United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R05-90/122
March 1990

EPA

Superfund Record of Decision:

Tri-State Plating, IN

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/ROD/R05-90/122	2.	3. Recipient's Accession No.

4. Title and Subtitle
SUPERFUND RECORD OF DECISION
Tri-State Plating, IN
First Remedial Action - Final

5. Report Date
03/30/90

6.

7. Author(s)

8. Performing Organization Rept. No.

9. Performing Organization Name and Address

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

13. Type of Report & Period Covered
800/000

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 3,900-square foot Tri-State Plating site is an abandoned metal plating facility in Columbus, Bartholomew County, Indiana. Land use in the vicinity of the site is residential and industrial. Metal plating operations at the site began during the 1940s. Tri-State Plating operated the facility from 1981 until 1984, when operations were shut down and the site abandoned. Site features include an electroplating building, and an onsite storage building. In 1983, the State identified soil contaminated with chromium, lead, and other metals, which was thought to be a result of an onsite waste spill. Tri-State Plating excavated the contaminated soil and placed it in onsite drums. Subsequently, the State identified additional onsite contaminated soil and elevated levels of chromium in offsite ground water, and determined that facility wastes had been discharged directly into the sewer line. In 1984, following additional onsite waste disposal violations, onsite spills, and the failure of Tri-State Plating to install an onsite waste treatment system, the State blocked sewers from the site and cut off the water supply. From 1987 to 1989, in two separate actions, EPA removed 27 drums of inorganic material from the storage building, excavated contaminated onsite soil, decontaminated and demolished all onsite structures, filled and revegetated the,

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Tri-State Plating, IN
First Remedial Action - Final
Contaminated Medium: gw
Key Contaminants: metals (chromium)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 28
	20. Security Class (This Page) None	22. Price

(See ANSI-Z39.18) *See Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

EPA/ROD/R05-90/122
Tri-State Plating, IN
First Remedial Action - Final

Abstract (Continued)

excavated areas, and disposed of the soil and debris in offsite landfills. Subsequent site investigations revealed that ground water beneath and migrating from the site was contaminated with metals and required remediation. Previous removal actions successfully reduced metal concentration in onsite soil to background levels; therefore, onsite soil does not warrant remedial action. This ROD addresses the contaminated onsite ground water. The primary contaminants of concern affecting the ground water are metals including chromium.

The selected remedial action for this site includes pumping contaminated ground water from the underlying aquifer and discharging the water to a publicly owned treatment works (POTW); monitoring ground water and surface water; conducting a public education program; and implementing institutional controls and site access restrictions including fencing. The estimated present worth cost for this remedial action ranges from $1,110,000 to $1,115,000 for 2-10 years, depending on the ground water pumping rate. O&M costs were not provided for this remedial action.

PERFORMANCE STANDARDS OR GOALS: Pumping of ground water will continue until contaminant levels meet State and Federal standards including chromium 50 ug/l.

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

TRI-STATE PLATING
COLUMBUS, INDIANA

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Tri-State Plating Site, in Columbus, Indiana, which was chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site.

The State of Indiana concurs with the selected remedy.

ASSESSMENT OF THE SITE

Groundwater beneath and migrating from the site is contaminated with chromium and hexavalent chromium. While there are no known private drinking water wells in the vicinity of the site at this time, the potential exists for human exposure via future groundwater use.

DESCRIPTION OF THE SELECTED REMEDY

This Record of Decision is to address the contaminated groundwater emanating from the Tri-State site. The major components of the selected remedy include:

- Monitoring groundwater quality and contamination migrating on a quarterly basis
- Monitoring surface-water quality on a quarterly basis
- Restricting future groundwater use until ARARs are achieved
- Conducting a public education program
- Re-evaluating site conditions every five years until cleanup levels are achieved
- Installating two additional extraction wells and extracting groundwater
- Constructing a discharge pipeline to the Columbus sewer system and monitoring the extracted groundwater prior to discharge
- Treating contaminated groundwater at the Columbus POTW

- Installating a fence around portions of the site

STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to this remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technology, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

3/30/90
DATE

Valdas V. Adamkus
Regional Administrator
Region V

RECORD OF DECISION SUMMARY
TRI-STATE PLATING

1. SITE NAME, LOCATION AND DESCRIPTION

The Tri-State site is located at 1716 Keller Avenue in a residential and small business neighborhood of Columbus, Indiana. Residences lie to the north, east, and the west of the site, and a tool and machine plant lies to the south (Figure 1). Prior to the decontamination and demolition of all on-site structures in 1989, an electroplating process building and a storage building were located on the site. The Tri-State Plating Property encompasses an area of approximately 130 feet by 120 feet. The site is located 800 feet southwest of the City of Columbus secondary municipal well field and 800 feet west of Haw Creek. The area surrounding the site is relatively flat, with steeper slopes to the east of the site along Haw Creek.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

SITE HISTORY

Metal-plating operations occurred at the site for 40 years prior to Tri-State Plating under Hull Industries and Quality Plating Service Company, Inc. The facility was purchased by James Padgett and renamed Tri-State Plating Inc. on April 13, 1981. Plating operations were performed by this company from December 1981 until the facility closed in May 1984.

Environmental problems at the site were brought to the attention of authorities when, on January 25, 1983, Bartholomew County Health Department (BCHD) was summoned to the site following the death of six birds that reportedly drank from a pool of solutions dumped on site by Tri-State Plating near the Columbus Tool and Machine Inc. property boundary. A sample of the liquid was collected and elevated concentrations of cadmium, cyanide, chromium, manganese and lead were detected. Tri-State Plating employees excavated soil in the area where the spill occurred, and placed the soil into drums that were stored on site.

Following the death of additional birds on February 1, 1983 near the location of the January 25, 1983 spill, a sample of liquid and one sample of soils at the location were collected by the Indiana State Board of Health (ISBH). Analysis of the liquid and solid samples detected high concentrations of cadmium, chromium, copper, lead, manganese, nickel and zinc. Tri-State Plating officials were again instructed to cleanup the spill area and two additional drums of soil were collected.

Subsequent investigations by BCHD and ISBH conducted in February, March and April 1983 revealed that onsite surface soils contained extremely high levels of cadmium, chromium, lead, nickel and cyanide when compared to offsite samples from surrounding properties. These investigations also discovered elevated levels of chromium in water from the Arvin Industries well located 200 feet south of the site, although cyanide and other site contaminants were

Source:

U.S.G.S. 7.5' Topographic Map
Columbus, Indiana Quadrangle,
Dated 1962, Photorevised 1980,
Scale: 1"=2000'.

