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Superfund Record of Decision:

Auto Ion Chemicals, MI

50272-101

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

Auto Ion Chemicals site is a former plating waste treatment and disposal facility occupying approximately 1.5 acres of vacant, fenced land in Kalamazoo, Michigan. The site is bounded to the north, east, and west by commercial/industrial facilities and lies adjacent to and within the floodplain of the Kalamazoo River. Ground water at the site is not currently used as a source of drinking water. From 1964 to 1973 the facility received chrome and cyanide plating waste. Heavy metals were precipitated from the plating waste nd deposited in an onsite lagoon, and wastewater was discharged to the sanitary sewer. Leaks and spills from storage tanks, lagoon seepage, and other site activities resulted in soil contamination. In 1983 EPA conducted an emergency surface removal and, in 1986, they demolished the site structures which housed tanks and storage facilities. This first operable unit represents a source control remedial action for the soil. A second operable unit will address ground water contamination. The primary contaminants of concern affecting the soil are organics including PAHs; and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes excavation and offsite stabilization of approximately 7,200 cubic yards of contaminated soil; offsite disposal of treated soil in an approved land disposal area; and replacement of the excavated soil with clean fill. The estimated capital cost for this remedial action is $3,332,988, with an estimated annual O&M cost of $5,900.

17. Document Analysis a. Descriptors

Record of Decision - Auto Ion Chemicals, MI
First Remedial Action
Contaminated Medium: soil
Key Contaminants: organics (PAHs), metals (arsenic, chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 55
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(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

UNITED STATED ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: November 22, 1989

SUBJECT: Transmittal of 4Q FY89 Record of Decision for Auto Ion, Kalamazoo, Michigan

FROM: Rita Cestaric RC
Remedial Project Manager

TO: Bill Hansen, Chief
Remedial Planning and Response Branch
Hazardous Site Control Division

Enclosed you will find the following:

1) One hard copy of the Record of Decision (ROD) for the Auto Ion Site, Kalamazoo, Michigan. Attached to the ROD is the Responsiveness Summary; and

2) A diskette which contains the ROD and the Responsiveness Summary for the site.

If you have any questions, please call me at FTS 353-6500.

Declaration for the Record of Decision

SITE NAME AND LOCATION

Auto Ion Chemicals Site
Kalamazoo, Michigan

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for soil remediation for the Auto Ion Chemicals site in Kalamazoo, Michigan, chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. This decision is based on the administrative record file for this site.

The State of Michigan concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare or the environment.

DESCRIPTION OF THE REMEDY

This operable unit is the first of two operable units for the site. This initial operable unit addresses the source of soil and groundwater contamination. The remedy addresses the principal threats at the site by removing and treating the contaminated soil. Treated soil will be disposed of off-site.

The major components of the remedy include:

- excavation and off-site treatment, via stabilization, of approximately 7200 cubic yards of contaminated soil;
- disposal of the treated soils in an appropriate off-site facility; and
- replacement of the excavated soil with clean fill.

A supplemental RI/FS report will be completed to identify the extent of groundwater contamination and to develop and evaluate appropriate remedial alternatives.

STATUTORY DETERMINATIONS

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 the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies 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 not result in hazardous substances remaining on-site above health-based levels, the 5-year review will not apply.

Valdas V. Adamkus
Regional Administrator

September 27th, 1989
Date

SITE NAME, LOCATION AND DESCRIPTION

The Auto Ion site is located at 74 Mills Street in a commercial/industrial area of Kalamazoo, Michigan (see figure 1). The site of the former plating waste, treatment and disposal facility occupies approximately 1.5 acres of vacant, fenced land adjacent to the Kalamazoo River. The land north of the site is used as an auto impound lot. An industrial paint facility operates to the west of the site. A railroad yard is to the east. The nearest residence is about 500 feet north of the site. As of the 1980 census, the population within a one mile radius was about 36,000.

Site relief is very flat and all of the buildings have been removed. A cement slab in the northeast portion of the site is the only notable feature remaining (see figure 2). The building which originally housed the plating waste treatment facility was located toward the center of the site. A lagoon area that received waste was located to the west of the former building. Tanks and storage facilities were located in the building (see figure 3).

Due to its proximity to the Kalamazoo River, the site is located in a flood plain. The average depth to the ground water is ten feet. Under normal conditions, ground water flow is towards the river in a southerly direction; however, due to the high permeability of the soil, the direction of ground water flow is variable and related to the water level fluctuations of the adjacent river. Ground water at the site is not currently used as a source of drinking water. Drinking water for the community is supplied from municipal wells. The nearest municipal well field is located approximately one mile north of the site in the opposite direction of usual ground water flow.

Surface water from the site drains to the Kalamazoo River and through direct run-off toward O'Neil Street. Site topography is shown in figure 4.

SITE HISTORY

The property at 74 Mills Street was originally used as an electrical generating station by the city of Kalamazoo from sometime during the 1940s until 1956, when Consumers Power purchased the plant. Shortly thereafter, the plant was closed and dismantled. In 1963, Consumers Power entered into a land contract with James Rooney, owner of Auto Ion Chemicals, Inc. In 1964, Rooney began company operations. The facility received chrome and cyanide plating waste. Treatment involved the precipitation of heavy metals from the plating waste and deposit into a lagoon. Waste water was discharged to the sanitary sewer. During operations, wastes were discharged to the site soils, sewers, and the Kalamazoo River. Poor storage practices were followed resulting in numerous spills and leaks.

The Auto Ion facility ceased active waste hauling operations in 1973, when its license to transport, store, and treat liquid industrial waste was not renewed by the Water Resources Commission due to numerous violations. Contained and uncontained liquid waste was left in the building and on the grounds at that time.

The state obtained title to the property in 1981 because of Auto Ion's failure to pay taxes. In 1983, an Emergency Action Plan was prepared by EPA's Technical Assistance Team (TAT). In accordance with the Emergency Action Plan, a surface removal was conducted by OH-Materials, Inc. This was followed, in 1986, by demolition of the buildings on site. In addition to James Rooney, approximately sixty potentially responsible parties (PRPs) had been identified through invoices from Auto Ion's business records. Twenty-three PRPs signed an Administrative Order in 1987 to do the Remedial Investigation/Feasibility Study. Special notice letters to conduct the Remedial Design/Remedial Action were sent on August 21, 1989 to the identified PRPs.

COMMUNITY PARTICIPATION

Since Auto Ion is in an industrial area, there has been very little community interest in the site. A public meeting to announce plans for start of the RI was held in September, 1987. The RI/FS and Proposed Plan for the Auto Ion site were released to the public in August, 1989. These two documents were made available to the public in both the administrative record and the information repositories maintained at the Kalamazoo City Hall and the Kalamazoo Public Library. The notice of availability for these two documents was published in the Kalamazoo Gazette on August 3, 1989. A public comment period was held from August 3, 1989 through September 1, 1989. In addition, a public meeting was held on August 8, 1989. At this meeting, representatives from EPA and the Michigan Department of Natural Resources (MDNR) received public comments and answered questions about problems at the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision.

This decision document presents the selected remedial action for the Auto Ion site in Kalamazoo, Michigan, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Law of 1980, CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, SARA, and to the extent practicable, the National Contingency Plan (NCP). The decision for this site is based on the Administrative Record.

SCOPE AND ROLE OF OPERABLE UNIT

The work at the Auto Ion site has been divided into two operable units (OUs). These are:

- OU One: Source control remedial action for the soil
- OU Two: Remedial action for the ground water

This ROD outlines U.S. EPA's preferred alternative for OU One. This response action is a source control operable unit. This operable unit is being implemented to protect public health and the environment by preventing any type of direct contact with contaminated soil and controlling migration of contamination into the ground water. The operable unit addresses known areas of surface and subsurface contamination in the site soils. Confirmatory sampling at the site is required to ensure that all areas of contamination are being addressed. The OU is consistent with future site work.

An FS is planned to determine the need for and type of ground water remediation. The result of this study, and its recommendations, will be described in a future operable unit Record of Decision.

SUMMARY OF SITE CHARACTERISTICS

In June, 1989, a Remedial Investigation report was completed under the guidance and oversight of EPA and MDNR. The report summarized all ground water, surface water, sediment, and soil analytical data that had been collected. This report should be consulted for a more thorough description of site characteristics.

SOIL

Several source areas of contamination were identified: the site of the former facility structure and the area of the former aboveground storage tanks and seepage lagoons. Analytical results of the soil samples indicate the presence of elevated concentrations of several heavy metals with respect to average regional background concentrations. The heavy metals of concern include arsenic, chromium, and lead. These are primarily localized in the northwestern portion of the property. Several polycyclic aromatic hydrocarbons (PAHs) were found in the soils, including benzo(b)fluoranthene, benzo(a)pyrene, and chrysene. The range of concentrations for these contaminants in the soil is:

Chemical	Concentration range (mg/kg)
Arsenic	Below detection limits (BDL) - 80
Chromium	7.50 - 3521.00
Lead	BDL - 928.0
Benzo(b)fluoranthene	BDL - 2.50
Benzo(a)pyrene	BDL - 0.44
Chrysene	BDL - 1.40

The soils are generally not contaminated below the surface of the water table, which is at approximately 10 feet.

The soil contains constituents of wastewater treatment sludges from electroplating operations which, when excavated and removed outside the area of contamination, are Resource Conservation and Recovery Act, RCRA, hazardous waste. This type of waste is given U.S. EPA hazardous waste code F006, and is described in 40 CFR 261 as:

"Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum."

Under the mixture rule, 40 CFR 261.3 (a)(2), when any solid waste and a listed hazardous waste are mixed, the entire mixture is a listed hazardous waste. Therefore, the contaminants in the soil are considered RCRA hazardous waste.

Summaries of analytical results for soil samples are given in tables 1 and 2.

GROUND WATER

One round of ground water samples was collected in November, 1987 and a second round was collected in April, 1988. Each round of ground water sampling produced different analytical results. This may be explained by the fact that during normal conditions the ground water flows toward the river in a southwesterly direction, however, the high hydraulic conductivity of the aquifer allows for a quick response for precipitation events. Such a response causes a reversal in the ground water flow to the northwesterly direction and would explain the different analytical results. Monitoring well sampling indicated that Safe Drinking Water Act Maximum Contaminant Levels (MCLs) were exceeded for the following contaminants barium, cadmium, chromium, lead, 1,2 dichloroethane, trichloroethane, and vinyl chloride.

SEDIMENTS

A number of metals and PAHs were detected in the sediment samples. The PAHs were detected with greatest frequency and magnitude approximately adjacent to and slightly downstream of the site. Metals were most prevalent adjacent to and approximately one-half mile downstream of the site. The range of concentrations of chromium and PAHs in sediment samples taken adjacent to and downstream of the site is:

Chemical	Concentration Range(mg/kg)
Chromium	12-113
Benzo(a)pyrene	BDL - 2.60
Benzo(b)fluoranthene	BDL - 2.10
Chrysene	BDL - 1.90

A complete summary of analytical results for sediment sampling is given in table 3.

SURFACE WATER

Surface water samples were taken from the Kalamazoo River. Cadmium, copper, lead, and nickel were detected in surface water samples collected downstream of the site at concentrations which exceed U.S. EPA Ambient Water Quality Criteria. The range of concentrations of these contaminants is;

Chemical	Concentration Range(mg/l)
Cadmium	.012 - .013
Copper	.032
Lead	.193 - .199
Nickel	.060 - .061

A complete summary of analytical results for surface water is given in table 4.

The river is classified as a 307 site (Michigan Public Act 307), which means that Auto Ion is on the State's list of hazardous waste sites. This portion of the Kalamazoo River is also included as part of the Kalamazoo River Superfund Site. It is anticipated that the sediments and surface water will be addressed as part of the Kalamazoo River cleanup.

SUMMARY OF SITE RISKS

The endangerment assessment was conducted to evaluate the risk to public health and the environment posed by the site and to assist in determining the proper level of remedial response. To define the risks posed to human health and the environment, the endangerment assessment examines the hazardous substances found at the site, the amounts of these substances, and the exposure pathways. The greatest risk present at the site is from the ground water contamination. The source of ground water contamination is the hazardous substances found in the soils at the site.

