976; Blake et al., 1983; Blake and Mann, 1983; Graziano et al., 1995; Heard and Chamberlain, 1982; James et al., 1985; Rabinowitz et al., 1976, 1980), which is within the approximate linear range, if the extrapolation from the Pocock et al. (1983) and Sherlock et al. (1982) studies is reasonable. Based on these considerations, the value of $AF_{soluble}$ of 0.2 is considered to be a reasonable default value if applied to exposure scenarios in which lead intakes are less than 300 µg/day. At intakes greater than this, absorption of soluble lead may be less than the default value; however, it can be similarly argued that, based on the Sherlock et al. (1984) regression model, the default $AF_{soluble}$ may underestimate absorption by some degree at low exposures.

Effect of lead form and particle size on lead bioavailability. The default value of 0.2 for $AF_{soluble}$ applies to soluble forms of lead in drinking water and food and would be expected to overestimate absorption of less soluble forms of lead in soil. Experimental studies have shown that the bioavailability of lead in soil tends to be less than that of soluble lead. Weis et al. (1994) assessed the relative bioavailability of lead in soil compared to water soluble lead (acetate) in immature swine and estimated that the relative bioavailability of lead in soil from Leadville, CO was 0.6 to 0.8. Ruby et al (1996) reported estimates of the relative bioavailability of lead in a variety of soils from mining sites and smelters as assessed in the Sprague-Dawley rat; the estimates ranged from 0.09 to 0.4. Maddaloni et al. (1996) reported preliminary data from a study in which 6 fasted human subjects were administered a single dose of lead-contaminated soil. The dose was 250 µg lead normalized to a 70 kg body weight; the concentration of lead in the soil was 2850 µg/g and the amount of soil administered to each subject was generally a little less than 100 mg. The average estimate of lead absorption in the six subjects was 26%. If the absorption factor for soluble lead in fasted adults is assumed to be 0.6 (James et al., 1985), then the Maddaloni et al. (1996) estimate suggests a relative bioavailability of 0.5 (i.e., 0.3/0.6) for lead in soil.

Based on the above evidence, the TRW considers 0.6 to be a plausible default point estimate for the relative bioavailability of lead in soil compared to soluble lead ($RBF_{soil/soluble}$) when site-specific data are not available. Such data are highly desirable as variation in relative bioavailability is expected for different species of lead and different particle sizes (Barltrop and Meek, 1975, 1979), both of which may vary from site to site. For example, the bioavailability of metallic lead has been shown to decrease with increasing particle size (Barltrop and Meek, 1979), therefore, the default value for $RBF_{soil/soluble}$ may overestimate absorption of lead if applied to soils contaminated with large lead particles such as firing range debris or mine tailings. Here again, the TRW cautions against the use of a lower value for the $RBF_{soil/soluble}$, unless it can be supported by experimental assessments of relative bioavailability.

The default value of 0.6 for $RBF_{soil/soluble}$, coupled with the default value of 0.2 for $AF_{soluble}$, yields a default value of 0.12 for AF_S (0.6 · 0.2). The TRW considers 0.12 to be a plausible point estimate for the absorbed fraction of ingested soil lead for use in assessments in which site-specific data on lead bioavailability are not available. The default value of 0.12 takes into account uncertainties regarding the possible nonlinearity in the relationship between lead intake and absorption and should be adequately protective in scenarios in which predicted blood lead concentrations are less than 20 µg/dL. The use of the default value for populations that have substantially higher blood lead concentrations may result in an overestimate of lead uptake, and conversely, lead uptake may be underestimated at lower exposures.

7. Daily Soil Ingestion Rate (IR_S)

The TRW recommends a default value of 0.05 g/day as a plausible point estimate of the central tendency for daily soil intake from all occupational sources, including soil in indoor dust, resulting from non-contact intensive activities. This would include exposures that are predominantly indoors. More intensive soil contact would be expected for predominantly outdoor activities such as construction, excavation, yard work, and gardening (Hawley, 1985). Site-specific data on soil contact intensity, including potential seasonal variations, should be considered in evaluating whether or not the default value is applicable to the population of concern and, if not, activity-weighted estimates of IR_S that more accurately reflect the site can be developed.

