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Superfund Record of Decision:

Allied Chemical & Ironton Coke, OH

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Second Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 95-acre Allied Chemical and Ironton Coke site is comprised of a former coke plant and an operating tar plant in Ironton, Lawrence County, Ohio. The site is located within a coal mining region, and surrounding land use is predominantly industrial and residential. The Ohio River, a source of drinking water for the city of Ironton, lies approximately 500 feet to the west of the tar plant. Onsite lagoons lie within the 100-year floodplain of the Ohio River, with portions of the lagoons inundated sufficiently to maintain wetlands vegetation. From approximately 1920 to the late 1960's, wastewater and solid wastes including coke and coal fines, tank car sludge, boiler ash, and weak ammonia liquor were discharged into swampy areas east of the Coke Plant, which are adjacent to Ice Creek, a tributary to the Ohio River. From the early 1970's until the coke plant closed in 1982, a series of four lagoons in the eastern area of the plant were used to treat process wastewaters, stormwater run-off, and waste sludge; and a fifth lagoon was used to dispose of solid waste. Tar plant operations began onsite in 1945. Types of wastes generated included anthracene residues and salts, coal tar pitch scrap, and phthalic anhydride residues, which were disposed of onsite in the Goldcamp Disposal Area, a former sand pit adjoining the tar plant.

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Allied Chemical and Ironton Coke, OH
Second Remedial Action - Final
Contaminated Media: soil, sediment, gw
Key Contaminants: VOCs (benzene), other organics (PAHs, phenols), metals (arsenic), other inorganics (cyanide)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 116
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EPA/ROD/R05-91/151
Allied Chemical and Ironton Coke, OH
Second Remedial Action - Final

Abstract (Continued)

Extensive studies and onsite investigations identified contamination in onsite soil in the Coke Plant and tar plant areas, lagoon sediment, Ice Creek sediment downstream of the site, and ground water beneath and surrounding the site. A 1988 Record of Decision (ROD) addressed the Gold Camp Disposal Area and documented installation of a cap and slurry wall, pumping and treatment of contaminated ground water, and provisions for supplemental study and remediation of nonaqueous phase contaminants found on top of the bedrock. This ROD addresses contamination at all areas not previously addressed, and provides a final remedy at the site. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene; other organics including PAHs and phenols; metals including arsenic; and other inorganics including cyanide.

The selected remedial action for this site includes excavating and incinerating onsite approximately 122,000 cubic yards of waste material from Lagoon 5, and 31,000 cubic yards of waste coal, followed by onsite waste fuel recovery (re-use of the waste heat generated during incineration), and disposing of the residual ash offsite; in-situ bioremediation of approximately 475,000 cubic yards of waste material from Lagoons 1 through 4, the residual soil of Lagoon 5, and the adjacent inner and outer dikes; excavating and onsite bioremediation on a prepared pad of approximately 40,000 cubic yards of soil from the Coke and tar plant soil; pumping and treatment of ground water at a future onsite treatment facility, with onsite reinjection or offsite discharge; monitoring ground water onsite and downgradient of Ice Creek, and developing a contingency plan in the event that contaminant migration is encountered; pilot testing the effectiveness of in-situ bioremediation and developing a contingency plan for an alternative remedial action for Lagoons 1 through 4, if necessary; and implementing institutional controls including deed restrictions, and site access restrictions such as fencing. The estimated capital cost for this remedial action is $21,000,000, with an estimated total O&M cost of $28,500,000. Total estimated cost is $49,500,000.

PERFORMANCE STANDARDS OR GOALS: The waste fuel recovery system shall be designed and operated to achieve a 99.99% destruction of carcinogenic PAHs. Lagoon 5 materials will be excavated until EPA visibly determines that natural stream sediment has been encountered. Bioremediation of soil and lagoon sediment must reduce PAHs to attain a cancer risk level of 10^{-4} to 10^{-6} and an HI<1. Chemical-specific levels for bioremediated soil include PAHs 0.97 mg/kg and arsenic 0.56 mg/kg. Chemical-specific goals for soil include PAHs 1.4 mg/kg of organic carbon and benzene 0.485 mg/kg of organic carbon. Leach tests will be performed on the treated waste materials to determine the concentrations of arsenic and cyanide that will be protective of the ground water. Ground water clean-up goals are based on site-specific risk assessment, MCLs, and Health Advisories. Chemical-specific ground water goals include benzene 0.005 mg/l, phenol 4 mg/l, total PAHs 0.005 mg/l, and arsenic 0.05 mg/l.

Declaration for the Record of Decision

Site Name and Location

Allied Chemical and Ironton Coke, Ironton, Ohio

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Allied Chemical and Ironton Coke site, in Ironton, Ohio, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the remedy for this site.

The Ohio Environmental Protection Agency concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for this site.

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 Record of Decision (ROD), may present an imminent and substantial threat to public health, welfare, or the environment.