Arsenic is the hazardous substance posing the primary risk at the Auto Ion site. Chromium, lead, cyanides and polycyclic aromatic hydrocarbons (PAHs) are contaminants of concern also found at the site.

Health risks potentially posed by contaminants were qualitatively evaluated for the following exposure scenarios: ingestion of soil, inhalation of airborne soil particles, dermal contact with the soil, and ingestion of ground water. Carcinogenic risk calculations were performed for potential adult exposure. Cancer risks are not calculated for children since cancer is primarily a chronic disease of adulthood. If an exposed child remained in the area for his/her lifetime, the cancer risk to that individual would be approximately the equal to the cancer risk calculated for an adult in the same area. If an individual were exposed during childhood and then moved from the area, the excess lifetime cancer risk to that individual would be somewhere between zero and the risk associated with continued residence in the area.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g. 1.0×10^{-6}). An excess lifetime cancer risk of 1.0×10^{-6} indicates that, as an upper bound, an individual has a one in one million chance of developing cancer as a result of site related exposure to a carcinogen over a 70 year lifetime under the specific exposure conditions at the site.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). By adding the HQs for all contaminants within a medium or across all media to which a population may be reasonably exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. To be protective of public health and the environment, a hazard index greater than one is considered unacceptable.

As stated in the Federal Register, 53 Fed. Reg. at 51505, remediation goals that establish acceptable exposure levels that are protective of human health and the environment shall be developed considering the ARARs and the following:

"(1) For systematic toxicants, acceptable exposure levels shall present concentration levels to which the human population, including sensitive subgroups, is expected to be exposed without appreciable risk of significant adverse effect during a lifetime.

(2) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upperbound lifetime cancer risk of between 10^{-4} and 10^{-7} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or not sufficiently protective.

(3) Presence of multiple contaminants at a site or multiple pathways of exposure."

Therefore, U.S. EPA policy and guidance establishes a 10^{-6} point of departure risk level for known or suspected carcinogens and a hazard index not to exceed one.

The risks from the ground water and soil pathways are:

	Carcinogenic		Non-carcinogenic	
Pathway	Most Probable Case	Realistic Worst Case	Most Probable Case	Realistic Worst Case
Ground Water	1.68×10^{-3}	3.05×10^{-3}	24.9	33.3
Soil	7.6×10^{-5}	1.06×10^{-4}	18.6	22.1

Based on these risk levels, U.S. EPA has determined that actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Specific risk is calculated for each of the exposure scenarios under current and potential future conditions. These risks are added to develop a cumulative risk number for carcinogenic risks and chronic health hazards for each potentially affected population based on contaminants found at the site.

Dermal contact with on site soils was estimated by using the oral potency factors and oral acceptable intake chronic. Exposures for current conditions assume that contact with on-site soils will occur when trespassers are on site. Exposures for future conditions assume the development of the site into a residential area. Under neither the current conditions nor potential future conditions does the carcinogenic risk due to dermal contact exceed 10^{-6} or the hazard index exceed 1.0.

Risks via soil ingestion were calculated for both children and adults. Children were assumed to ingest 200 mg of soil per day; adults were assumed to ingest 100 mg of soil per day. Acceptable carcinogenic risk levels for soil ingestion were exceeded under both the most probable case and realistic worst case scenarios. These risks were induced primarily by arsenic and PAHs.

Acceptable carcinogenic risk levels for adults via inhalation were exceeded under both the most probable and realistic worst case scenarios. Arsenic posed the greatest risk.

Ground water at the Auto Ion site is not currently used as source of drinking water. Ground water ingestion under potential future conditions exceeded acceptable carcinogenic risk levels under both the most probable case and realistic worst case scenarios. The risk is induced primarily by arsenic, although a number of metals including cadmium, chromium, and lead and organics including vinyl chloride exceeded their MCLs.

Ground water contamination at the site may have an impact on the degraded water quality in the Kalamazoo River. Health risk based cleanup goals addressing soil and ground water exposure scenarios will be protective of human health and environmental exposures to Kalamazoo River surface water and sediments.

Table 5 gives the carcinogenic health risks under current and future conditions for each of the exposure pathways. Table 6 presents noncarcinogenic risks for these conditions.

CLEANUP LEVELS

This initial source control operable unit is being implemented to reduce the threat via soil ingestion as well as to reduce the potential for migration of the contamination to the ground water below the site.

The cleanup goals for OU One establish a total carcinogenic risk of 10^{-6} for soil situated above the ground water. This number falls within the 10^{-4} to 10^{-7} individual lifetime excess cancer risk, which is the standard used by EPA to comply with CERCLA's mandate to protect human health. Confirmatory background sampling shall be performed to further refine the target cleanup levels. If the additional background samples have a greater risk associated with them, the health risk based cleanup goal will be adjusted accordingly.

DESCRIPTION OF ALTERNATIVES

Alternatives for Operable Unit One, remediation of contaminated soil, were formulated to achieve the following goals:

- minimize the potential for direct contact with the contamination
- minimize the potential for migration of soil contaminants into the ground water

A comprehensive list of appropriate remedial technologies was identified for source control. These technologies were screened based on the characteristics of the site and the characteristics of the contaminants. Cost was used as a screening criteria only between alternative technologies providing similar degrees of protection and treatment. Technologies which satisfied the screening requirements were refined to form remedial action alternatives. The six alternatives developed are detailed below. The alternatives presented are numbered to correspond with the numbers in the RI/FS report. The source control alternatives for OU One are:

Alternative 1: No Action
Alternative 3: Stabilization/Capping
Alternative 4: Vadose Zone Excavation/Disposal
Alternative 5: Selected Vadose Zone Excavation/Disposal
Alternative 7: Vadose Zone Excavation/Stabilization/Disposal
Alternative 8: Selected Vadose Zone Excavation/Stabilization/Disposal

Alternative 1: No Action

Capital Cost: $0
Annual Operation and Maintenance (O&M) cost: $59,500
Time to Implement: None

The National Contingency Plan (NCP) requires that the "no action" alternative be considered through the detailed analysis. Under this alternative, the existing chain link fence would be inspected periodically in order to make any necessary repairs and warning signs would be posted on the fence. Periodic sampling and analysis would be performed to monitor environmental conditions in and around the site.

The no action alternative does not address the public health and environmental concerns at the site.

Alternative 3: Stabilization/Capping

Capital Cost: $1,857,597
Annual O&M: $70,980
Time to Implement: 10 months

The major features of this alternative involve excavation of all soils above the ground water that contain contaminants above target cleanup levels, treatment of the soil using a stabilization process, and replacement of stabilized soil on site followed by construction of a multi-layer capping system.

The entire site would be capped. The cap would be designed and constructed to promote drainage, minimize erosion of the cover, and minimize the migration of liquids through the underlying contaminated soil. The contaminant residuals that remain are the fixated mass of soil covered with an impermeable cap.

Annual O&M will consist of site inspections, ground water sampling and analysis, reports and maintenance of the cap.

The remedial objective of reducing the risks due to contact with the contaminants will have been met, however there are long term uncertainties regarding potential damage to the capping system during flooding events.

Alternative 4: Vadose Zone Excavation/Disposal

Capital Cost: $3,755,248
Annual O&M: $5,900
Time to Implement: 10 months

Alternative 4 consists of excavation of all soil on site situated above the water table and off-site disposal in an approved land disposal cell. The volume of soil excavated under this alternative is approximately 16,800 cubic yards of soil. The excavated portions of the site would be backfilled using clean, imported gravel or soil. At the completion of the remedial action, health risks posed by the soil would be no greater than the selected cleanup level.

Annual O&M would consist of site inspections.

This alternative provides desired levels of protection at the site, but does not satisfy EPA's policy giving preference to permanent solutions or alternative treatment methods. In addition, off-site disposal of waste of this type, classified as F006, without prior treatment has been prohibited as of August 8, 1988 by 40 CFR 268, RCRA land disposal restrictions, unless EPA can certify that no treatment capacity is available.

Alternative 5: Selected Vadose Zone Excavation/Disposal

Capital Cost: $1,627,158
Annual O&M: $5,900
Time to Implement: 10 months

This alternative consists of excavation of approximately 7,200 cubic yards of contaminated soil from hot spots found on site and off-site disposal in an approved land disposal cell. The excavated portions of the site will be backfilled using clean, imported soil or gravel.

The direct contact threat would be eliminated along with removal of the source of ground and surface water inspections.

Annual O&M would consist of site inspections.

This alternative provides desired levels of protection at the site. Alternative 5 does not satisfy RCRA land disposal restrictions.

Alternative 7: Vadose Zone Excavation/Stabilization/Disposal

Capital Cost: $7,797,179
Annual O&M: $5,900
Time to Implement: 10 months

Alternative 7 consists of excavation of 16,800 cubic yards of soil, stabilization, and off-site disposal in a permitted facility. All soil located within the site boundaries and situated above the ground water table will be excavated, treated, and disposed of off-site. The excavated soils would be treated to meet RCRA land disposal restrictions for soils contaminated with F006 wastes prior to off-site disposal. The excavated portions of the site would be backfilled using clean, imported gravel or soil. At the completion of the remedial action, health risks posed by the soils would be no greater than the selected cleanup level.

Annual operation and maintenance would consist of site inspections.

Alternative 8: Selected Vadose Zone Excavation/Stabilization/Disposal

Capital Cost: $3,332,988
Annual O&M: $5,900
Time to Implement: 10 months

Alternative 8 is a combination of the excavation, stabilization, and off-site land disposal technologies. Under this alternative, soils located within the site boundaries posing a health risk greater than $1.0x10^{-6}$ would be excavated, treated, and shipped to an approved land disposal cell for off-site disposal.

The excavated soils would be treated to meet RCRA land disposal restrictions for soil contaminated with F006 wastes prior to off-site disposal. At the completion of the remedial action, health risks posed by the soil would be no greater than the selected cleanup level.

Annual operation and maintenance would consist of site inspections.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The six alternatives assembled were evaluated based on the following nine criteria:

- Overall protection of human health and the environment
- Compliance with all federal and state applicable and relevant or appropriate requirements
- Reduction of toxicity, mobility, or volume
- Short term effectiveness
- Long term effectiveness
- Implementability
- Cost
- Community acceptance
- State acceptance

A summary of the relative performance of the alternatives with respect to each of the nine criteria is provided in this section. Table 7 may also be consulted for a review of the comparative analysis.

OVERALL PROTECTION

Each of the alternatives with the exception of no action would provide protection of human health and the environment by eliminating, reducing, or controlling risk posed by potential exposure to contaminated soils at the site through treatment, engineering controls or institutional controls.

COMPLIANCE WITH ARARs

Alternatives 1 and 3 do not meet Michigan or Federal requirements. The Federal regulation, 40 CFR 264.18, limits the placement of waste in a 100 year flood plain. The Michigan rule for location standards, MAC R 299.9603, specifies that exposures and enlargements of existing facilities shall not be located in a floodway.

Alternatives 4 and 5 involve excavation and placement of the waste in an off-site land disposal cell without treatment. Off-site disposal of this type of waste, given RCRA hazardous waste code F006, without prior treatment has been prohibited as of August 8, 1988, by 40 CFR 268< RCRA land disposal restrictions.

Alternatives 7 and 8 which involve excavation, treatment and off-site disposal, would comply with all Federal and State applicable and relevant or appropriate requirements. A summary of ARARs is given in table 8.

LONG TERM EFFECTIVENESS AND PERMANENCE

Alternatives 7 and 8 treat the metals in the contaminated soils. The treatment will reduce the mobility of some of the inorganic contaminants present in the excavated soils. The no action alternative produces no reduction in public health risks. Alternatives 3,4,7,and 8 provide for elimination of direct contact and inhalation/ingestion via construction of physical barriers or source removal. Since the site is in a flood plain, under alternative 3 there exists the potential for damage to the capping system during flooding events which would make the cap ineffective.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS

Neither the toxicity nor the volume of the contaminants is reduced under any of the alternatives. Reduced mobility would be achieved under alternatives 7 and 8. Under these alternatives, the reduced mobility is due to the physical and chemical bonds formed between some of the inorganics and the stabilization reagent. However, the volume of the contaminated soil and reagent mixture will be greater than the volume of the soils before treatment.