In adopting the single IR_S parameter to describe all sources of ingested soil, the methodology remains consistent with recommendations of the Superfund program and their implementation for risk assessment; specifically, the 0.05 g/day value used for adult soil ingestion addresses all occupational soil intake by the individual, whether directly from soil or indirectly through contact with dust (U.S. EPA, 1993). This value specifically applies to the assessment of soil lead risk, and not risks associated with non-soil sources of lead in dust. In making soil ingestion exposure estimates under the Risk Assessment Guidelines for Superfund (RAGS) framework, no specific assumptions are needed about the fraction of soil intake that occurs through dust.

An alternative approach was needed in the IEUBK Model because childhood lead exposures are often strongly influenced by indoor sources of lead in dust (e.g., indoor paint) (U.S. EPA, 1994b). In a situation where indoor sources of dust contamination are important, an exposure estimate that addresses only soil exposures (including the soil component of dust) would be incomplete. The IEUBK Model assigns separate values to outdoor soil and total indoor dust ingestion and partitions the indoor dust into soil-derived and non-soil-derived sources. At a minimum, paired soil and indoor dust samples should be collected to adequately characterize exposure to lead where indoor sources of dust lead may be significant.

Alternate method for calculating soil and dust ingestion as separate exposure pathways. In this alternate approach, separate estimates are made of lead intake from the direct ingestion of outdoor soil and from the ingestion of indoor dust (which may contain lead from soil and as well as from indoor sources such as deteriorated lead based paint). Exposure to lead from soil (outdoor contact) can be calculated using Equation A-12, while exposure to lead from indoor dust can be

calculated using Equation A-13.

$$INTAKE_{S,outdoors} = \frac{PbS \cdot IR_{S,outdoors} \cdot EF_{Site}}{AT} \qquad \text{(Equation A-12)}$$

$$INTAKE_{D,indoors} = \frac{PbD \cdot IR_{D,indoors} \cdot EF_{Site}}{AT} \qquad \text{(Equation A-13)}$$

$INTAKE_{S,\ outdoors}$	=	Daily average intake (ingestion) of lead from soil ingested outdoors (µg/day).
$INTAKE_{D,\ indoors}$	=	Daily average intake (ingestion) of lead from dust ingested indoors (µg/day).
PbS	=	Soil lead concentration (µg/g) (average concentration in assessed individual exposure area).
PbD	=	Indoor dust lead concentration (µg/g).
$IR_{S,\ outdoors}$	=	Intake rate (ingestion) of outdoor soil (g/day).
$IR_{D,\ indoors}$	=	Intake rate (ingestion) of indoor dust (g/day).
EF_{Site}	=	Exposure frequency at site (days of exposure during the averaging period); may be taken as days per year for continuing, long term exposures.
AT	=	Averaging time, the total period during which the assessed exposures (from all sources) occur (days). May be taken as 365 days per year for continuing, long term exposures.

Note that, in Equations A-12 and A-13, exposure frequency refers to the number of days that an individual is present at the site and does not partition between periods of indoor and outdoor exposures. The intake rate is a long term average value appropriate for that media and is influenced by both the duration of outdoor (or indoor) exposures and the intensity of those exposures.

Calculation of $IR_{S,\ outdoors}$ and $IR_{D,\ indoors}$ from total intake of soil and dust (IR_{S+D}). Intermediary calculations may be needed to generate estimates of the parameters in the intake equations. An estimate of the total intake of soil and dust materials (IR_{S+D}) serves as a starting point. Note that IR_{S+D} differs from IR_S, which was discussed above, because IR_{S+D} includes not only the total mass of soil ingested (both directly and as a component of indoor dust), but also the ingested mass of non-soil derived dust components including various materials of indoor origin. Since a

substantial fraction of the mass of indoor dust comes from sources other than outdoor soils, an estimate of IR_{S+D} will be higher than the corresponding estimate of IR_S. Secondly, an estimate of the fraction the total soil and dust intake that is ingested directly as soil is needed ($Weighting_{soil}$). This estimate needs to take into account the intensity and duration of the outdoor soil intake and the indoor dust intake. Equations A-14 and A-15 can be used to derive media-specific ingestion rates from IR_{S+D} and $Weighting_{soil}$.

$$IR_{S,outdoors} = Weighting_{soil} \cdot IR_{S+D} \qquad \text{(Equation A-14)}$$

$$IR_{D,indoors} = (1 - Weighting_{soil}) \cdot IR_{S+D} \qquad \text{(Equation A-15)}$$

$Weighting_{soil}$ = Fraction of total soil and dust intake that is directly ingested as soil (dimensionless).