Description of the Selected Remedy

This operable unit is the second and final of two operable units for the site. The first operable unit addressed the Goldcamp Disposal Area, a former sandpit which has been filled with wastes. The selected remedy for the first operable unit includes installation of a cap and slurry wall, pumping and treatment of groundwater, and the supplemental study of a layer of non-aqueous phase substances (NAPS).

This final, second operable unit remedy addresses groundwater and soil contamination by reducing the risks posed by the site, through treatment and institutional controls. The major components of the selected remedy for the second operable unit include the following:

- incineration of approximately 122,000 cubic yards (cy) of lagoon waste materials, and on-site re-use of the waste heat generated during incineration (Waste Fuel Recovery),
- in-situ bioremediation of approximately 457,000 cy of lagoon waste material,
- prepared-pad surface bioremediation of approximately

40,000 cy of contaminated soil materials,

- pumping and on-site treatment of groundwater,
- monitoring of groundwater downgradient of Ice Creek and preparation of a contingency plan,
- fencing, security, and deed restrictions,
- evaluation of the effectiveness of in-situ bioremediation, with a contingency for development of an alternative remedial action for Lagoons 1 through 4.

Declaration of 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, or a waiver can be justified for any State applicable or relevant and appropriate requirements that will not be met, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as their principal element.

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

Valdas V. Adamkus
Regional Administrator
United States Environmental Protection Agency
Region V

12/28/90
Date

Decision Summary for the Record of Decision

I. Site Name, Location, and Description

The Allied Chemical and Ironton Coke site (the Site) is located in Ironton (pop. 14,290), Lawrence County, Ohio, and covers approximately 95 acres. The Site includes the following related areas of contamination (see figure ES-1):

1) An operating Tar Plant The Tar Plant contains several areas in which the soils are contaminated with organic chemicals as a result of spillage, totalling approximately 2,000 cubic yards.

2) A closed and partially dismantled Coke Plant The Coke Plant includes several areas in which the soil is contaminated with organic chemicals as a result of spillage, from the operation of the Coke Plant, and from its related processing facilities, totalling approximately 38,000 cubic yards.

3) Lagoons Five lagoons were used to receive process wastewater and several types of hazardous solid wastes originating from the Coke Plant. This has resulted in the following types of contamination:

a) The discharge of process waste water from the coking operation resulted in contamination of the sediments in the Lagoons with organic chemicals.

b) Solid wastes from treatment processes at the Coke Plant were discharged to several of the lagoons. Lagoon 5 (see figure 1-2) contains a hazardous waste (Decanter Tank Tar Sludge, K087) which is highly contaminated with organic chemicals. Lagoons 1 and 3 contain a hazardous waste (Lime Kiln Sludge, K060) which is contaminated with organic and inorganic chemicals.

Lagoons 1 through 4 contain approximately 457,000 cubic yards of contaminated materials. Lagoon 5 contains approximately 122,000 cubic yards of contaminated materials.

4) Contaminated sediments in Ice Creek The sediments in Ice Creek have been contaminated with organic chemicals due to the discharge of process waste water from the Coke Plant to Ice Creek, prior to the construction of the lagoons in the early 1970s. The contaminated sediments total approximately 150,000 cubic yards.

5) Contaminated groundwater underlying the site The groundwater underlying the site is contaminated with organic

and inorganic chemicals as a result of leaching of contaminants which are found in the site soils.

6) The Goldcamp Disposal Area A former sand pit adjoining the tar plant has been filled with waste materials from the tar plant and other sources, totalling approximately 300,000 cubic yards.

The Site is located in the southeastern section of Ironton and is surrounded by industry, business, personal residences, and waterways. Directly adjacent to the Site on the east and south is Ice Creek, a tributary to the Ohio River. Past Ice Creek to the south is the village of Coal Grove (pop. 2840). The primary source of drinking water for Coal Grove residents comes from the Coal Grove well field, approximately two thousand feet south of the Coke Plant area. A junk yard lies along approximately 450 feet of the Site's southern boundary. The Ohio River lies approximately 500 feet to the west of the Tar Plant. (see Figure 1-1).

The Site is located within a coal mining region, and is underlain by sand and gravel resources, which were formerly mined in the Goldcamp Disposal Area. The lagoons are within the 100-year flood plain. Portions of the lagoons are inundated sufficiently often to maintain wetlands-type vegetation. The Ohio River is used as a source of drinking water by the City of Ironton, and in many other locations upstream and downstream of the Site.

II. Site History and Enforcement Activities

In 1920, Ironton Solvay Coke Co. constructed the coke plant and initiated the coking process. In 1926, Ironton Solvay Coke Co. united with several other companies to form Allied Chemical (Allied). Allied operated the plant until 1977 when it was sold to McClouth Steel Corporation. McClouth Steel managed the facility before declaring bankruptcy in 1982. For a short time during the bankruptcy proceedings, the bankruptcy court managed the site. Shortly thereafter, the plant and its facilities were purchased by Ironton City fuels (ICF), who in March 1984 sold the plant to Allied, with the exception of surface materials. For the next year, ICF was allowed to salvage materials from the surface, and demolished much of the plant. At the end of the year, those materials not removed became the property of Allied Chemical.