SITE LOCATION

0 2000 4000

SCALE IN FEET

FIGURE 1

SITE LOCATION MAP

TRI - STATE PLATING SITE

not detected. Also during this period, sampling and analysis of effluent leaving the Tri-State Plating facility, conducted by Columbus Utilities, verified that plant wastes were being discharged to city sewers.

During the months of February, March and April 1984, several meetings took place between representatives of the City of Columbus and Tri-State Plating in attempts to get the plating facility into compliance with discharge standards. These meetings took place in response to numerous incidences of chromium wastes being flushed into public sewers by Tri-State Plating employees during the washing of the plating building walls and floor. On April 3, 1984, the City of Columbus requested that Tri-State Plating install a waste treatment system to prevent a recurrence of past discharges into the sewer system. The city also gave Mr. Padgett verbal authorization to continue operating in the interim provided that total chromium levels would not exceed 15 milligrams per liter and discharge of solids would not exceed 40 lbs. per day.

In May 1984, following several discharges that exceeded the specified limits, illegal dumping of wastes on the ground surface at the site, failure to install a waste treatment system, and one severe spill that interrupted the biological treatment system at the City of Columbus Waste Water Treatment Facility, sewers from Tri-State Plating were blocked and the water supply was cut off. Subsequently, Mr. Padgett moved his operation to Greenfield, Indiana, in July of 1984 and reopened under the name of Greenfield Manufacturing Enterprises. The Tri-State Plating site has been abandoned since this time.

Several additional rounds of sampling and analysis were conducted by various agencies following the closure of Tri-State Plating. In July 1984 the BCHD obtained a sample from a 20 to 25 gallon sludge spill observed on the site. In December 1984, the Process Engineering Group (PEG), a private consultant, collected and analyzed soil and liquid waste samples on behalf of the site owners and submitted results to the Indiana State Board of Health (ISBH). ISBH collected water samples from the Columbus supplemental wellfield in March 1985.

On September 23, 1986, the current owner, Mr. James Padgett, was notified of EPA intentions to conduct a Remedial Investigation and Feasibility Study. An information request was attached to that notice letter. On March 18, 1987, Mr. Padgett submitted a reply to USEPA and provided a short history of the industry and a list of four names and telephone numbers of previous owners. He did not offer to perform any studies or remedial action at the site and informed USEPA that he had filed for bankruptcy.

USEPA onsite activities started early in 1987. On January 6, 1987, the USEPA Technical Assistance Team (TAT) conducted a site assessment aided by the USEPA Remedial Project Manager and officials from IDEM and BCHD. Surface soil samples from the Tri-State Plating Site and a background sample were collected. On January 8, 1987, the USEPA On-Scene Coordinator and two TAT members conducted a follow-up inspection of the site, collecting samples from several of the 27 drums present inside the storage shed on the northwest side of the main building. Air monitoring inside the main building and the sheds,

utilizing an HNu photoionization detector and a hydrogen cyanide monitor, failed to indicate any readings above background. After the site inspection, the buildings were locked, but accessways to the contaminated yard remained open. On March 18, 19, and 20, 1987, TAT conducted a more extensive sampling program to determine the extent of soil contamination on and off the site. Forty-nine soil samples and four groundwater samples were submitted for cyanide and metals analysis. These samples included background samples from local residences. The USEPA samples detected metals and cyanide contamination to a depth of 4 feet on site, which was the maximum sampling depth. The well water samples collected did not detect cyanide contamination; however, low levels of metals were discovered in Arvin Industries East Well No. 2.

Preliminary remedial activities began shortly thereafter. On June 5, 1987, a fence was constructed by USEPA to prevent site access. On August 26 and 27, 1987, 20 drums containing inorganic materials were removed and disposed at a RCRA compliant facility. During the week of August 29, 1987, TAT obtained subsurface soil samples to determine the vertical extent of contamination. Samples were also collected from a residence north of the site. Additional background soil samples were also collected. A total of 19 soil samples were collected on and near the site and submitted for analyses. On September 24, 1987, the OSC and TAT supervised removal and disposal of seven remaining drums and took seven samples of building materials, including ceiling, brick and floor materials. Samples were analyzed for inorganic parameters.

In the Fall of 1987, the USEPA Emergency Response Section (ERS) performed a site building decontamination and limited contaminated soil removal action. Approximately one foot of top soil was removed from the open yard areas at the site. Several areas of visible contamination were noted adjacent to the building foundation during the top soil removal and a trench approximately four feet deep was excavated along the northern and southern foundations of the main process building to remove the discolored materials. All excavated areas were backfilled and regraded with clean soil. Contaminated subsurface soils identified during past TAT sampling activities were left on site. The ERS also washed the interior surface of the main process building using a caustic-sodium hypochlorite solution. This was performed in an attempt to remove surface contamination identified through past TAT sampling efforts.

U.S. EPA initiated a two-phased Remedial Investigation at the Tri-State site beginning in 1987 to determine the nature and extent of any remaining contamination following U.S. EPA's initial removal action activities. During the first phase of the study, U.S. EPA collected samples from 10 locations on the surfaces of walls, ceilings, and floors in the on-site buildings to determine whether the 1987 building decontamination activities had been successful. In addition, 25 surface and subsurface soil samples were collected to determine the depth of soil contamination at the site. U.S. EPA also installed four monitoring wells at the site and collected eight groundwater samples for laboratory analysis. These Phase I activities, completed in January 1988, revealed elevated levels of cyanide, chromium, copper, and cadmium on building surfaces and/or in subsurface soils and groundwater at the site.

U.S. EPA began Phase II of the Remedial Investigation in the fall of 1988. Phase II activities involved installing eight new monitoring wells, collecting two rounds of 19 groundwater samples from on-site monitoring wells and industrial wells at Arvin Industries, and collecting 46 subsurface soil samples.

Based on the results of the Remedial Investigation, there was concern that contamination in on-site soil may continue to migrate into groundwater and that people or animals may come into direct contact with contaminated on-site buildings. Because of these concerns, the U.S. EPA conducted a second removal action at the site from February to March 1989. This removal action, called an Expedited Response Action (ERA), involved excavating soil, decontaminating and demolishing all structures on the site, and transporting the soil, building debris, and asbestos found during the course of the cleanup to state and federally-regulated landfills. The excavated area was filled with clean soil, the site fence was removed, and the site was graded and revegetated.