SHORT TERM EFFECTIVENESS

Each of the alternatives involving active site work poses potential risk due to exposing and distributing contaminated soil. These risks can be controlled by use of :

- water application for dust control
- sediment barriers and containment for run off control
- personnel protective equipment for controlling exposures of site workers

None of the alternatives present appreciable risks to individuals away from immediate construction areas.

IMPLEMENTABILITY

Each of the alternatives can be implemented.

COST

There are no construction costs associated with alternative 1. The costs associated with the other alternatives are:

- Alternative 3: $1,857,597
- Alternative 4: $3,755,248
- Alternative 5: $1,672,158
- Alternative 7: $7,797,179
- Alternative 8; $3,332,988

STATE ACCEPTANCE

The State of Michigan supports EPA's preferred alternative.

COMMUNITY ACCEPTANCE

Two public meetings have been held for the site. The first was held on September 24, 1987 to announce plans to conduct an RI/FS for the site and to answer citizen's questions. The second meeting was held on August 8, 1989 to present EPA's preferred alternative and accept public comment on the preferred alternative.

Community interest in the site has been very low. This is primarily due to the site's location in an industrial area. Two comments were received from the community on the Proposed Plan. These are presented in the Responsiveness Summary section of the ROD, along with comments submitted by the PRPs.

THE SELECTED REMEDY

Based upon the consideration of the requirements of CERCLA, the detailed analysis of alternatives, and public comments, the EPA and the MDNR have determined that alternative 8: selected vadose zone excavation/stabilization/disposal is the most appropriate remedy for the Auto Ion site in Kalamazoo, Michigan.

Approximately 7200 cubic yards of contaminated soil hot spots will be excavated from the site. The soil will be treated using a stabilization technology. Treatability studies will be conducted to determine the most suitable stabilization/fixation agents for the contaminated soil at the site. The treated soils must pass the Toxicity Characteristic Leaching Procedure (TCLP) prior to off-site disposal in an approved land disposal cell.

Confirmational sampling of the soil on site is required to ensure that all areas of contamination are being addressed. The confirmational samples will test soil for inorganics and organics. Areas of soil contamination posing an excess lifetime cancer risk above cleanup levels will be excavated, treated, and disposed of off-site in accordance with the remedy outlined above.

REMEDIATION GOALS

The purpose of this response action is to control risks posed by contact with soils and to minimize migration of contaminants to ground water. Existing conditions at the site have been determined to pose an excess lifetime cancer risk of 3.1×10^{-3}. Action levels for contaminants in soil above the ground water table will be set to correspond with health risk based cleanup levels. The cleanup levels will be based on a site specific analysis of background soil samples. Several additional background soil samples, taken in the surrounding area, are required to confirm the health based risk level. If the additional background samples have a risk greater than 10^{-6} associated with them, the health risk based cleanup goal will be adjusted accordingly.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for the site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy must also be cost effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous waste as the principal element. The following sections discuss how the selected remedy meets these statutory requirements.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy protects human health and the environment through excavation of contaminated soil, stabilization of the soil, and off-site disposal of the soil in a RCRA permitted land disposal unit. Since no soil above the ground water table posing a cancer risk greater than health risk based cleanup levels will be left on site , the risk of exposure via soil ingestion and the migration of soil contamination into the ground and surface water is reduced. There are no short term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from this component of the remedy.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This selected remedy of excavation, stabilization, and off-site disposal will comply with all applicable or relevant and appropriate chemical, action, and location specific requirements (ARARs). The ARARs are presented below.

Action-specific ARARs:

RCRA generator standards in 40 CFR 262 and Michigan Act 64, Part 2, which set forth standards applicable to generators of hazardous waste.

RCRA transporter standards in 40 CFR 263 and Michigan Act 64, Part 2, which sets forth standards applicable to transporters of hazardous waste.

RCRA closure and post closure in 40 CFR 264 sets performance standards that apply to owners and operators of all hazardous waste management facilities for closure of the facility.

DOT rules for transport of hazardous materials, 40 CFR 107 and 171.1-171.5, which specifies procedures for packaging, labelling, manifesting and transporting hazardous materials.

OSHA general industry standards in 29 CFR 1910.120 which specify occupational safety and health standards for hazardous waste activities under CERCLA.

OSHA safety and health standards in 29 CFR 1926 which specify the 8 hour time weighted average concentration for various substances.

OSHA record keeping and reporting in 29 CFR 1904 which sets forth record keeping and reporting for employers.

Soil erosion and sedimentation control in Michigan Act 347, Rule 1704 which requires a soil erosion and sedimentation plan for any earth changes of one acre or more. also requires implementation of erosion and sedimentation control measures.

Chemical specific ARARs:

RCRA land disposal restrictions in 40 CFR 268 which sets forth prohibitions and restrictions on land disposal , including treatment standards for certain wastes.

Location specific ARARs:

Executive Order 11988 concerning floodplain management. This order requires action to be taken to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.

Michigan law, MAC R 299.9603, which specifies that expansions and enlargements of existing facilities shall not be located in a floodway.

COST EFFECTIVENESS

The selected remedy is cost effective. The capital cost for this remedy is approximately $3,332,988. The selected remedy effectively reduces the hazards posed by the contaminants at the site and is less than half of the cost involving excavation, stabilization and disposal of the entire volume of soil within the site boundaries and above the ground water table. The estimated cost is broken down into individual tasks in table 9.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

EPA and the State of Michigan have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost effective manner for the first source control operable unit at the Auto Ion site. Of those alternatives that are protective of human health and the environment and comply with ARARS, EPA and the State have determined that this selected remedy provides the best balance of trade offs in terms of long term effectiveness and permanence , reduction in toxicity, mobility or volume through treatment, short term effectiveness, implementability, cost, also considering the statutory preference for treatment as a principal element and considering State and community acceptance.

The selected remedy significantly reduces the hazards posed by the contaminated soil through excavation, stabilization and off-site disposal. Since many of the soil contaminants will be bound through the stabilization process, the impact on human health and the environment would be minimal if the off-site containment cell were to fail.

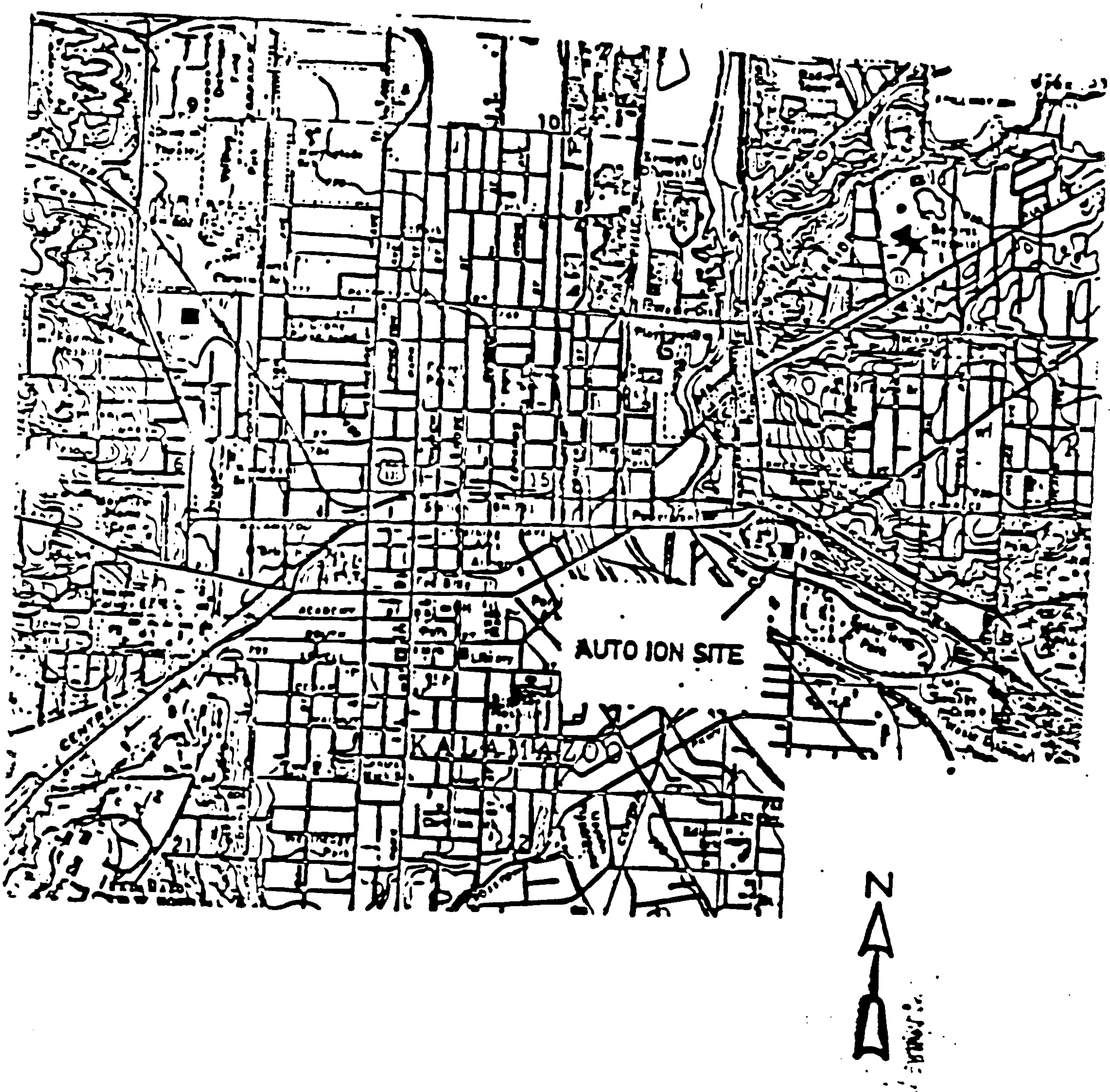
The selected remedy treats the principal threats posed by the soils. The selected remedy is at least as effective as the other options in the short term, requiring 10 months to implement. The remedy is readily implementable. The selected remedy is the least costly treatment and off-site disposal option.

The selection of treatment of the contaminated soil is consistent with program expectations that indicate that highly toxic and mobile waste are a priority for treatment and that treatment is often necessary to ensure the long term effectiveness of the remedy. The selected remedy can be implemented more quickly and at less cost than other treatment and off-site disposal options and is therefor determined to be the most appropriate solution for contaminated soil at the Auto Ion site.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

By treating the contaminated soils through a stabilization process, as required by RCRA land disposal restrictions for F006 waste, the selected remedy addresses one of the principal threats posed by the site. The statutory preference for remedies that employ treatment as a principal element is satisfied.