IR_{S+D} = Total daily average intake of outdoor soil and indoor dust (all dust components) (g/day).

Data are needed to generate separate estimates of the concentrations of lead in outdoor soil and in indoor dust. A site assessment using this alternate methodology would generally be based on direct measurement data for both soil and dust at the facilities of concern. For comparison with exposure estimates based on total soil ingestion (the primary approach presented in this paper), Equation A-16 may be utilized to estimate the ratio of dust lead concentration to soil lead concentration.

$$PbD = PbS \cdot K_{SD} \qquad \text{(Equation A-16)}$$

K_{SD} = Ratio of indoor dust lead concentration to soil lead concentration (dimensionless).

Assuming that the same absorption fraction is applicable to both soil and dust, Equation A-17 may be used to estimate the uptake of lead from these two sources.

$$UPTAKE = AF_{S,D} \cdot (INTAKE_{S,outdoors} + INTAKE_{D,indoors}) \qquad \text{(Equation A-17)}$$

UPTAKE = Daily average uptake of lead from the gastrotintestinal tract into the systemic circulation; soil and dust sources (μg/day).

$AF_{S,D}$ = Absolute gastrointestinal absorption fraction for ingested lead in soil and dust (dimensionless).

Comparison of lead intake estimated from principal and alternate approaches. It is helpful to compare exposure estimates derived using our principal approach based on total soil intake

(including soil present in ingested dust) with the results of the disaggregated pathway analysis for soil and dust. We will consider the case in which there are not important indoor sources of lead in dust. We can then compare the total lead intake estimates from the two approaches.

Under the model based on total soil ingestion (which we re-label as $IR_{S,total}$ for clarity):

$$INTAKE = \frac{PbS \cdot IR_{S,total} \cdot EF_{Site}}{AT} \qquad \text{(Equation A-18)}$$

By contrast, using the disaggregated soil and dust model, Equations A-14, A-15, A-16, and A-18 may be combined to give Equation A-19:

$$INTAKE = \frac{PbS \cdot IR_{S+D} \cdot (Weighting_{soil} + K_{SD} \cdot (1 - Weighting_{soil})) \cdot EF_{Site}}{AT} \qquad \text{(Equation A-19)}$$

When applied to the same exposure assessment problem, the two approaches should give equivalent estimates of lead intake. The estimates will be equivalent when:

$$IR_{S+D} \cdot (Weighting_{soil} + K_{SD} \cdot (1 - Weighting_{soil})) = IR_{S,total}$$

8. Exposure Frequency (EF_S)

The TRW recommends a default value of 219 days/year. This is the same as the central tendency occupational exposure frequency recommended by U.S. EPA (1993) Superfund guidance, which is based on 1991 data from the Bureau of Labor Statistics. This estimate corresponds to the average time spent at work by both full-time and part-time workers engaged in non-contact intensive activities (U.S. EPA, 1993). Site-specific data on exposure frequency should be considered in evaluating whether or not the default value is applicable to the population of concern. In evaluating site-specific data, it should be kept in mind that exposure frequency and daily soil ingestion rate (IR_S) may be interdependent variables, particularly in contact-intensive scenarios; therefore, the assignment of a site-specific value to EF_S should prompt an evaluation of the applicability of the default value for IR_S to the population of concern (see Section 7 of the Appendix for further discussion).

Nonresidential exposure scenarios in which exposure frequency would be substantially less than 219 days/year are frequently encountered. Examples include trespassing and recreational use of a site. Important methodology constraints on exposure frequency and duration must be considered in assigning values to EF_S that would represent infrequent contact with the site; these constraints relate to the steady state assumptions that underlie the BKSF. The BKSF derived from the Pocock

et al. (1983) data applies to exposures that result in a quasi-steady state for blood lead concentration; that is, an intake over a sufficient duration for the blood lead concentration to become nearly constant over time. Based on estimates of the first order elimination half-time for lead in blood of approximately 30 days for adults (Rabinowitz, et al., 1974, 1976; Chamberlain et al., 1978), a constant lead intake rate over a duration of 90 days would be expected to achieve a blood lead concentration that is sufficiently close the quasi-steady state. This is the minimum exposure duration to which this methodology should be applied.