During the ERA, U.S. EPA collected 357 subsurface soil samples on the site to determine the limits of excavation. U.S. EPA also collected 21 soil samples from the base of the excavated areas to determine the effectiveness of the removal activities. U.S. EPA also conducted a groundwater pump test to determine whether the migration of contaminated groundwater from the site could be prevented by the continuous withdrawal of groundwater and to calculate the pumping rate necessary to accomplish this objective. Groundwater sampling was conducted to determine the level of contamination in the groundwater following the groundwater pump test and site cleanup. Contaminated groundwater collected during the pump test was discharged to and treated at the Columbus POTW.

ENFORCEMENT ACTIVITIES

The USEPA notified Mr. Padgett and the other Potentially Responsible Parties (PRPs) of the USEPA intent to perform removal and remedial actions at the site. The PRPs were given an opportunity to proceed with these actions, but were unresponsive to these requests. Mr. Padgett is currently liquidating his assets under supervision of a bankruptcy judge at this time. The USEPA sent a notice letter to the PRPs in February 1990 stating the agency's decision not to invoke the settlement procedures under Section 122 of SARA due to the past lack of interest, and/or claimed lack of finances, in reaching a negotiated settlement at the site.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

In accordance with CERCLA Section 117, the Proposed Plan, which contains information on all the remedial alternatives considered by the U.S. EPA as well as the proposed remedy for the site, was made available to the public for comment on February 1, 1990. Notice of the start of this public comment period was published in a local newspaper prior to this date announcing the start of a 30-day public comment period running from February 1 to March 1. A public meeting was held in Columbus, Indiana on February 15, 1990 to explain

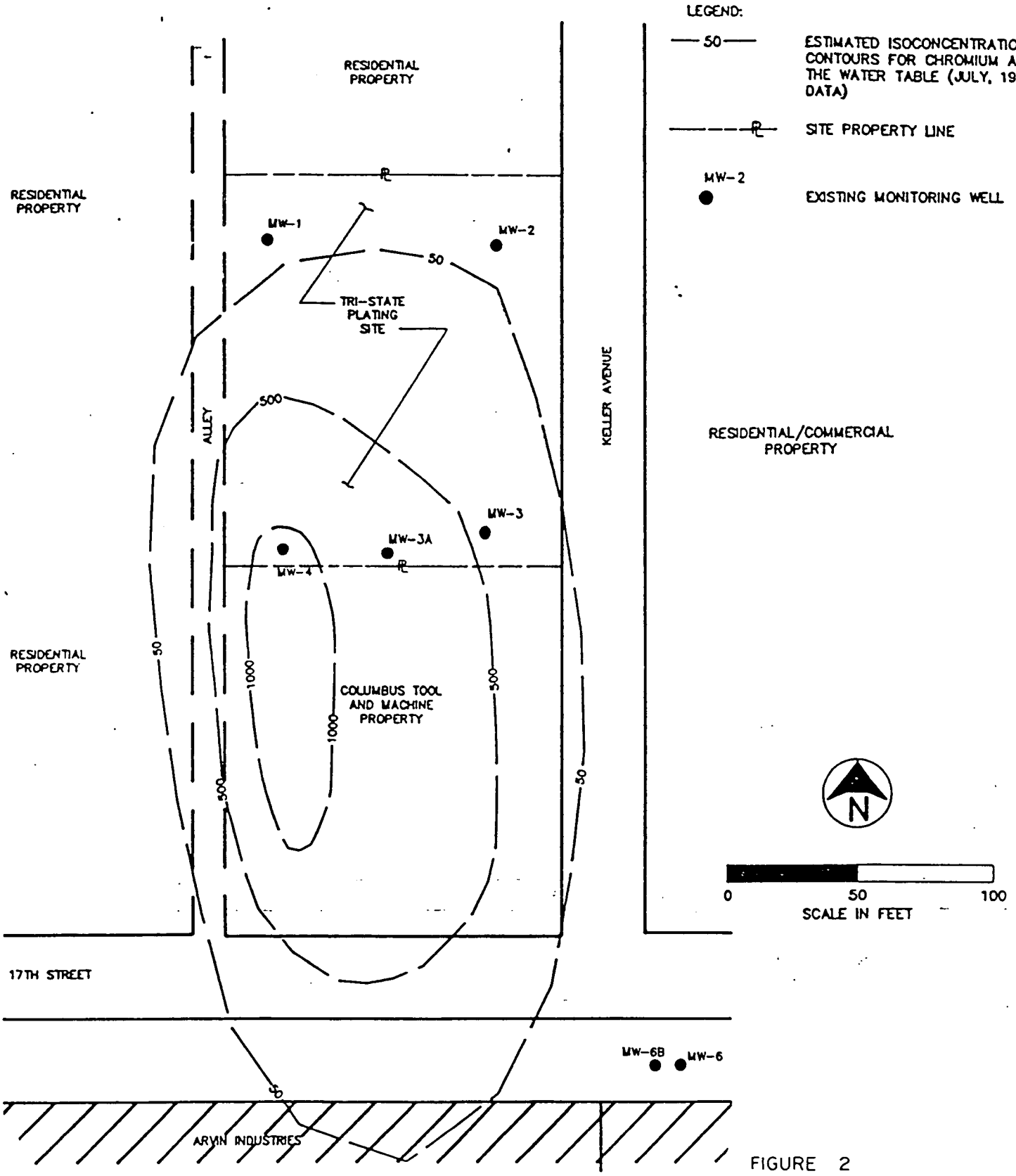


FIGURE 2
ESTIMATED CHROMIUM CONCENTRATIONS
TRI-STATE PLATING SITE

the alternatives considered by the U.S. EPA, describe the U.S. EPA's proposed remedy as outlined in the Proposed Plan, and to solicit comments from the public. Public comments and response to the comments are contained in the Responsiveness Summary (Appendix 2.)

4. SUMMARY OF CURRENT SITE CONDITIONS AND SITE RISKS

SOILS

U.S. EPA found that contamination concentrations in soil samples from most areas on the site were substantially reduced over previous levels after completion of the removal activities and were close to the natural range for these chemicals. Low levels of inorganic compounds such as chromium, cadmium, lead, and zinc were still present in subsurface soils in the northern, western, and southern boundaries of the site (Table 1). The low levels found during the Remedial Investigation indicated that the previous removal actions were successful in eliminating the potential threat to public health posed by contaminated surface soils. According to the U.S. EPA's Public Health/Environmental Assessment, the levels of possible contaminant exposure were found to be extremely low and do not pose a threat to health. The low levels of soil contamination remaining in the saturated zone, approximately 20 feet below the ground surface, do not represent a significant threat. In addition, since the source of contamination in the unsaturated zone has been removed, the contaminant levels in the saturated zone should diminish with time as the groundwater flows through the saturated soil. A summary of the site risks are presented in Table 2.