FIGURE 1



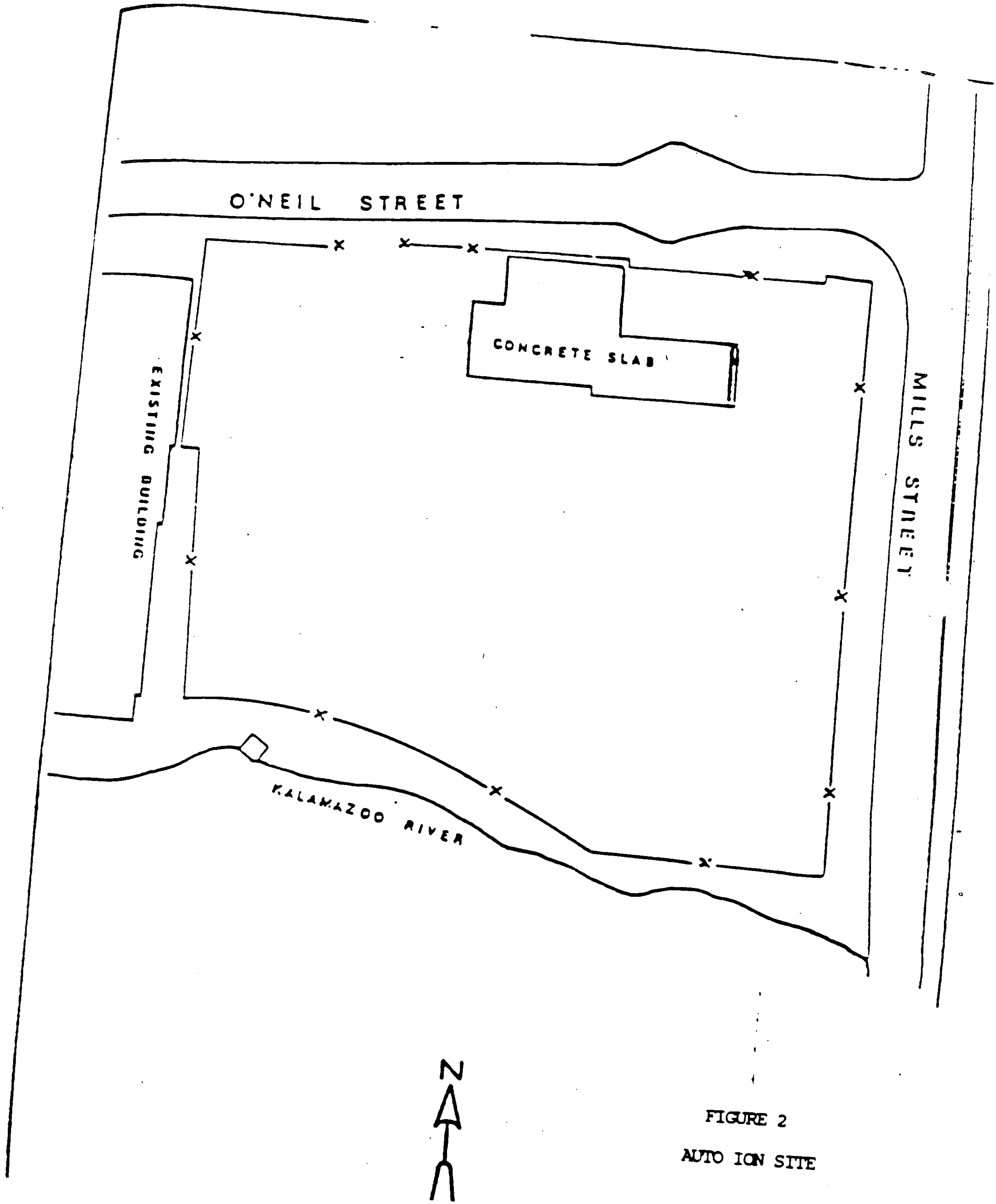


FIGURE 2

AUTO ION SITE

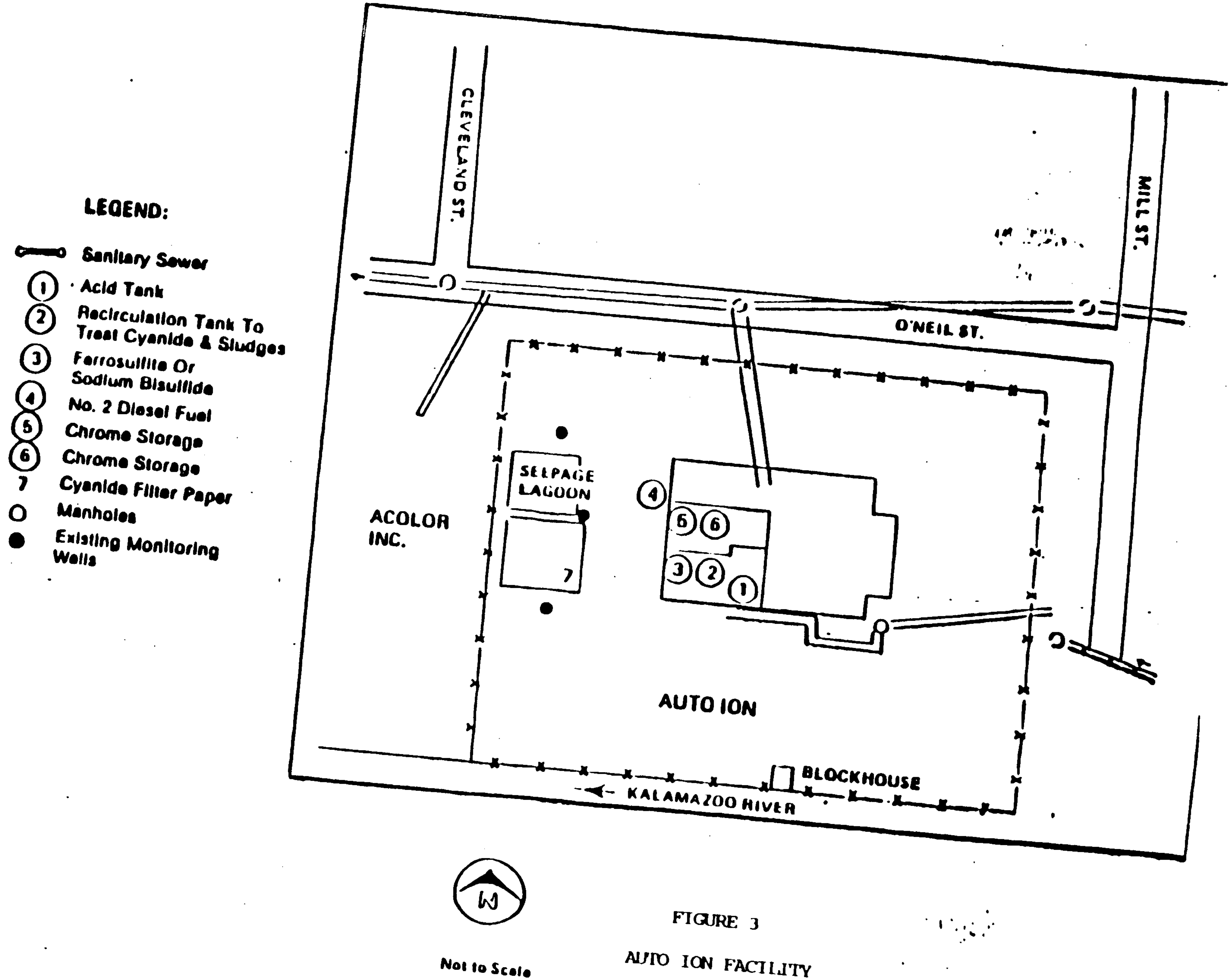


FIGURE 3

AUTO ION FACILITY

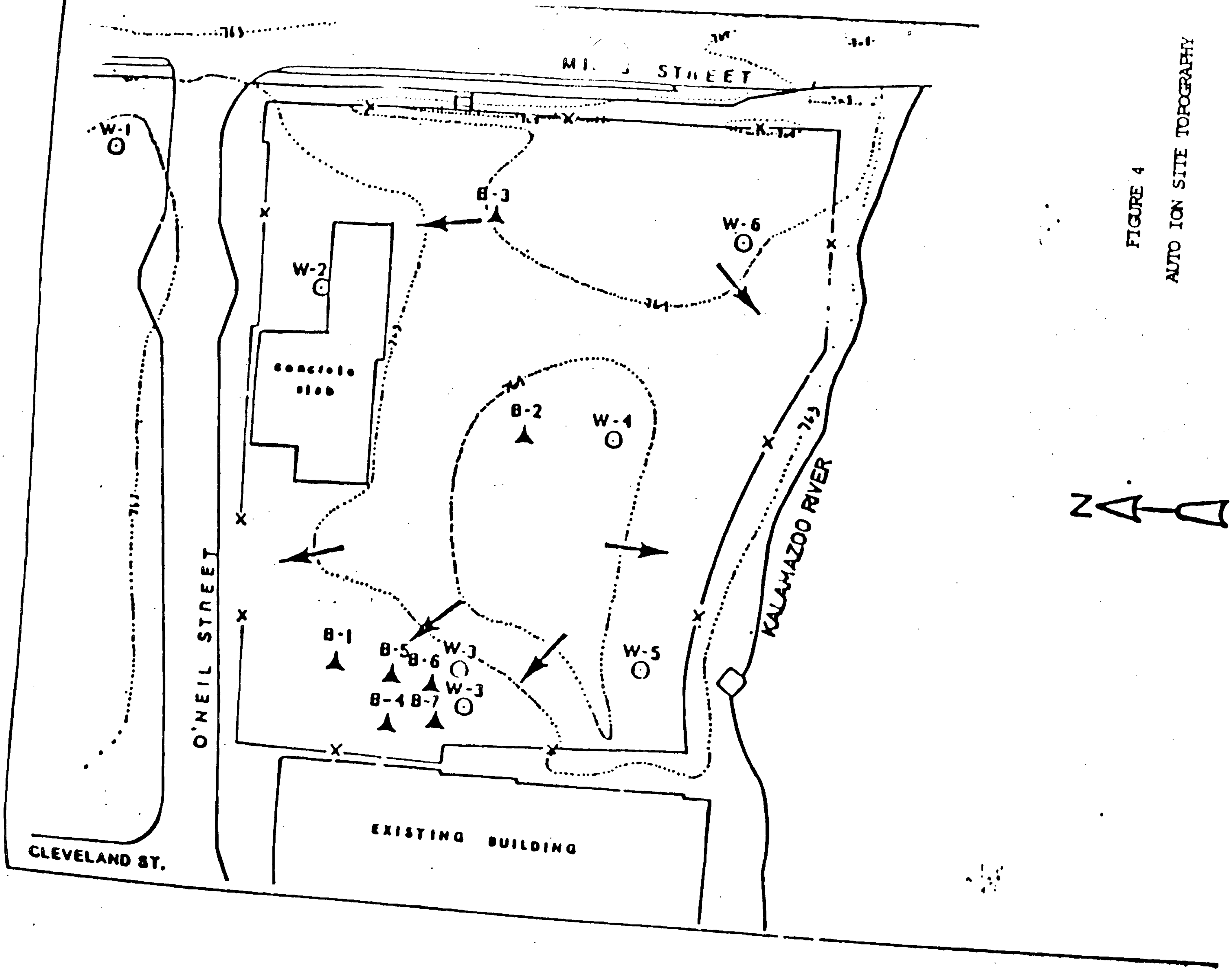


FIGURE 4
AUTO ION SITE TOPOGRAPHY

TABLE 1

SUMMARY OF ANALYTICAL RESULTS OF SOIL SAMPLES (mg/kg)

Parameter	On-Site Surface Soil Samples (0-2 ft.) Number of Samples(1)	Number Positive IDs	Sample Range Low	High	Sample Mean(2)	Background Surface Soil Sample(1)	Average Regional Background Levels(3)
Metals:							
Aluminum	11	11	2668.00 -	4464.00	3473.55	8243	1,000-50,000
Antimony	4	*****All Samples were BDL*****				R	<1-10
Arsenic	12	10	BDL -	80.00*	21.03*	4.5	<1-6.8
Barium	11	8	BDL -	280.00	132.00	40.0	300-500
Beryllium	12	1	BDL -	1.30*	1.30*	U	<1
Cadmium	12	4	BDL -	9.20*	4.40*	U	0.01-2.0 (4)
Chromium	12	12	17.00 -	2433.00*	676.54*	11.0	1-30
Cobalt	12	1	BDL -	5.00	5.00	U	<3-7
Copper	12	12	13.00 -	1203.00*	249.67*	12.0	<1-28
Cyanide	11	10	BDL -	74.00	22.64*	R	
Iron	11	11	1000.00 -	45200.00*	15704.73	9694	1,000-20,000
Lead	12	12	5.60 -	928.00*	166.32*	23.0	<10-20
Magnesium	12	11	BDL -	26300.00*	10889.00*	6135	100-3,000
Manganese	11	11	35.00 -	310.00	200.45	287	<2-2,000
Mercury	10	8	BDL -	0.50*	0.25*	U	0.032- 0.130
Nickel	12	12	13.00 -	1020.00*	199.79*	7.0	<5-15
Selenium	12	1	BDL -	2.00*	2.00*	U	<0.1-0.5
Silver	12	1	BDL -	3.30*	3.30*	U	<0.1-1.0 (4)
Thallium	12	1	BDL -	5.10*	5.10*	U	<0.1-0.8 (4)
Vanadium	12	10	BDL -	17.00	12.99	12.0	<7-50
Zinc	12	12	29.00 -	1474.00*	236.83*	40.0	20-74
Organics:							
Anthracene	2	1	BDL -	11.00	11.00	NA	-
Fluoranthene	2	2	0.41 -	11.00	5.70	NA	-
Pyrene	2	2	0.37 -	0.48	0.43	NA	-
Bis (2-ethylhexyl) phthalate	2	1	BDL -	0.94	0.94	NA	-
Di-n-butylphthalate	2	2	0.52 -	3.60	2.06	NA	-