Infrequent exposures (i.e., less than 1 day per week) over a minimum duration of 90 days would be expected to produce oscillations in blood lead concentrations associated with the absorption and subsequent clearance of lead from the blood between each exposure event. Based on the above assumptions about the elimination half-time lead in blood, the TRW recommends that this methodology should not be applied to scenarios in which EF_S is less than 1 day/week.

9. Applying Monte Carlo Analysis to the Adult Lead Methodology

Recent EPA guidance (Browner, 1995) recommends that risk assessments include a clear and transparent discussion of variability and uncertainty. The lead risk assessment methodology presented here develops explicit estimates of the variability of blood lead levels among adults who are exposed to specified concentrations of environmental lead. This analysis relies on data from a large number of studies (baseline blood lead levels, variability of blood lead levels, contact rates with environmental media, lead bioavailability, and lead biokinetics) to support a predictive probabilistic (lognormal) model for adult and fetal blood lead concentrations. Important issues regarding the uncertainty in parameter inputs and the mathematical form of the model are discussed in the sections of this Appendix The TRW recognizes that there is considerable scientific interest in the different analytical approaches that may be applied to aid in the analysis of variability and uncertainty in risk assessments. In particular, under appropriate circumstances, Monte Carlo methods may provide a useful approach for developing quantitative estimates of the variability, uncertainty (or both) in risk predictions.

The TRW chose not to pursue application of Monte Carlo or other stochastic simulation methods in this effort addressing adult lead risk assessment. Several factors went into this decision. First, the TRW understood the needs of EPA Regions for a risk model that could be developed relatively rapidly and which Regional lead risk assessors could apply easily with limited need for additional study or training. These considerations made it advantageous to focus on models that are conceptually similar to the IEUBK model for children in terms of applying a parametric lognormal modeling approach to address distributions for blood lead levels. Secondly, the TRW recognized that there would be substantial scientific issues associated with developing widely applicable stochastic simulation models for adult lead risk assessment. These difficulties primarily relate to the absence of reliable distributional data for a variety of important variables in the assessment. As one example, very limited data are available on soil ingestion rates in adults and a distributional choice for this key parameter would depend heavily on individual judgement with little Agency precedent for support. Additionally, in a stochastic assessment, a greater complexity would arise due to likely correlations among the variables in the adult lead risk assessment. Stochastic analyses need to explicitly account for important correlations among variables if the simulations are to provide realistic distributions of

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Outline of Tasks for Water Management to achieve South Ditch Closure

Scope of work

The purpose of this document is to outline and detail a water management scheme for Keystone's Wire Mill storm and process water in relationship to the ditch system adjacent to the Union Pacific Railroad.

In this review of the system an attempt has been made to address any and all of the high maintenance areas, seasonal flow problems, and separate storm water and process piping as much as possible.

Order of events

I. Storm Water Collection

Plug the end of the 48" culvert at S. ditch
Install 24" Storm drain from distribution box to Mid Mill ditch
Install storm water distribution box
Storm water collection of tenant buildings (Engineering)
Remove existing plug installed in 42" culvert N. ditch
Remove plug from 15" storm drain to Mid Mill ditch
Plug the end of 18" drain to N. half South ditch.
Close condenser water piping to ditch

II. Install a New Process Line to Waste Water Treatment Plant

Install a new 16" pvc process force main to WWTP
from existing 16"main at acid recovery.

III. Install a New Pump Station at the Mid Mill Ditch.

Install a new pump station #1-A
Install discharge piping to 12" transite pipe

IV. Install a New Sump Area at #2 Pump Station

Construct a pile sump for separation of ditch materials.
Rework site for Ditch level control

V. Install a New Pump Station and Piping for South Ditch Dewatering.

New sump construction #1-B (existing pumps from N. station)
Construct an new gravity pipe to #2 Sump
Extend storm drains from tenant property to sump