GROUNDWATER

Groundwater contamination investigations at the Tri-State Plating Site have been focused to characterize the plume of chromium and hexavalent chromium contamination discovered during the RI. These investigations have concluded that no adverse health risks are posed by the contaminant plume to the municipal wellfield, or the industrial users located downgradient of the site. There are also no known private drinking water wells in the vicinity of the site at this time. However, there are risks present that future residential use of groundwater in the affected area will result in the ingestion of levels of chromium that pose unacceptable health risks. A summary of these risks are presented in Table 2. The plume as identified during the RI investigation is shown in Figure 2.

It should be noted that the ERA groundwater pump testing and verification sampling completed in December 1989 provided data indicating that the contaminant plume may have changed since its characterization in the Remedial Investigation/Feasibility Study as shown in Figure 2. As of the last sampling event, the chromium concentrations in wells on site have dropped below federal and state water quality standards except in the area of Monitoring Well 6 downgradient of the site. This may suggest one of three possible scenarios:

TABLE I
TRI-STATE PLATING

SUMMARY OF CONTAMINANTS IN SOILS AND GROUNDWATER REMAINING ON-SITE

SOILS

CONTAMINANT	MAXIMUM CONCENTRATION	GEOMETRIC MEAN CONCENTRATION
POST-ERA (2)		
Chromium	195 mg/kg	14 mg/kg
Cadmium	79 mg/kg	1 mg/kg
Lead	40 mg/kg	6 mg/kg
Zinc	59 mg/kg	24 mg/kg

GROUNDWATER

PRE-ERA (1)	MAXIMUM CONCENTRATION	GEOMETRIC MEAN CONCENTRATION
Chromium	1800 ug/l	57 ug/l
Cyanide	55 ug/l	6 ug/l
Nickel	26 ug/l	7 ug/l
POST-ERA (2)		
Chromium	1154 ug/l	31 ug/l

(1) Prior to Expedited Response Action (ERA)
(2) After completion of the Expedited Response Action (ERA)

- The ERA cleanup and groundwater pumping test temporarily modified the levels of contamination and/or configuration of the plume and it will eventually return to its original state as presented in Figure 2;

- The entire plume has actually migrated along the direction of the groundwater flow and has now just reached Monitoring Well 6; or

- The plume has migrated to Monitoring Well 6 and the ERA activities have cleaned up the majority of the plume located at the site.

The scenario that is accurate is currently unknown and once resolved may have some impact on the implementation of the proposed alternative presented later in this document. U.S. EPA will choose a remedial action which will address any risks the contaminant plume poses to future residential use of the site. Prior to developing the design of the remedial action, U.S. EPA will conduct a pre-design investigation to determine which of the above scenarios is correct. This pre-design investigation will determine the location and extent of the contamination plume to be addressed by the final remedial action chosen for the site.

5. DESCRIPTIONS OF THE REMEDIAL ALTERNATIVES

Remedial Alternative 1: No Action

- No action

Remedial Alternative 1 proposes that no further action be taken at the Tri-State site. U.S. EPA policy requires consideration of a no action alternative at all Superfund sites to serve as a basis of comparison for other remedial alternatives. Under the no action alternative, it is expected that groundwater contamination would decrease naturally over time.

Remedial Alternative 2: Groundwater and Surface Water Monitoring

- Monitoring groundwater quality and contaminant migration

- Monitoring surface-water quality

- Restricting future groundwater use

- Conducting a public education program

- Re-evaluating site conditions every five years until cleanup levels are reached

Under this alternative, U.S. EPA would continue to monitor groundwater quality and contaminant migration until federal and state water quality standards are met. The monitoring program would involve sampling and

TABLE 2

SUMMARY OF RISKS
TRI-STATE PLATING SITE

Scenario	Total Upperbound Lifetime Excess Cancer Risks		Hazard Index	
	Average	Plausible Maximum	Average	Plausible Maximum
Current Land-Use Scenario				
Direct Contact with Surface Soil	NC (a)	NC	<1	<1
Future Land-Use Scenarios				
Direct Contact with Subsurface Soil	NC	NC	<1	<1
Ingestion of Groundwater - Residents On-Site				
Pre-ERA conditions (b)	NC	NC	<1	10
Post-ERA conditions	NC	NC	<1	7
Inhalation of Subsurface Soil - Construction Workers	3E-07	2E-06	NC	NC

(a) NC = Not calculated. Chemicals of potential concern do not exhibit adverse effects in this category for this exposure scenario.

(b) ERA refers to the Expedited Response Action which consisted of removal of contaminated soils and buildings.

analyzing groundwater from selected existing monitoring wells and any new monitoring wells determined to be required after the pre-design activities. In addition, U.S. EPA would monitor surface-water quality in Haw Creek twice a year until federal and state water quality standards are met. Surface and groundwater monitoring would cease three years after groundwater contamination levels meet federal and state water quality and health-based standards.

Under Alternative 2, U.S. EPA also would place restrictions on the future use of groundwater as a drinking-water supply for all properties within potentially contaminated areas. Residents near the site would be required to use the municipal water supply and the installation of new wells would be restricted. In addition, U.S. EPA would conduct a public education program to ensure public awareness of the potential hazards associated with drinking groundwater from contaminated wells.

U.S. EPA would conduct a review of site conditions every five years to determine whether changes in contamination levels or migration of groundwater off the site warrant a change in the activities conducted under this alternative. As part of the review process, U.S. EPA would consider comments or complaints received from the public concerning the site and the monitoring program.

U.S. EPA estimates that Alternative 2 would take one year to implement and would cost approximately $294,000.

The following ARARS would be complied with if this alternative is selected; 40 CFR 264 Subpart F, 40 CFR 141.11, Indiana Standards 327 IAC 2-1-6 and 2-1-7, 29 CFR 1910, 40 CFR 261, 40 CFR 264, 40 CFR 29, and 329 IAC 3-20. For a more detailed description of these ARARS, please refer to Appendix 1 of the Record of Decision.