TABLE 2

Parameter	Samples Collected from 2-20 ft.: Number of Samples	Number Positive IDs	Sample Range Low	High	Sample Mean(1)	Samples Collected from Depths Greater than 20 ft.: Number of Samples	Number Positive IDs	Sample Range Low	High	Sample Mean(1)
Inorganics:										
Aluminum	50	50	153.00 -	11700.00	3826.66	30	30	842.00 -	11700.00	1786.27
Antimony	24	1	BDL -	6.50	6.50	22	1	BDL -	22.00*	22.00*
Arsenic	47	34	BDL -	56.00*	11.17*	30	6	BDL -	20.00*	8.25*
Barium	49	21	BDL -	640.00*	177.95	30	2	BDL -	152.00	118.50
Beryllium	50	3	BDL -	1.70*	1.40*	30	####### ALL SAMPLES WERE BDL ######			
Cadmium	50	10	BDL -	12.00*	2.70*	30	1	BDL -	1.10	1.10
Chromium	50	50	7.50 -	3521.00*	848.82*	30	30	8.00 -	635.00*	41.84*
Cobalt	50	2	BDL -	24.00*	19.50*	30	####### ALL SAMPLES WERE BDL ######			
Copper	50	46	BDL -	10100.00*	442.73*	30	8	BDL -	119.00*	23.63*
Cyanide	35	22	BDL -	531.00	48.98	22	4	BDL -	4.40	2.30
Iron	49	49	2662.00 -	101200.00*	6335.80	30	30	1640.00 -	63700.00*	8646.27
Lead	50	49	BDL -	601.50*	32.11*	30	10	BDL -	27.00*	7.76
Magnesium	50	43	BDL -	27000.00*	8889.09*	30	30	4260.00 -	26200.00*	8329.30*
Manganese	49	49	29.00 -	1838.00	238.80	30	30	41.00 -	1352.00	138.73
Mercury	41	15	BDL -	4.60*	0.75*	29	5	BDL -	2.00*	0.64*
Nickel	50	48	BDL -	3291.00*	286.35*	30	8	BDL -	89.00*	24.81*
Thallium	50	1	BDL -	4.40*	4.40*	30	####### ALL SAMPLES WERE BDL ######			
Selenium	49	1	BDL -	1.30*	1.30*	30	####### ALL SAMPLES WERE BDL ######			
Silver	50	3	BDL -	4.40*	3.27*	30	1	BDL -	8.50*	0.50*
Vanadium	50	27	BDL -	32.00	15.90	30	5	BDL -	30.00	15.02
Zinc	47	47	8.70 -	1409.50*	145.50*	30	27	BDL -	145.00*	21.44
Organics:										
Acetone	6	3	BDL -	0.11	0.05	1	1	0.01 -	0.01	0.01
Carbon Disulfide	6	2	BDL -	0.06	0.04	1	###### ALL SAMPLES WERE BDL ######			
Ethylbenzene	6	2	BDL -	4.20	2.10	1	###### ALL SAMPLES WERE BDL ######			
Methylene Chloride	6	5	BDL -	0.87	0.19	1	###### ALL SAMPLES WERE BDL ######			
Tetrachloroethene	6	2	BDL -	3.10	1.56	1	###### ALL SAMPLES WERE BDL ######			
Trans-1,2-Dichloroethane	6	1	BDL -	0.01	0.01	1	###### ALL SAMPLES WERE BDL ######			
1,1,1-Trichloroethane	6	2	BDL -	0.01	0.01	1	###### ALL SAMPLES WERE BDL ######			

Parameter	Samples Collected From 2-20 ft. Number of Samples	Number Positive IDs	Sample Range Low	High	Sample Mean(1)	Samples Collected From Depths Greater than 20 ft. Number of Samples	Number Positive IDs	Sample Range Low	High	Sample Mean(1)
Organics: (Continued)										
Trichloroethene	6	2	BDL –	0.10	0.07	1	###### ALL SAMPLES WERE BDL ######			
Toluene	6	5	BDL –	8.00	1.62	1	###### ALL SAMPLES WERE BDL ######			
Total Xylenes	6	1	BDL –	31.00	31.00	1	###### ALL SAMPLES WERE BDL ######			
Anthracene	5	1	BDL –	0.37	0.37	4	###### ALL SAMPLES WERE BDL ######			
Benzo(a)anthracene	6	3	BDL –	1.70	0.91	4	###### ALL SAMPLES WERE BDL ######			
Benzo(a)pyrene	6	2	BDL –	0.44	0.42	4	###### ALL SAMPLES WERE BDL ######			
Benzo(b)fluoranthene	6	2	BDL –	2.50	1.69	4	###### ALL SAMPLES WERE BDL ######			
2-Butanone	6	5	BDL –	9.50	1.99	4	###### ALL SAMPLES WERE BDL ######			
Chrysene	6	3	BDL –	1.40	0.74	4	###### ALL SAMPLES WERE BDL ######			
Fluoranthene	6	3	BDL –	3.30	1.30	4	###### ALL SAMPLES WERE BDL ######			
Phenanthrene	6	3	BDL –	3.00	1.63	4	###### ALL SAMPLES WERE BDL ######			
Pyrene	6	4	BDL –	3.00	1.33	4	###### ALL SAMPLES WERE BDL ######			
Styrene	6	1	BDL –	6.40	6.40	4	###### ALL SAMPLES WERE BDL ######			
Bis(2-Ethylhexyl)phthalate	6	4	BDL –	7.60	2.67	4	###### ALL SAMPLES WERE BDL ######			
Butylbenzylphthalate	6	###### ALL SAMPLES WERE BDL ######				2	2	0.94 –	2.40	1.67
Di-n-octylphthalate	6	1	BDL –	4.90	4.90	4	3	BDL –	1.60	1.24
Di-n-butylphthalate	6	5	BDL –	3.80	2.36	4	###### ALL SAMPLES WERE BDL ######			
						2	1	BDL –	2.70	2.70
Pesticides:										
Heptachlor	1	1	0.09 –	0.009	0.009	5	###### ALL SAMPLES WERE BDL ######			
Beta-BHC	1	###### ALL SAMPLES WERE BDL ######				5	5	0.008–	0.020	0.016

Footnotes:

* means that this value is greater than average regional background levels.
BDL means Below Detection Limit.
Only data validated by a QA/QC audit is presented on this table.
NA means that the parameter was not analyzed for.
R means that this data was rejected for QA/QC reasons.
– means that this criteria is not applicable to this parameter because the parameter's presence at any level indicates contamination.
U means that this data is below required detection limits.
(1) Sample locations are shown in Figure 3-A of the Remedial Investigation Report.
(2) The sample mean is calculated only from the samples in which the parameter was detected, not the total number of samples.
(3) Source: Shacklette and Boerngen, 1984 (unless otherwise specified).
(4) Source: Adriano, 1986.

(1633m-3)

TABLE 3

ANALYTICAL SUM - SEDIMENT SAMPLES

ALL DATA IN (mg/kg)

Parameter	TRANSECT A (Upgradient of Site)					TRANSECTS B, C and D (Adjacent to Site)				
	Number of Samples	Number Positive IDs	Sample Range Low	Sample Range High	Sample Mean	Number of Samples	Number Positive IDs	Sample Range Low	Sample Range High	Sample Mean
Inorganics:										
Aluminum	4	4	952.00	1377.00	1112.50	12	12	663.00	2620.00	1378.67
Arsenic	4	1	BDL	2.00	2.00	12	2	BDL	5.60	4.05
Barium	4	0	BDL	BDL	BDL	12	2	BDL	95.00*	78.50*
Cadmium	4	0	BDL	BDL	BDL	12	0	BDL	BDL	BDL
Chromium	4	4	16.00	19.00	17.75	12	12	12.00	113.00*	26.13
Copper	4	2	BDL	14.00	10.00	12	8	BDL	117.00*	26.65
Iron	4	4	3668.00	5784.00	4400.50	12	12	4156.00	21461.00*	9093.50
Lead	4	4	11.00	18.00	14.25	11	11	8.00	208.00*	49.65
Magnesium	4	4	3666.00	9219.00	6849.00	12	12	6671.00	36500.00*	13095.08*
Manganese	4	4	192.00	259.00	228.50	12	12	131.00	294.00	221.50
Mercury	4	0	BDL	BDL	BDL	12	7	BDL	2.90*	0.61*
Nickel	4	1	BDL	16.00	16.00	12	2	BDL	18.00	15.00
Thallium	4	0	BDL	BDL	BDL	12	0	BDL	BDL	BDL
Vanadium	4	0	BDL	BDL	BDL	12	1	BDL	15.00*	15.00*
Zinc	4	4	23.00	38.00	31.00	12	12	17.00	82.00	48.75
Organics:										
Acetone	1	1	0.07	0.07*	0.07*	2	0	BDL	BDL	BDL
2 Butanone	4	0	BDL	BDL	BDL	12	1	BDL	0.01*	0.01*
Anthracene	4	0	BDL	BDL	BDL	11	2	BDL	0.81*	0.61*
Benzo(a)anthracene	4	0	BDL	BDL	BDL	11	3	BDL	2.00	1.11
Benzo(a)pyrene	4	0	BDL	BDL	BDL	11	3	BDL	1.60	0.90
Benzo(b)fluoranthene	4	0	BDL	BDL	BDL	11	3	BDL	2.10	1.14
Benzo(k)fluoranthene	4	0	BDL	BDL	BDL	12	2	BDL	1.00	0.90
Chrysene	4	0	BDL	BDL	BDL	11	3	BDL	1.90	1.04

(CLS105B/1633N)

TABLE 4

ANALYTICAL SUMMARY - SURFACE WATER SAMPLES

	Concentrations Upgradient (mg/l)(1)		Concentrations Downgradient (mg/l)(1)	
	SW-A-1	SW-A-4	SW-D-1	SW-D-4
Organics				
Acetone	U	U	0.044	0.020
Bis(2-ethylhexyl)phthalate	0.420	0.198	0.094	0.140
Inorganics				
Aluminum	U	U	0.219	0.207
Cadmium	U	U	0.013	0.012
Calcium	74.0	73.25	76.8	77.0
Chromium III	0.007	U	0.039	0.037
Copper	U	U	0.032	0.032
Iron	0.46	0.327	0.527	0.392
Lead	U	U	0.193	0.199
Magnesium	22.2	22.0	22.2	22.3
Manganese	0.040	0.049	0.058	0.048
Nickel	U	U	0.060	0.061
Silver	U	U	0.27	0.28
Zinc	0.013	0.014	0.026	U

TABLE 5

CARCINOGENIC RISK FOR ADULTS UNDER CURRENT CONDITIONS CUMULATIVE RISK

Pathway	Most Probable Case	Realistic Worst Case
Soil Ingestion	6.10×10^{-5}	8.82×10^{-5}
Inhalation	1.50×10^{-5}	1.80×10^{-5}
Direct Contact	1.57×10^{-9}	9.73×10^{-8}
TOTAL	7.60×10^{-5}	1.06×10^{-4}