VI. S. Mill Gravity Drain

Redirect 24" Drain to new pump station #1-B

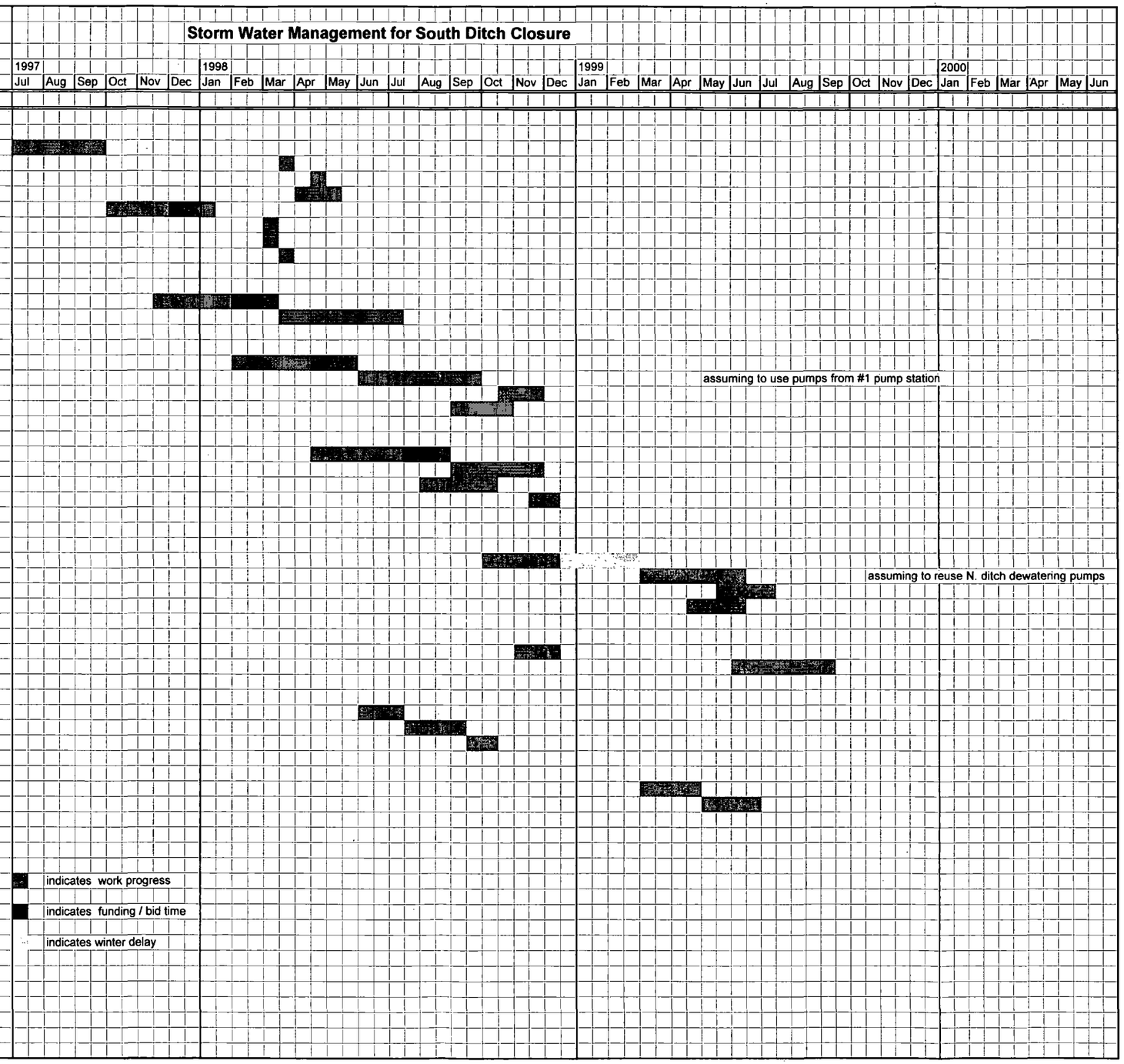
VII. Upper South Ditch Steam Line Support