Remedial Alternative 3: Groundwater Extraction and Discharge to the Columbus Publicly Owned Treatment Works (POTW)

- Monitoring groundwater quality and contamination migration on a quarterly basis
- Monitoring surface-water quality on a quarterly basis
- Restricting future groundwater use until ARARs are achieved
- Conducting a public education program
- Re-evaluating site conditions every five years until cleanup levels are achieved
- Installing two additional extraction wells and extracting groundwater
- Constructing a discharge pipeline to the Columbus sewer system

- Treating contaminated groundwater at the Columbus POTW
- Installating a fence around a portion of the site

Alternative 3 includes all the activities in Alternative 2 in addition to extracting and treating contaminated groundwater. Under Alternative 3, U.S. EPA would use an existing extracting well and install two new extraction wells to pump contaminated groundwater to the Columbus sewer system for discharge to the Columbus POTW. Prior to discharge to the Columbus POTW, the extracted groundwater will be monitored for selected parameters to assure compliance with all federal, state and/or local requirements. Groundwater from the site would be treated at the Columbus POTW and discharged to the East Fork of the White River.

Groundwater would be extracted until contamination levels meet state and federal standards. U.S. EPA would also construct a six-foot high chain link fence around a portion of the site to limit public access during the cleanup.

U.S. EPA anticipates that Alternative 3 would cost between $1,110,000 and $1,115,00 and take 2-10 years to complete, depending on the rate at which groundwater is pumped from the site.

The following ARARs would be complied with if this Alternative is selected: 40 CFR 264 Subpart F, 40 CFR 403, 40 CFR 141.11, 40 CFR 141.50, 40 CFR 50, 327 IAC 2-1-6 and 2-1-7, 29 CFR 1910, 40 CFR 261, 40 CFR 264, 40 CFR 403, 40 CFR 29, 329 IAC 3, 329 IAC 3-20, 310 IAC 16, 327 IAC 5 Rules 1-10 and 11-15, 329 IAC 3-45, and 326 IAC 6-4. For a more detailed description of these ARARs, please refer to Appendix 1 of the Record of Decision.

Remedial Alternative 4: **Groundwater Extraction, On-site Treatment, and Discharge to Haw Creek**

- Monitoring groundwater quality and contamination migration
- Monitoring surface-water quality
- Restricting future groundwater use until ARARs are achieved
- Conducting a public education program
- Re-evaluating site conditions every five years until cleanup levels are reached
- Installing two new extraction wells and extracting groundwater
- Constructing a discharge pipeline to Haw Creek
- Treating contaminated groundwater in an on-site treatment plant and discharging treated groundwater to Haw Creek
- Installing a fence around portions of the site

Alternative 4 includes all the components of Alternative 3. The primary difference between the two alternatives is that Alternative 3 uses the Columbus POTW for groundwater treatment and Alternative 4 uses a temporary on-site treatment plant. Under Alternative 4, groundwater would be collected from three extraction wells and pumped to a temporary on-site treatment plant using electrochemical techniques to change hexavalent chromium, a hazardous man-made material found at the site, into trivalent chromium, a relatively harmless natural material. The trivalent chromium would then be removed from the water through the use of common water treatment chemicals. Treated groundwater would then be discharged to Haw Creek.

Groundwater would be extracted for treatment until contamination levels meet state and federal water quality standards. When the cleanup is complete, the on-site treatment plant would be dismantled and removed.

U.S. EPA estimates that Alternative 4 would cost between $1,552,000 and $2,593,000 and take 2-10 years to complete, depending on the rate at which groundwater is pumped from the site.

The following ARARs would be complied with if this alternative is selected: 40 CFR 264 Subpart F, 40 CFR 122, 40 CFR 141.11, 40 CFR 141.50, 40 CFR 50, 330 IAC 1-1-6, 327 IAC 5-1-1, 29 CFR 1910, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 268, 40 CFR 29, 320 IAC-4, 327 IAC 3-1, 329 IAC 3-21-2, 329 IAC 3-20, 329 IAC 3-45, 310 IAC 16 and 325 IAC 6-4. For a more detailed description of these ARARs, please refer to Appendix 1 of the Record of Decision.

6. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Comparisons of the differences are presented qualitatively, identifying substantive differences between alternatives. These comparisons are based on the relative expected performance of each alternative to the evaluation criteria presented below:

- Overall protection of human health and the environment;
- Compliance with ARARs;
- Short-term effectiveness, including protection of the community, protection of remediation workers, environmental impacts, and the time required for implementation;
- Long-term effectiveness and permanence, including the magnitude of residual risks, the adequacy of controls, and the reliability of controls;
- Reduction of toxicity, mobility, or volume;
- Implementability, including technical feasibility, administrative feasibility, and availability of services;
- Cost, including total net present worth, capital costs, operating cost, and the cost for five-year reviews;
- State acceptance, and
- Community acceptance

1. Overall Protection of Human Health and the Environment

Of all the alternatives, Alternative 1 provides no overall protection, while the other three provide protection to human health and the environment.

Alternatives 2 provides protection by limiting human exposure to contaminants through administrative controls until the aquifer is restored by natural flushing and attenuation. This may not occur within the 30-year analysis period, based on groundwater modelling analysis, which indicate that 40 to 45 years may be necessary.

Alternatives 3 and 4 provide protection by expediting aquifer restoration through active groundwater extraction. During the extraction period, ranging from 2 to 10 years based on the pumping rate selected, human exposure is also prevented through administrative controls.

Alternatives 2, 3 and 4 provide similar levels of protection once the aquifer has been restored.

2. Compliance with ARARs

All technologies proposed for use in Alternatives 2 through 4 can be designed and implemented to satisfy all action-specific ARARs.

In terms of achieving chemical-specific ARARs for groundwater, Alternatives 3 and 4 will achieve them within the 30-year analysis period, while Alternatives 1 and 2 may not. It is estimated that Alternatives 1 and 2 may eventually achieve chemical-specific ARARs in groundwater between 40 and 45 years from the current time.

3. Short-Term Effectiveness

Because of the limited activities associated with the implementation of all of the alternatives, no significant impact to workers, the community, or the environment are expected as a result of any remedial actions.

Time to implement the alternative ranges from 6 months to 1 year after ROD signing for Alternatives 2 and 3, to 1 year to 1 1/2 years after ROD signing for Alternative 4.

4. Long-Term Effectiveness and Permanence

The magnitude of residual risks due to groundwater contamination is negligible at the completion of Alternatives 3 or 4. Since the groundwater will be considered "clean" when the chromium concentration in groundwater is less than 50 ug/l, the correspondence hazard index of about 0.3 indicates that there should be no adverse health effects at that time.

With Alternatives 1 and 2, the average and maximum chromium concentrations groundwater at the end of the 30-year analysis period should be substantially less than they currently are. The maximum chromium concentrations, however,

may still exceed the 50 ug/l MCL at that time, indicating that the hazard index associated with the groundwater consumption should be greater than 0.3. The exact value at that time cannot be accurately predicted.