CARCINOGENIC RISK FOR ADULTS UNDER POTENTIAL FUTURE CONDITIONS CUMULATIVE RISK

Pathway	Most Probable Case	Realistic Worst Case
Soil Ingestion	6.10×10^{-5}	8.82×10^{-5}
Inhalation	1.50×10^{-5}	1.80×10^{-5}
Ground Water Ingestion	1.68×10^{-3}	3.05×10^{-3}
Direct Contact	2.00×10^{-8}	6.21×10^{-7}
TOTAL	1.76×10^{-3}	3.16×10^{-3}

TABLE 6

NONCARCINOGENIC CHRONIC HEALTH HAZARDS UNDER CURRENT CONDITIONS CUMULATIVE RISK

Pathway	Children: Most Probable Case	Children: Realistic Worst Case	Adult: Most Probable Case	Adult: Realistic Worst Case
Soil Ingestion	1.78×10^{0}	1.88×10^{0}	2.17×10^{-1}	2.29×10^{-1}
Inhalation	3.37×10^{-2}	4.27×10^{-2}	1.92×10^{-2}	2.44×10^{-2}
Direct Contact	4.62×10^{-2}	2.91×10^{-1}	1.27×10^{-2}	4.82×10^{-2}
TOTAL	1.86×10^{0}	2.21×10^{0}	2.49×10^{-1}	3.02×10^{-1}

NONCARCINOGENIC CHRONIC HEALTH HAZARDS UNDER POTENTIAL FUTURE CONDITIONS CUMULATIVE RISK

Pathway	Children: Most Probable Case	Children: Realistic Worst Case	Adult: Most Probable Case	Adult: Realistic Worst Case
Soil Ingestion	1.78×10^{0}	1.88×10^{0}	2.17×10^{-1}	2.29×10^{-1}
Inhalation	3.37×10^{-2}	4.27×10^{-2}	1.92×10^{-2}	2.44×10^{-2}
Direct Contact	4.62×10^{-2}	2.91×10^{-1}	1.27×10^{-2}	4.82×10^{-2}
Ground Water Ingestion	2.49×10^{1}	3.13×10^{1}	1.20×10^{1}	1.51×10^{1}
TOTAL	2.67×10^{1}	3.35×10^{1}	1.22×10^{1}	1.54×10^{1}

Auto Ion Chemicals, Mich
9-27 9

TABLE 7

SUMMARY OF ALTERNATIVES
EVALUATION

EVALUATION CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 3 Stabilization/Capping	ALTERNATIVE 4 Excavation/Disposal	ALTERNATIVE 5 Selective Excavation/Disposal	ALTERNATIVE 7 Excavation/Stabilization & Disposal	ALTERNATIVE 8 Selective Excavation/ Stabilization/Disposal
		*Long term inspections necessary. *Potential uncertainties include failure in capping system. *Further vertical migration prevented by cap. *Potential damage to cap during river flooding could be problematic.	*Groundwater conditions underlying the site should be benefited due to removal of source of contaminants.	*Groundwater conditions underlying the site should be benefited in that inorganics are are removed to background levels and sources of organic contaminants are reduced.	*Groundwater conditions underlying the site should be benefited due to removal of source of contaminants.	*Groundwater conditions underlying the site should be benefited in that inorganics are are removed to background levels and sources of organic contaminants are reduced
Implementability	*Readily implementable. *Nothing is required other than periodic monitoring & site inspection. *No significant administrative requirements.	*Not readily implementable due to >100% volume increase and resulting grade changes/steep slopes on cap. *Construction of capping system can be accomplished using common earth moving equipment. *No significant administrative requirements.	*Readily implementable. *Excavation can be accomplished using common earth moving equipment. *Transportation can be accomplished using conventional tractor trailers. *Permits required for off-site disposal. *Scheduling delays may occur. *No significant administrative requirements.	*Readily implementable. *Excavation can be accomplished using common earth moving equipment. *Transportation can be accomplished using conventional tractor trailers. *Permits required for off-site disposal. *Scheduling delays may occur. *No significant administrative requirements.	*Readily implementable but very difficult space constraints. *Excavation can be accomplished using common earth moving equipment. *Transportation can be accomplished using conventional tractor trailers. *Permits required for off-site disposal. *Scheduling delays may occur. *No significant administrative requirements.	*Readily implementable. *Excavation can be accomplished using common earth moving equipment. *Transportation can be accomplished using conventional tractor trailers. *Permits required for off-site disposal. *Scheduling delays may occur. *No significant administrative requirements.

TABLE 7

SUMMARY OF ALTERNATIVES
EVALUATION

VALUATION CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 3 Stabilization/Capping	ALTERNATIVE 4 Excavation/Disposal	ALTERNATIVE 5 Selective Excavation/Disposal	ALTERNATIVE 7 Excavation/Stabilization & Disposal	ALTERNATIVE 8 Selective Excavation/ Stabilization/Disposal
rall Protection	*No protection to the environment. *No protection to public health.	*Provides increased degree of protection to the environment through construction of physical barrier and reduced contaminant mobility. *Provides increased degree of protection to human health by blocking pathways for direct contact and ingestion.	*Provides increased degree of protection to human health by removal of source. *Provides increased degree of protection to the environment through source removal. *Potential for adverse environmental impacts to occur if liner and/or leachate collection systems of disposal facility fail.	*Provides increased degree of protection to human health by removal of source. *Provides increased degree of protection to the environment through source removal. *Potential for adverse environmental impacts to occur if liner and/or leachate collection systems of disposal facility fail.	*Short-term risks associated with soil excavation can be addressed by dust controls & use of protective equipment. *Long-term risks posed to groundwater greatly reduced. *Potential for adverse environmental impacts to occur if liner and/or leachate collection systems of disposal facility fail.	*Provides increased degree of protection to human health by removal of source. *Provides increased degree of protection to the environment through source removal. *Potential for adverse environmental impacts to occur if liner and/or leachate collection systems of disposal facility fail.
pliance with ARARs	*Does not comply with probable action- or substance-specific ARARs. *Requirements of WMD/MDNR Draft Guidance will not be satisfied regarding soil clean-up limits.	*Does not comply with probable action- or substance-specific ARARs. *Requirements of WMD/MDNR Draft Guidance will not be satisfied regarding soil clean-up limits. *Does not comply with probable location-specific ARARs regarding floodplains.	*In compliance with probable ARARs. *Compliance with land disposal restrictions, if determined to be applicable, would not be achieved.	*In compliance with most probable ARARs. *Compliance is achieved with the soil clean-up ARARs to the extent that inorganics would be removed to background levels. Organic contaminants would be reduced but may not achieve ARARs. *Compliance with land disposal restrictions, if determined to be applicable, would not be achieved.	*In compliance with probable ARARs. *Compliance with land disposal restrictions, if determined to be applicable, would likely be achieved.	*In compliance with most probable ARARs. *Compliance is achieved with the soil clean-up ARARs to the extent that inorganics would be removed to background levels. Organic contaminants would be reduced but may not achieve ARARs. *Compliance with land disposal restrictions, if determined t be applicable, would likely b achieved.

TABLE 7

SUMMARY OF ALTERNATIVES
EVALUATION

EVALUATION CRITERIA	ALTERNATIVE 1 No Action	ALTERNATIVE 3 Stabilization/Capping	ALTERNATIVE 4 Excavation/Disposal	ALTERNATIVE 5 Selective Excavation/Disposal	ALTERNATIVE 7 Excavation/Stabilization & Disposal	ALTERNATIVE 8 Selective Excavation/ Stabilization/Disposal
Reduction in MTV	*No reduction in mobility. *No reduction in toxicity. *No reduction in volume.	*Mobility of organics reduced. *Mobility of inorganics(except arsenic) greatly reduced. *No reduction in toxicity. *Increase in volume(>100%) due to addition of stabilization agents.	*Mobility of organics and inorganics reduced by physical barriers of selected disposal facility. *No reduction in toxicity. *No reduction in volume.	*Mobility of organics and inorganics reduced by physical barriers of selected disposal facility. *No reduction in toxicity. *No reduction in volume.	*Mobility of organics and inorganics reduced by stabilization. *No reduction in toxicity. *Increase in volume(>100%) due to addition of stabilization agents.	*Mobility of organics and inorganics reduced by stabilization. *No reduction in toxicity *Increase in volume(>100%) due to addition of stabilization agents.
Short-Term Effectiveness	*No short-term risks during implementation. *Response objectives would not be met.	*Potential but controllable risks due to exposing and disturbing surface soils. *Principal response objective of source removal would not be met, but direct contact & inhalation/injestion would be eliminated.	*Potential but controllable risks due to exposing and disturbing surface soils. *Response objectives can be met.	*Potential but controllable risks due to exposing and disturbing surface soils. *Principal response objective of source removal would be met to the extent that inorganics are removed to background levels and organic levels would be reduced. Direct contact & inhalation/ingestion would be eliminated.	*Potential but controllable risks due to exposing and disturbing surface soils. *Response objectives can be met.	*Potential but controllable risks due to exposing and disturbing surface soils *Principal response objective of source removal would be met to the extent that inorganics are removed to background levels and organic levels would be reduced Direct contact & inhalation/ingestion would be eliminated
Long-Term Effectiveness	*Target risk levels would not be attained for any contaminated soils. *Long term inspections necessary. *Conditions at the site could worsen.	*Target clean-up levels for contaminated surface soils would be attained. *Soils below the groundwater table and posing a potential risk >1.0E-06 would not be addressed.	*Target clean-up levels for contaminated surface soils would be attained. *Soils below the groundwater table and posing a potential risk >1.0E-06 would not be addressed.	*Target clean-up levels for contaminated surface soils would be attained. *Soils below the groundwater table and above clean-up levels would not be addressed.	*Target clean-up levels for contaminated surface soils would be attained. *Soils below the groundwater table and posing a potential risk >1.0E-06 would not be addressed.	*Target clean-up levels for contaminated surface soils would be attained. *Soils below the groundwater table and above clean-up levels would not be addressed.

TABLE 8

ARARs FOR OPERABLE UNIT ONE

REGULATION OR LAW	REGULATORY OR STATUTORY REFERENCE	APPLICABILITY/REQUIREMENTS	ALTERNATIVE APPLICABILITY 1	3	4	5	7	8
LOCATION SPECIFIC ARARs								
RCRA Facility Location Standards	40 CFR 264.18(a)	Seismic standard applies to placement of waste in the vicinity of a fault displaced in Holocene time.		X				
	40 CFR 264.18(b)	Floodplain standard limits placement of waste in a 100 year floodplain.		X				
Inland Lakes and Streams Act	Michigan Act 346	Establishes guidelines for the construction, enlargement, removal, or placement of a structure on bottom land (floodplain). Permit application to MDNR (and USACOE) required for filling in a floodplain area.		X				
CHEMICAL-SPECIFIC ARARs								
RCRA Land Disposal Restrictions	40 CFR 268	Sets forth prohibitions and restrictions on land disposal, including treatment standards for certain wastes		X	X	X	X	X
Clean Air Act - National Ambient Air Quality Standard	40 CFR 50.6	Specifies 24-hour standard of 150 ug/m^3 for particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}).		X	X	X	X	X
Michigan Act 348	Rule 901	Requires that emissions for treatment processes not have injurious effects on human health or safety.		X			X	X

REGULATION OR LAW	REGULATORY OR STATUTORY REFERENCE	APPLICABILITY/REQUIREMENTS	ALTERNATIVE APPLICABILITY 1	3	4	5	7	8
ACTION SPECIFIC ARARs								
RCRA Landfill Cover System	40 CFR 264.310	Sets forth design, operation and maintenance requirements for landfill capping systems.		X				
RCRA Closure of Hazardous Waste Facilities	40 CFR 264.116	Requires survey plat filed with local authority which states the owner's obligation to restrict disturbance of the hazardous waste disposal unit.		X				
RCRA Post Closure Care	40 CFR 264.117	Requires post closure care for the hazardous waste disposal unit for a period of 30 years following closure. Section 264.117(b) requires continuation of access restrictions during the post-closure period.		X				
RCRA Closure Plan	40 CFR 264.112	Sets forth requirements for a written closure plan to be submitted and approved by the Regional Administrator as part of the permit issuance procedures.		X				
RCRA Closure Performance Standard	40 CFR 264.111	Sets forth closure performance standard for controlling, minimizing or eliminating post-closure releases. Also requires closure to be performed in a manner that minimizes further maintenance.		X				