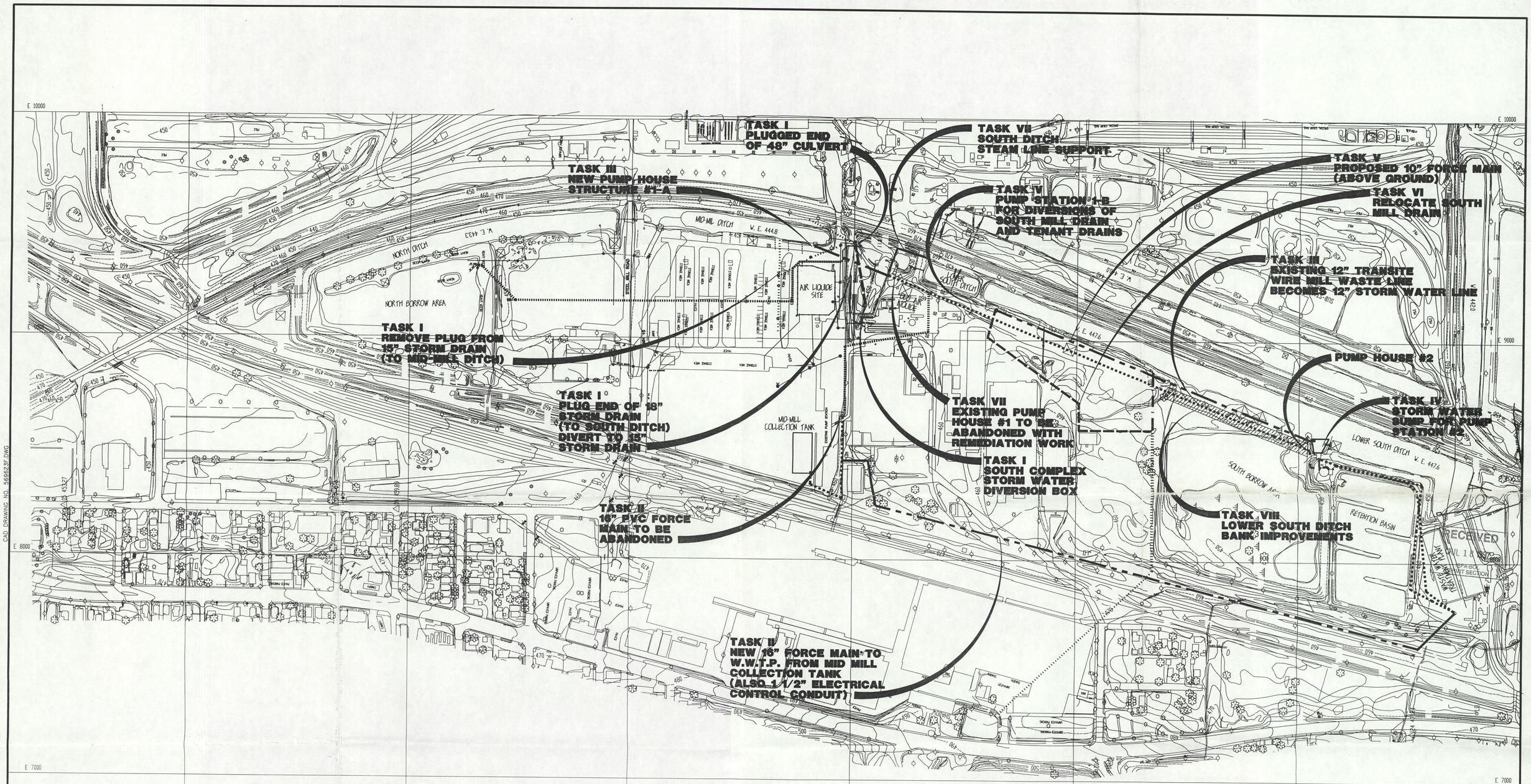
Sheet piling
Structural steel support
Remove existing intake structure @ #1 pump station

VIII. South Ditch Bank Improvements

Stabilize banks for equipment access
Construct dike for water control

Storm Water Management for South Ditch Closure





CAD DRAWING NO. 5696-23F.DWG

THIS SHEET DRAWN TO A SCALE OF 0 200 400 scale feet

D&A	Date:	Surveyed:	KEYSTONE STEEL & WIRE COMPANY BARTONVILLE, ILLINOIS	**WATER MANAGEMENT TO ACHIEVE SOUTH DITCH CLOSURE**
	Revision:	Designed:		Sheet: 1 of 1
		Drawn:		
		Checked:		
		Approved:		
	Prepared by: **DAILY & ASSOCIATES, ENGINEERS, INC.**		CHAMPAIGN & PEORIA, ILLINOIS	Job No. 5696.23