Controls to ensure that the aquifer has been restored, consisting largely of groundwater sampling and chemical analyses, are expected to be adequate in all cases. All alternatives involving treatment will also be monitored, which will ensure that effluent requirements are being achieved. Institutional controls, included in Alternatives 2, 3 and 4, may be ineffective if they prove to be unenforceable and are disregarded by the general populace.

5. Reduction of Toxicity, Mobility, or Volume

Alternatives 1 and 2, which rely on natural flushing of attenuation to restore the aquifer, may result in overall reductions in toxicity and volume, but not through treatment processes, and not within any predictable period of time.

Alternatives 3 and 4, which utilize active extraction and treatment processes, will reduce mobility by withdrawing the contaminants prior to offsite transport. They will also reduce contaminant toxicity and volume through the treatment processes employed after groundwater extraction.

The groundwater extraction system is expected to remove between 1300 and 1400 lbs. of chromium from the aquifer, which represents 70 to 90 percent of the 1600 to 1800 lbs. of chromium estimated to be present.

Removal efficiencies for the POTW are expected to be in the range of 40 to 98 percent, based on an inflow concentration of 50 to 1800 ug/l of chromium, and an effluent concentration of 20 to 30 ug/l. Removal efficiencies of the onsite treatment plant may range from 0 to 97 percent, based on similar influent concentrations and an effluent concentration of about 50 ug/l.

6. Implementability

Alternative 2 is potentially the easiest to implement, consisting only of institutional controls and monitoring. Alternative 3 is somewhat more difficult than Alternative 2, but is still relatively simple to implement. Alternative 4, which includes onsite treatment, is the most difficult of the three to implement due to the treatment plant operational requirements. All alternatives use readily available and implementable technologies.

In terms of administrative feasibility, all alternatives require long-term coordination between the USEPA, IDEM, and the City of Columbus. Alternative 4 also requires cooperation with the Department of Transportation and other IDEM divisions responsible for surface waters and sludge disposal.

7. Cost

The total present worth of the alternatives vary from $294,000 for Alternative 2 to $2,593,000 for Alternative 4.

8. State Acceptance

The Indiana Department of Environmental Management concurs with the selected remedy.

9. Community Acceptance

Comments from the community regarding this alternative, and U.S. EPA's response to these comments, are provided in Appendix 2.

7. SELECTED REMEDY

Based on an evaluation of all four proposed remedial alternatives, U.S. EPA recommends Remedial Alternative 3 (Figure 3). U.S. EPA's Proposed Plan involves:

- Monitoring groundwater quality and contamination migration on a quarterly basis
- Monitoring surface-water quality on a quarterly basis
- Restricting future groundwater use until ARAR's are achieved
- Conducting a public education program
- Re-evaluating site conditions every five years until cleanup levels are achieved
- Installing two additional extraction wells and extracting groundwater
- Constructing a discharge pipeline to the Columbus sewer system
- Treating contaminated groundwater at the Columbus POTW
- Installing a fence around portions of the site

Remedial Alternative 3 involves extracting and treating contaminated groundwater using an existing extraction well and installing two additional extraction wells to a depth of 60 feet below the ground surface. Groundwater would be pumped from these wells, analyzed prior to discharge, then discharged via a pipeline to the Columbus POTW. The Columbus POTW, which is located at 327 Water Street, is operated by Columbus City Utilities. Treated water would then be discharged with all other waters from the Columbus POTW to the East Fork of the White River.

Groundwater would continue to be extracted for treatment until contamination levels meet state and federal water quality standards. It is estimated that this process would take between 2 and 10 years, depending on the rate at which groundwater is extracted from the ground. Due to the presence of equipment at the site during the cleanup, U.S. EPA would

construct a six foot high chain link fence around portions of the site to limit site access.

Alternative 3 also includes a public education program, to ensure public awareness of the potential hazards associated with drinking groundwater from contaminated wells. The public education program would include activities such as public meetings, fact sheets, and meetings with local authorities. Restrictions would also be placed on the future use of groundwater as a drinking-water supply until all contaminated groundwater has been successfully treated. Site conditions would be re-evaluated every five years until cleanup levels are reached, and groundwater and surface water sampling would be conducted continuously until three years after cleanup levels have been achieved.

U.S. EPA anticipates that implementing Remedial Alternative 3 would cost between $1,110,000 and $1,115,000, depending on the rate at which groundwater is pumped from the site. It is estimated that the groundwater extraction and treatment system could begin operating at the site within 6 to 12 months after the signing of the Record of Decision. Until this time, monitoring of the plume will begin as soon as possible. Remedial design work is currently scheduled to start as soon as the Record of Decision is approved by the U.S. EPA and IDEM.

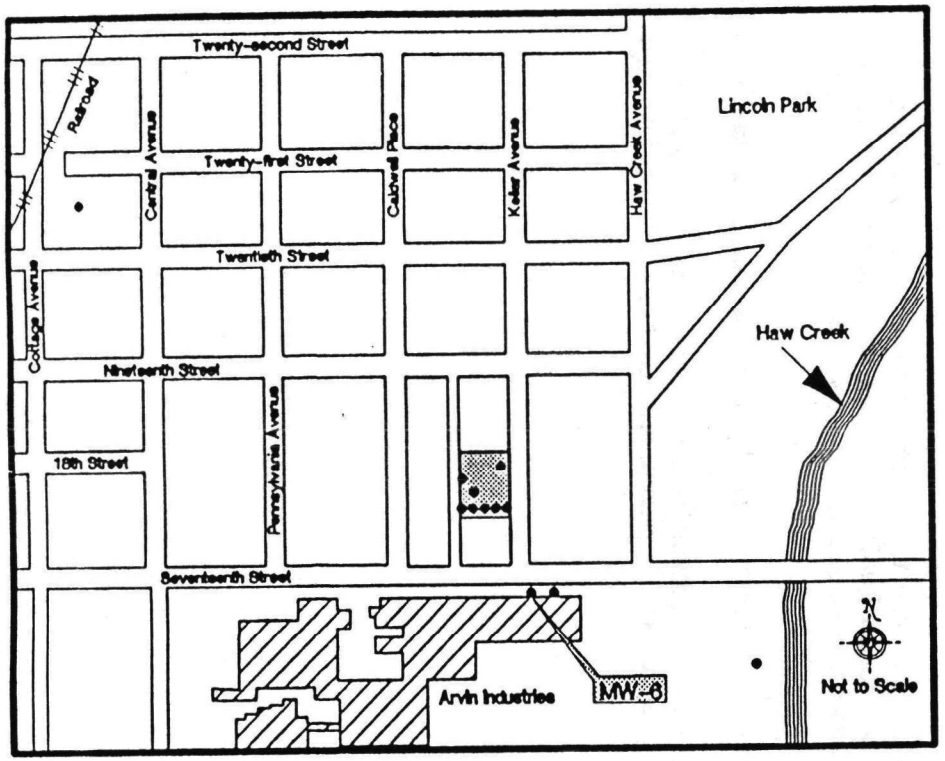
The results of the pre-design investigation to be performed may have some impact on the activities performed at the site under this Proposed Plan. In particular, depending on U.S. EPA and IDEM's determination of the location and extent of the groundwater contamination plume, modifications in the number and locations of groundwater extraction wells may be necessary, and the cost and time required for completion for this Proposed Plan may change. The final activities conducted under this Proposed Plan will, however, achieve all the same cleanup goals described above.