ARARs FOR OPERABLE UNIT ONE

REGULATION OR LAW	REGULATORY OR STATUTORY REFERENCE	APPLICABILITY/REQUIREMENTS	ALTERNATIVE APPLICABILITY					
			1	3	4	5	7	8
DOT Rules for Transport of Hazardous Materials	49 CFR 107 and 171.1-5	Specifies procedures for packaging, labelling, manifesting and transporting hazardous materials.			X	X	X	X
OSHA - General Industry Standards	29 CFR 1910.120	Specifies occupational safety and health standards for hazardous waste activities under CERCLA. Includes requirements for safety planning, site control, training, medical monitoring, use of protective equipment and air monitoring.	X	X	X	X	X	X
OSHA - Safety and Health Standards	29 CFR 1926	This regulation specifies the 8-hour time weighted average concentration for various substances, including arsenic, lead and nickel.	X	X	X	X	X	X
OSHA - Recordkeeping and Reporting	29 CFR 1904	Sets forth recordkeeping and reporting for employers.	X	X	X	X	X	X
Michigan Hazardous Waste Management Act - Construction Permits	Act 64, Rule 504	Specifies general information required required from applicants for construction permits seeking to construct new hazardous waste disposal units.		X				

ARARs FOR OPERABLE UNIT ONE

REGULATION OR LAW	REGULATORY OR STATUTORY REFERENCE	APPLICABILITY/REQUIREMENTS	ALTERNATIVE APPLICABILITY 1	3	4	5	7	8
RCRA Facility Permitting	40 CFR 270	Establishes requirements for RCRA Part A and Part B permit applications, sets forth permit conditions applicable to all permits, establishes procedures for permit modification.		X				
RCRA Generator Standards	40 CFR 262 and Michigan Act 64, Part 2	Sets forth standards applicable to generators of hazardous waste including manifesting, pre-transport packaging/labelling/marking and accumulation, and requirements for recordkeeping and reporting.		X	X	X	X	X
RCRA Transporter Standards	40 CFR 263 and Michigan Act 64, Part 4	Sets forth requirements for transporters of hazardous waste including compliance with the manifest system, recordkeeping and clean-up of discharges during transport.			X	X	X	X
RCRA Design Standards for Landfills	40 CFR 264, Subpart N	Sets forth design and operating requirements for hazardous waste landfills including liner system construction, monitoring, inspection, surveying and recordkeeping.		X				

ARARs FOR OPERABLE UNIT ONE

REGULATION OR LAW	REGULATORY OR STATUTORY REFERENCE	APPLICABILITY/REQUIREMENTS	ALTERNATIVE APPLICABILITY 1	3	4	5	7	8
	Act 64, Rule 505	Specifies technical information required from construction permit applicants desiring to construct liner systems for landfills.		X				
Soil Erosion and Sedimentation Control	Michigan Act 347, Rule 1706	Requires a soil erosion and sedimentation plan for any earth changes of one acre or more. Also requires implementation of erosion and sedimentation control measure.		X	X	X	X	X

TABLE 9

COST ESTIMATE - ALTERNATIVE 8
SELECTED VADOSE ZONE EXCAVATION/STABILIZATION/DISPOSAL

Item No.	Description	Total Cost($)	
1.	Excavate and load contaminated soil		
	Labor		
	Equipment	$110,400	
	Materials	123,200	
	Subcontractor/Expenses	156,140	
		46,900	
	Subtotal		
2.	Transportation		$ 436,640
3.	Disposal		$ 316,230
4.	Backfill and Restoration		$ 1,503,600
	Labor		
	Equipment	16,000	
	Materials	5,800	
	Subcontractor/Expenses	55,320	
		3,105	
	Subtotal		
5.	Support Services & Restoration		$ 80,225
	Labor		
	Equipment	62,820	
	Materials	17,000	
	Subcontractors/Expenses	10,150	
		53,230	
	Subtotal		
	Estimated Total Items		$ 143,200
	Engineering (12%)		$ 2,479,895
	Total Estimate		$ 297,585
	Contingency (20%)		$ 2,777,480
	Project Estimate with Contingency =		$ 555,500
			$ 3,332,980

AUTO ION
KALAMAZOO, MICHIGAN

RESPONSIVENESS SUMMARY

INTRODUCTION

The United States Environmental Protection Agency (U.S. EPA) entered into an 106 Administrative Order requiring the undertaking of a Remedial Investigation and Feasibility Study (RI/FS) for the Auto Ion site located in Kalamazoo, Michigan with the following potentially responsible parties (PRPs): Amerace Corporation, Brunswick Corporation, Buckeye Products Corporation, Clark Equipment Company, Contractors United, Inc., Corning Glass Works, Dana Corporation, Faultless Caster Corporation, General Motors Corporation, Gilbert Plating and Bumper Exchange, Inc., Harman Automotive, Inc., Hoover Universal, Inc., Johnson Controls, Inc., Kawneer, Inc., KTS Industries, Inc., Muskegon Piston Ring Co., Shakespeare Company, Sheller-Globe Corporation, Stanadyne, Inc., Sunstrand Heat Transfer, Inc., United Technologies Automotive, Inc., Whirlpool Corporation, and Wickes Manufacturing Company. The required RI/FS activities for Operable Unit One (OU One) concerning soil remediation have been completed, information was collected on the nature and extent of contamination in the soil at the Auto Ion site (RI), and alternatives for appropriate remedial action for OU One at Auto Ion were developed and evaluated (FS and Proposed Plan). At the conclusion of the FS, a Proposed Plan was finalized by U.S. EPA in consultation with MDNR, which identified a recommended alternative for remedial action at the Auto Ion site.

U.S. EPA invited public comment on the Proposed Plan for the Auto Ion Superfund site from August 3, 1989 through September 1, 1989. On August 8, 1989, U.S. EPA held a public meeting at the Kalamazoo City Hall in Kalamazoo, Michigan to present the preferred alternative and accept public comments for operable unit one outlined in the Proposed Plan. U.S. EPA representatives in attendance at the meeting were:

Rita Cestaric - EPA Remedial Project Manager (RPM)
Frank Rollins - Previous RPM

Representatives from the MDNR were:

Gary Hoffmaster - MDNR Environmental Quality Analyst
Peter Ollila - MDNR Environmental Response Division Supervisor

The meeting was opened at 7:00 p.m. by Gary Hoffmaster, who explained that the purpose of the meeting was to present EPA's preferred alternative for soil remediation at the site and accept public comment. He pointed out that fact sheets were available summarizing the alternatives evaluated for soil remediation and presenting the Proposed Plan. He discussed site history and the results of the Remedial Investigation. The EPA Remedial Project Manager for the site, Rita Cestaric, reviewed the alternatives presented in the Feasibility Study, discussed EPA's nine criteria used to evaluate and compare the alternatives, and presented the preferred alternative for soil remediation. She mentioned that copies of the RI/FS report and Proposed Plan were available in the information repositories for the site. The meeting concluded with a public comment period.

A transcript of the public meeting was made. The transcript is a fairly accurate account of the meeting. However, since there was no taped audio account of the meeting, and the court reporter had difficulties understanding parts of the presentations, a minimal amount of reconstructing of the presentations has been done for the written transcript. There was only one comment given at the meeting, and that had been recorded accurately.

The purpose of this responsiveness summary is to document the comments received during the public comment period, and U.S. EPA's responses to the comments. All of the comments summarized in this document were considered prior to U.S. EPA's final decision embodied in the Record of Decision for the site.

The responsiveness summary is divided into the following sections:

I. Responsiveness Summary Overview. This section briefly outlines the proposed remedial alternatives as presented in the Proposed Plan, including the recommended alternative.

II. Summary of Public Comments Received During the Public Comment Period and U.S. EPA Responses. Both oral and written comments are grouped by issues, followed by U.S. EPA responses to these comments.

I. Responsiveness Summary Overview

On August 3, 1989, U.S. EPA made available to the public for review and comment the Proposed Plan for OU One at the Auto Ion site. The alternatives for remedial action describe methods for cleaning up the soils on site. U.S. EPA's Proposed Plan describes in detail six alternatives for remedial action at the site. The proposed remedial alternatives are listed below:

Alternative 1 - No action - in which no further work will be done at the site.

Alternative 3*- Excavation of all soil above the ground water that contains contaminants above cleanup levels, stabilization treatment of the soil, replacement of stabilized soil, followed by construction of a multi-layer capping system over the entire site.

Alternative 4 - Excavation of all soil on site above the water table and off site disposal in an approved land disposal cell.

Alternative 5 - Excavation of contaminated soil from hot spots identified on site and off site disposal in an approved land disposal cell.

Alternative 7 - Excavation of all soil on site above the water table, stabilization, and off site disposal in an approved land disposal cell.

Alternative 8 - Excavation of soils above the water table located within site boundaries posing a health risk greater than the selected cleanup level would be excavated, treated, and shipped to an approved off site land disposal cell.

After careful evaluation of the RI and the FS, the U.S. EPA selected Alternative 8 as the preferred alternative in the Proposed Plan for OU One at the Auto Ion site.

* - Alternatives are numbered as they appear in the FS. Alternatives 2 and 7 were eliminated during the screening of alternatives, and are not presented in the Proposed Plan.

II. Summary of Comments Received During the Public Comment Period and U.S. EPA's Response to Comments.

Comments received during the public comment period were given at the public meeting and submitted to EPA in writing. Parties who submitted comments are:

1) Mr. Edward Junia, Esq., on behalf of
   Auto Ion Steering Committee

2) Ms. Kathleen Sullivan, Esq., on behalf of
   Brunswick Corp.

3) Mr. Richard Butler, Esq., on behalf of
   Faultless Caster

4) Mr. Richard Mc Callum
   owner of property adjacent to Auto Ion

The public comments summarized below are organized according to the following general subject areas: (a) risk assumptions; (b) soil treatment; (c) separation of the site into operable units; and (d) other comments. These comments have been taken into consideration in determining the best alternative for addressing contamination in the soil at the Auto Ion site.

Risk Assumptions

General

During the course of an RI/FS at any Superfund site, the U.S. EPA either prepares or has PRPs prepare a risk assessment according to U.S. EPA policy and guidelines. This risk assessment provides U.S. EPA with a basis for selection of remedy which would be protective of public health, welfare, and the environment. The U.S. EPA utilizes the best available information and makes certain reasonable assumptions in risk calculations. The risk assessment presented in the Auto Ion RI/FS was prepared consistent with U.S. EPA policy and guidance, and with risk assessments at other Superfund sites.

<u>I.A. Comment</u>: Subsurface (2 to 20 foot depth interval) soil concentrations for benzo(a)pyrene, benzo(a)anthracene, and chrysene were used to characterize risk associated with potential exposure to surface soils and to calculate theoretical surface soil cleanup levels, even though these three polycyclic aromatic hydrocarbons (PAHs) were not detected in any soil samples in the 0-2 foot depth interval.

<u>I.A. Response</u>: Benzo(a)pyrene, benzo(a)anthracene, and chrysene are possible cancer causing polycyclic aromatic hydrocarbons (PAHs). These PAHs may be carcinogenic by all routes, including dermal. Bioconcentration is important with these chemicals. These PAHs were found in the soil primarily in the 2-11 foot depth interval. These carcinogenic chemicals were used to characterize risk associated with exposure to surface soils for the following reasons:

1) The depth interval in which the PAHs were not found is very shallow. Since the PAHs are found starting at a depth of only two feet, any future invasive site work would likely expose the soil contaminated with PAHs, thereby posing risks associated with exposure to these compounds.

2) Any invasive type of activity, such as digging, can mix layers of contaminated soil with the shallow top layer.

<u>I.B. Comment:</u> The cancer potency factor (CPF) for benzo(a)pyrene was used to assess potential carcinogenic risks for all PAHs with a B2 weight of evidence of carcinogenity. This approach overestimates the risks posed by PAHs (i.e. chrysene) that are regarded as less potent carcinogens than benzo(a)pyrene.

<u>I.B. Response</u>: For years, the scientific community has been conducting specific studies on a variety of PAH compounds and conclusions regarding their actual carcinogenity are extremely variable. The actual health risks associated with PAH exposure are uncertain. The Office of Health and Environmental Assessment (OHEA) within the U.S. EPA's Office of Research and Development (ORD) has developed guidelines for carcinogen risk assessment. These guidelines discuss weighing the evidence that a substance is a carcinogen and classifying the chemical into one of five groups:

Group A - Human carcinogen
Group B - Probable human carcinogen
Group C - Possible human carcinogen
Group D - Not classified as to human carcinogenity
Group E - Evidence of noncarcinogenity for humans

For the PAH group of compounds the cancer potency factor for benzo(a)pyrene is used for quantitative risk estimations, and applied to those compounds which are actual or possible human carcinogens (i.e. Groups A, B, and C). It should be noted that there are uncertainties associated with the estimates of risks and the assumptions made in developing those estimations tend to be conservative, i.e., with a tendency towards overestimation. The actual risks are not likely to exceed those calculated, but may be lower. This method of risk calculation for PAH, applying the cancer potency factor of benzo(a)pyrene to Group A, B, and C carcinogens, provides for optimal protection of human health.

The U.S. EPA risk calculations presented in the RI/FS complied with Agency policy and guidance on risk assessment and resolve any ambiguities in favor of protecting human health and the environment.

<u>Comment I.C.:</u> The ingestion of surface soil at concentrations equal to average regional background levels (6.5 mg/kg) of arsenic in soil would result in carcinogenic risks greater than 1 x 10^{-6}. Therefore, the risk characterization calculations performed for surficial concentrations of arsenic in this EA probably greatly overestimate the actual risks posed by arsenic.

<u>Response:</u> The average regional background levels from literature are actually a range of less than 1 to 6.5 mg/kg. Additional background sampling for the site will be done during the remedial design to confirm cleanup levels. U.S. EPA risk calculations are done within a framework of policy and guidance and resolve any ambiguities in favor of protecting human health and the environment.

<u>Comment I.D.:</u> The calculated theoretical soil cleanup levels for arsenic are lower than regional and site background concentrations; therefore, the proposed cleanup goal for arsenic should be, at most, to achieve regional background levels.

<u>Response I.D.</u> Refer to response for I.C.

Comment I.D.: Incidental ingestion risks for adults and theoretical surface soil cleanup levels are based upon a conservative ingestion rate for adults of 100 mg/day for a 70-year lifetime exposure. This ingestion rate probably overestimates the actual rate of soil ingestion by an order of magnitude.

Response I.D.: U.S. EPA Directive 9850.4, "Interim Final Guidance for Soil Ingestion Rates", recommends that soil ingestion rates of 0.2 grams (200 mg) per day for children and 0.1 grams (100mg) per day for adults be used in risk assessment calculations. This guidance does not take into consideration children who exhibit abnormal mouthing behavior. The standard adult weight for risk assessment calculations is 70 kg.

The ingestion risk calculations presented in the RI/FS complied with Agency policy and guidance on risk assessment and resolve any ambiguities in favor of protecting human health and the environment.

Comment I.E.: Three conservative assumptions were used in the risk analysis for exposure to particulates in surface soil via the inhalation pathway. Based on these assumptions, calculated risks for the inhalation pathway overestimate the actual risk. Since these values were used to calculate theoretical surface soil cleanup levels for arsenic and nickel, it is likely that these cleanup levels are much more conservative than anticipated by the one in a million or acceptable risk level calculations.

Response I.E.: Inhalation health hazards or carcinogenic risks were calculated using the maximum concentration of respirable particulate matter in ambient air allowed under the Clean Air Act, since no air sampling was performed at the site during the RI.

In order to calculate inhalation exposures, the concentration of the chemical of concern present in surface soil was used to predict the concentration of the chemical in the air. The percentage of the substance present in surface soil was assumed to equal the percentage of the substance present in respirable particulates in the air. The assumptions made in developing those estimations tend to be conservative, with a tendency towards overestimation of risk, and were made in compliance with U.S. EPA policy and guidance which resolves any ambiguities in favor of protecting human health and the environment.

<u>Comment I.F.:</u> The potential for exposure via soil ingestion is thought to be minimal under current conditions and any projected future uses because the location of the site in an industrial area and the presence of a fence around the site minimize site access.

Therefore, site access would be restricted. Further, young children who are most likely to ingest soil are not expected to be present on the site.

<u>Response I.F.:</u> The U.S. EPA commonly uses a "residential scenario" (i.e. unrestricted use of the site) when quantifying risks. Although the site is not currently zoned residential, there are no assurances that this would not change in the future.

The preamble to the proposed National Contingency Plan (NCP), 53 Fed. Reg. at 51423, states that:"...institutional controls such as water and deed restrictions may supplement engineering controls for short- and long-term management to prevent, or limit exposure, to hazardous substances, pollutants, or contaminants. Institutional controls will be used routinely to prevent exposure to releases during the conduct of the remedial investigation and feasibility study, during remedial action implementation, and as a supplement to engineering controls designed to manage waste over time. <u>The use of institutional controls to restrict use or access should not, however, substitute for active response measures</u> (treatment and/or containment of source material, restoration of ground water to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of the remedy." (Emphasis added).

Trespassing has occurred on the site in the past, and is likely to continue. Due to vandalism, there are large openings in the fence surrounding the site. In addition, two schools are located within one-half mile of the site.

<u>Soil Treatment</u>

<u>General:</u> The Steering Committee appears to have six basic comments on the Agency's preference for soil excavation, treatment, and off-site disposal. The comments and the Agency's responses to such objections are set out below.

<u>Comment II. A.:</u> Arsenic is not F006 waste. If arsenic is the driving force behind the cleanup at the site, the Agency's reliance on CERCLA's general rules for cleanup standards is misplaced. More specifically, since arsenic is not F006 waste, treatment is not necessary prior to off-site disposal.

<u>Response II.A.:</u> The soil contains constituents of wastewater treatment sludges from electroplating operations which, when excavated and removed outside the area of contamination, are considered listed hazardous waste, given EPA hazardous waste code F006. This type of waste is described in 40 CFR 261 as:

> Wastewater treatment sludges from electroplating operations except from the following processes;(1) Sulfuric acid anodizing of aluminum;(2) tin plating on carbon steel;(3) zinc plating (segregated basis) on carbon steel;(4) aluminum or zinc-aluminum plating on carbon steel;(5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

Under the mixture rule, 40 CFR 261.3(a)(2), when any solid waste and a listed hazardous waste are mixed, the entire mixture is a listed hazardous waste. Therefore, the entire mixture of arsenic and F006, along with other soil contaminants, is considered listed hazardous waste.

Land disposal, or placement, as defined in RCRA 3004(k) includes, but is not limited to:

> any "placement" of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, salt bed formation, underground mine or cave, and concrete bunker or vault.

Since excavation and off-site disposal of the soil constitute placement of a RCRA hazardous waste (F006), RCRA land disposal restrictions (LDRs), which place restrictions on the land disposal of RCRA hazardous waste, apply. The treatment standard established under the LDR which applies to F006 in the soil matrix is a treatment standard expressed as a concentration level to be achieved prior to off-site disposal. Stabilization treatment to reduce the mobility of inorganics is required for F006 wastes in order to meet the concentration level. The test used to evaluate compliance with the concentration level standard will be the Toxicity Characteristic Leaching Procedure (TCLP) test.

Comment II.B.: The Agency has not established BDAT for arsenic in F006 wastes.

Response II.B.: For the reasons set out in the response above, the treatment technology will be that accorded F006 waste. Thus the establishment of treatment standards under the LDRs on the basis of the best demonstrated available technology (BDAT) for arsenic is not necessary as BDAT exists for treatment of F006 wastes.

Comment II.C.: It is doubtful there is any viable treatment technology for arsenic waste.

Response II.C.: The treatment technology will be that accorded F006 waste for the reasons given above. The stabilization treatment required for F006 waste is not experimental, but is routinely used to reduce mobility of F006 waste. The soil must pass the TCLP test for soil containing F006 waste prior to off site disposal, as required by RCRA land disposal restrictions.

Comment II.D.: U.S. EPA has maintained that reducing mobility, toxicity, and volume is a primary consideration. However, the volume increases, the toxicity is not reduced, and it is uncertain the effect treatment will have on the mobility of the waste.

Response II.D.: The stabilization treatment required for F006 waste is not experimental, but is routinely used to reduce mobility of F006 waste. The results of the treatability studies will indicate the most appropriate stabilization technology. Mobility of the F006 contaminants will be reduced, decreasing migration of these contaminants to ground water. Toxicity is not reduced, and volume will increase.

Comment II.E.: The soils being remediated because of arsenic levels cannot be considered to be F006 waste for two reasons: The Steering Committee believes that the 1)primary source of arsenic contamination at the site is the result of power plant operations and 2)disposal of power plant ash at the site and the land ban treatment standards do not contain a treatment standard for arsenic.

Response II.E.: There are two separate issues brought up in this comment. The first issue concerns the source of arsenic contamination. EPA has determined that the arsenic on site is from two sources; plating waste from the site and fly ash from operation of the power plant. U.S. EPA neither agrees nor disagrees that the primary source of arsenic contamination at the site is the result of power plant operations. The second issue concerns treatment standards for arsenic and is addressed in the responses to soil treatment comments above.

Comment II.F.: The Agency position, set out in Vol. 51 Fed. Reg. 40577 (November 7, 1986), wherein the Agency stated that "the treatability variances may be needed for some soils" and that the Agency planned to "perform additional characterizations of soils, and, where necessary, amend the treatment standards by adding additional standards specifically for these wastes", misled the regulated community into believing that additional standards for soil treatment, not specifically addressed at that time, would be established.

Response II.F.: The Agency's anticipation that variances may be needed for some soils and that it would do additional characterizations of soils where necessary, was in no way intended to mislead the affected community into believing that additional standards would be established. The language was not intended to bind the Agency to establishing such standards or to indicate that such additional standards would be necessary. Rather, the statement was intended only to indicate that such variances maybe necessary. At this point, the Agency has not found such additional standards necessary and asserts that the standards established for F006 wastes are sufficient.

Separation of Site into Operable Units

Comment III.A.: There is concern that the U.S. EPA's decision to split the remedial action into operable units will result in the U.S. EPA requiring work performed in each of the operable units that is inconsistent and duplicative or that could have been performed in a more cost effective manner if planning and implementation of both units could have taken place concurrently.

Response III.A.: The RI has identified contamination problems in the soils, including migration of the contaminants into the ground water. In order to protect human health and the environment, and to respond to the Agency's bias for action, U.S. EPA has divided the site into operable units, one for soils and another for ground water. While the ground water needs further study, there is no reason to delay remediation of the soils. The operable unit for the soils will be fully consistent with all future operable units.

Other Comments

Comment IV.A.: A representative from the city of Kalamazoo questioned what U.S. EPA was doing to pursue Jim Rooney, former owner of Auto Ion.

Response IV.A.: This question relates to U.S. EPA enforcement activities against PRPs at the Auto Ion site. The purpose of this responsiveness summary is not to comment on U.S. EPA enforcement strategy, but to respond to comments on the RI/FS and its recommendations.

Comment IV.B.: An adjacent property owner had ground water testing done on his property by a private firm. The owner states that he wants a cleanup done on his property, since the results of the testing indicate elevated levels of metals and organics.

Response IV.B.: Operable unit two concerns ground water contamination. Off site contamination problems will be considered then, including the contribution , if any, of off-site sources to contamination of the ground water at Auto Ion .