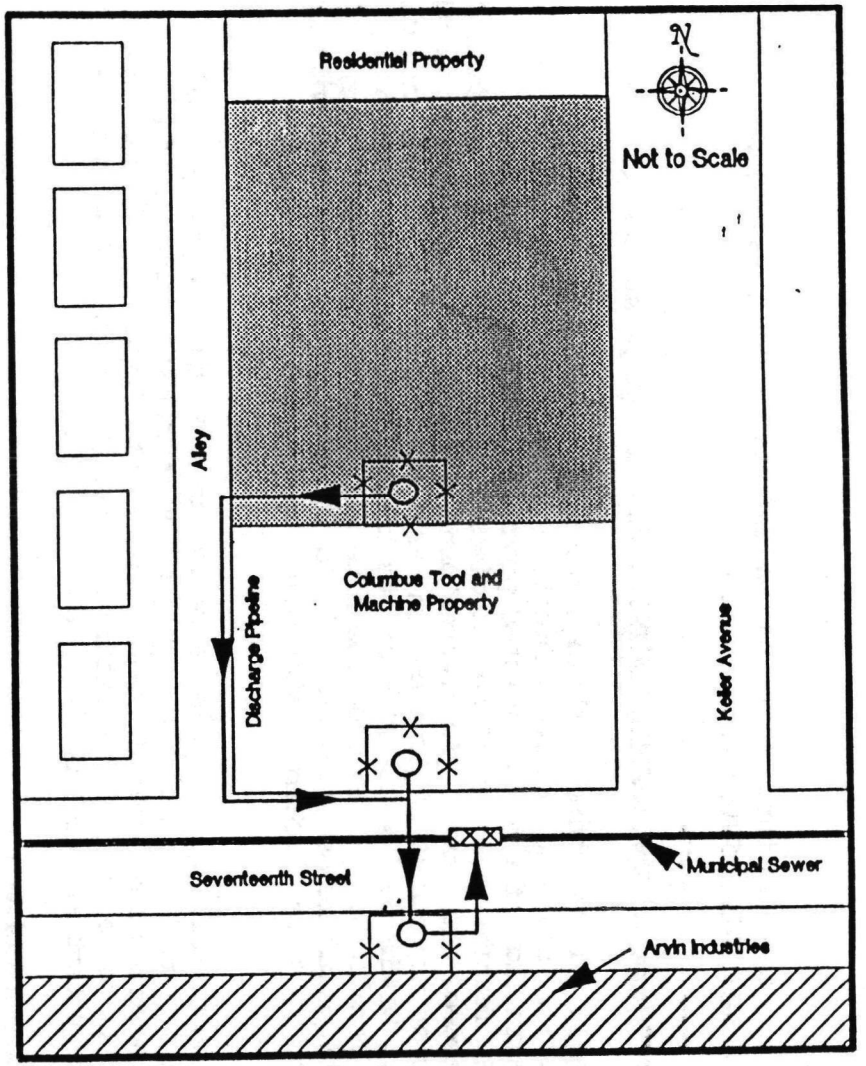
8. STATUTORY DETERMINATIONS

The U.S. EPA believes that the Selected Remedy satisfies the statutory requirements specified in Section 121 of CERCLA to protect human health and the environment; is cost effective; attains ARARs; utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable; and satisfies the preference for treatment as a principal element.

- **Protection of Human Health and the Environment**

The groundwater at the site currently poses an unacceptable health risk due to elevated levels of chromium and hexavalent chromium. The Selected Remedy, Alternative 3, will protect human health and the environment through extraction and treatment of the groundwater until this chromium levels in the unextracted groundwater are below 50 ppb. During remedial action, monitoring will continue to verify the effectiveness of the extraction system and assure that no further downgradient movement of the plume is occurring which may threaten other users or adversely affect Haw Creek. Further human exposure





Legend

- Tri-State Plating Superfund Site
- Residences
- Existing Ground-water Monitoring Wells
- Extraction Wells
- Proposed Fence
- Point of Discharge to Municipal Sewer

Figure 3: Proposed Plan

will also be prevented through the use of administrative controls, such as groundwater use restrictions.

- Attainment of Applicable, or Relevant and Appropriate Requirements

All ARAR's will be achieved through remedial action as proposed in Alternative 3. Based on previous investigations, the attainment of MCL's through extraction of the contaminated groundwater has been proved to be technically feasible. In addition, no discharges to the POTW will exceed or cause to exceed this facility's pretreatment standards or contribute to permit violations of any permit limitation (in particular; chromium, nickel, cyanide or copper). Discharges by the POTW of its treated water will be governed by its NPDES permit. Discharges from the site will also be reevaluated upon future POTW permit reissuances and, should it be necessary, treatment will be provided to the site discharge water prior to disposal to meet any new requirements.

Operating criteria for the discharge to the POTW will be developed to define conditions during which combined sewer overflow may occur. If a potential overflow may occur during a storm event, discharge from the site to the POTW will cease until notification is received from the POTW that the overflow or potential overflow is no longer a threat.

- Cost Effectiveness

Alternative 3, while more expensive than Alternative 2, provides a much higher degree of protection of human health and the environment by rapidly returning the aquifer to its most beneficial use as a safe drinking water supply.

- Utilization of Permanent Solutions and Preference for Treatment

By eliminating the source of the contamination during the ERA and extracting the contaminated groundwater, permanent restoration of the aquifer will be achieved.

APPENDIX I

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

TRI-STATE PLATING

APPENDIX I
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)
TRI-STATE PLATING SITE
FEASIBILITY STUDY REPORT

Law, Regulation, Policy, or Standard	Application	Alternative 1	2	3	4
CHEMICAL-SPECIFIC ARARs					
Resource Conservation and Recovery Act (RCRA)					
40 CFR 264 Subpart F Requirements for Groundwater	Groundwater should be cleaned up to background or drinking water standards or set at a level that is protective to public health or the environment. An appropriate ground water monitoring program must also be developed and implemented.	x	x	x	
Clean Water Act (CWA)					
40 CFR 122, 125 National Pollutant Discharge Elimination System (NPDES)	Discharges of extracted/treated groundwater will be subject to substantive requirements of the NPDES process if discharged to Haw Creek. NPDES is administered by the state.				x
40 CFR 403 Effluent Guidelines and Standards; Pretreatment Standards	Discharges of extracted/treated groundwater will be subject to pretreatment requirements if discharged to the POTW.			x	
Safe Drinking Water Act (SDWA)					
40 CFR 141.11 - Maximum Contaminant Levels (MCL)	Contaminated groundwater should be remediated such that MCLs should be attained.	x	x	x	
40 CFR 141.50 - Maximum Contaminant Level Goals (MCLG)	In the absence of other standards, MCLGs should be the groundwater cleanup standard to be attained.	x	x	x	

Law, Regulation, Policy, or Standard	Application	Alternative 1	2	3	4
CHEMICAL-SPECIFIC ARARs					
Clean Air Act (CAA)					
CAA Section 109 and 40 CFR 50 National Ambient Air Quality Standards	Fugitive dust from drilling would have to attain NAAQS for PM10.			x	x
State Regulations					
Indiana Water Quality Standards 327 IAC Current Standards	Sets water quality standards for the protection of various stream use designations. Discharges to Haw Creek must satisfy these standards				x
Industrial Pretreatment Program (NPDES) 327 IAC 5-1-1	If extracted treated groundwater is to be discharged to Haw Creek, NPDES discharge requirements are applicable. Numerical discharge requirements will have to be set.				x
Indiana Water Quality Standards 327 IAC 2-1-6, 2-1-7 as amended	Sets water quality standards for underground waters of the site, and for the protection of various stream use designations. Underground standards may set ARARs for cleanup; surface water standards applicable to discharge to Haw Creek.	x	x	x	
Local Requirements					
Columbus Control Authority Regulations	If extracted treated groundwater is to be discharged to the local POTW, pretreatment requirements will have to be met.			x	

Law, Regulation, Policy, or Standard	Application	Alternative 1	2	3	4
ACTION-SPECIFIC ARARs					
Occupational Safety and Health Act (OSHA)					
29 CFR 1910: General standards for worker protection	Worker safety for construction and operation of remedial action	x	x	x	x
29 CFR 1910: Regulations for workers involved in hazardous waste operations.	Worker safety for construction and operation of remedial action	x	x	x	x
Resource Conservation and Recovery Act (RCRA)					
40 CFR 261: Definition and identification of hazardous waste	Definition and identification of waste material as hazardous		x	x	x
40 CFR 262: Standards for generators of hazardous waste	Generator requirements include identification of waste generation activity, obtaining EPA ID number, record-keeping, and use of uniform national manifest				x
40 CFR 263: Standards for Transport of Hazardous Waste	The transport of hazardous waste is subject to requirements including DOT regulations, manifesting, record-keeping, and discharge cleanup				x
40 CFR 264: Standards for Treatment of Hazardous Waste	Establishes regulations for treatment, storage, and disposal of hazardous wastes. Includes groundwater monitoring and groundwater protection standards.		x	x	x
40 CFR 268: Land disposal restrictions	Treatment plant sludge subject to the treatment standards set forth by this regulation.				x

Law, Regulation, Policy, or Standard	Application	Alternative 1	2	3	4
ACTION-SPECIFIC ARARs					
Clean Water Act (CWA)					
40 CFR 122, 125 National Pollutant Discharge Elimination System (NPDES)	Discharges to surface water (Haw Creek) must satisfy the appropriate discharge requirements. Program administered by the state.				x
40 CFR 403 Effluent Guidelines and Standards; Pretreatment Standards	Discharges to the POTW must satisfy pretreatment standards.			x	
Intergovernmental Review of Federal Programs Executive Order 12372					
40 CFR 29	State and local coordination and review of proposed EPA-assisted projects.	x	x	x	x
State Regulations					
Indiana Hazardous Waste Management Permit Program and Related Hazardous Waste Management Requirements 329 IAC Article 3	Rules cover the regulations for identification of hazardous waste and standards for generators.			x	x
327 IAC Article 3 Wastewater Treatment Facilities; Issuance of Permits; Construction and Permit Requirements	Construction of onsite treatment plant.				x
329 IAC 3-21-2 Closure Performance Standards	Closure and post-closure care standards apply to closure of onsite treatment plant				x
329 IAC 3-20 Existing Hazardous Waste Facility Standards: Groundwater Monitoring	Defines requirements for groundwater monitoring program		x	x	x
329 IAC 3-45 Final (State) Permitted Facility Standards; Groundwater Protection	Defines protection standards for groundwater applicable to owners and operators of hazardous waste facilities			x	x

Law, Regulation, Policy, or Standard	Application	Alternative 1	2	3	4
ACTION-SPECIFIC ARARs					
327 IAC Article 5; Industrial Wastewater Pretreatment Programs (NPDES) Rules 1 - 10	Discharges to Haw Creek must comply with specific requirements for concentrations of specific compounds in discharge.				x
327 IAC 5 Rules 11 - 15 (Pretreatment Standards)	Discharge to POTW must not cause pass-through, interference, violation of specific prohibitions, or violations of local limitations of ordinances.			x	
Senate Enrolled Act 7 310 IAC 16	Well construction and abandonment requirements.			x	x
Indiana Air Pollution Control Board, Rule 326 IAC 6-4	Requires every available precaution to be taken during construction to minimize fugitive dust emissions.			x	x

APPENDIX 2

RESPONSIVENESS SUMMARY

TRI-STATE PLATING

APPENDIX 2

RESPONSIVENESS SUMMARY
TRI-STATE PLATING
COLUMBUS, INDIANA

I. RESPONSIVENESS SUMMARY OVERVIEW

In accordance with CERCLA Section 117, a public comment period was held from February 1, 1990 to March 1, 1990 to allow interested parties an opportunity to comment on the U.S. EPA Feasibility Study and Proposed Plan for the Tri-State Plating Site. On February 15, 1990 the U.S. EPA also held a public meeting in Columbus, Indiana to present the Proposed Plan, and to answer questions and accept comments from the public.

The U.S. EPA has not received any comments from the public concerning Tri-State Plating during either the public meeting or during the public comment period.

APPENDIX 3

ADMINISTRATIVE RECORD INDEX

TRI-STATE PLATING

Not included.