From approximately 1920 through the late 1960s, wastewater and solid wastes generated in the coking process were discharged into swampy areas east of the coke plant, adjacent to Ice Creek. These waste streams included process wastewater, coke and coal fines, decanter tank tar sludge, boiler ash, and weak ammonia liquor. Specific constituents present in these wastes include ammonia,

benzene, cyanide, metals, naphthalene, phenolics, and polynuclear aromatic hydrocarbons (PAHs).

In the early 1970s, a series of lagoons was constructed in the eastern area of the plant for the purpose of treating these wastewater streams. Process wastewater, stormwater runoff and some waste sludge were discharged to Lagoons 1, 2, 3, and 4, while solid waste, including decanter tank tar sludge, was deposited in Lagoon 5 (see figure ES-1). In 1982 the lagoons and the Coke Plant operation were shut down.

The lagoons were the subject of a 1981 Part A application for Interim Status under the Resource Conservation and Recovery Act (RCRA). This application was filed late, and the facility never received Interim Status. The facility continued to operate until 1982 at which time operation of the lagoons was discontinued. The lagoons were not closed per the requirements of RCRA.

The Tar Plant was constructed in 1945 and began operations as a unit of Allied Chemical and Dye Company's Barrett Division. The facility is still in operation, but now as a unit of Allied-Signal Inc., Engineered Materials Sector. Specific products of the Tar Plant operation include phthalic anhydride, creosotes, pitches, naphthalene, road tars, driveway sealer, roofing pitch and anthracene. Most of the generated wastes (anthracene residues and salts, coal tar pitch scrap and phthalic anhydride residues), were disposed of in the Goldcamp Disposal Area.

The Allied Site was placed on the National Priorities List in 1983, making it eligible for study and clean up under the Federal Superfund remedial program. A Remedial Investigation (RI) was completed in July, 1986. A Feasibility Study for the GDA Operable Unit was completed in July, 1988. The Feasibility Study for the Coke Plant and Lagoons Area was completed in July, 1990.

The study and cleanup that has been performed at the Site has been conducted pursuant to several legal agreements:

1) In 1984, an agreement was memorialized in the form of a Consent Order between the owners of the Site (now known as Allied-Signal Corporation), Ohio EPA and U.S. EPA, requiring the owners to conduct a Remedial Investigation and Feasibility Study at the Site. These activities are now completed.

2) In 1989, a unilateral Administrative Order was issued by the U.S. EPA requiring Allied to conduct Remedial Design and Remedial Action activities associated with the implementation of the Record of Decision for the Goldcamp Disposal Area. These activities are currently in progress.

3) In 1987, the U.S. EPA and Allied signed a consent order requiring Allied to dismantle and decontaminate processing facilities associated with the Coke Plant. Extensive demolition and cleanup of the Coke Plant has been, and is being, performed pursuant to this agreement.

III. Highlights of Community Participation

The Feasibility Study and the Proposed Plan for the Allied Chemical and Ironton Coke site were released to the public for comment on September 28, 1990. These documents, along with many others listed in the Administrative Record Index, were made available to the public at an information repository maintained at Briggs Lawrence County Public Library in Ironton, Ohio. The notice of availability for these two documents was published in the Ironton Tribune on September 28, 1990. A public comment period on the documents was held from September 28, 1990 to November 28, 1990. In addition, a public meeting was held on October 23, 1990. Notice of this public meeting was placed in the local Ironton newspaper on September 28, 1990 and on October 23, 1990. At this meeting, representatives from U.S. EPA and Ohio EPA answered questions about the site and the remedial alternatives under consideration. During the meeting, a request was made to extend the public comment period. As a result, the U.S. EPA extended the comment period for 30 days, so that the new ending date was November 28, 1990. Notice of this extension was published in the local Ironton newspaper. On November 7 and 8, 1990, U.S. EPA conducted community interviews with local officials and residents. On November 19, 1990, the U.S. EPA and Ohio EPA appeared before the Ironton City Council and members of the public in order to answer further questions, and distributed a fact sheet containing answers to many community questions. A response to the comments received during the public comment period is included in the Responsiveness Summary, which is part of this ROD.

This decision document presents the selected remedial action for the Allied site in Ironton, Ohio, chosen in accordance with CERCLA, as amended by SARA, and is not inconsistent with the NCP. The decision for this Site is based on the administrative record.

IV. Scope and Role of Operable Unit or Response Action Within Site Strategy

As is the case with many Superfund sites, the problems at this site are very complex. In order to deal with this complexity, the Site has been divided into two operable units. This means that the U.S. EPA has decided to address the Goldcamp Disposal Area separately from the rest of the site, as the first operable unit. A separate Feasibility Study, Proposed Plan, and Record of

Decision were prepared for the Goldcamp Disposal Area. The remedy for the Goldcamp Disposal Area is currently in the design phase, and involves installation of a cap over the top of the Area, construction of a slurry wall around the Area to limit the flow of groundwater, the pumping and treatment of contaminated groundwater, and the supplemental study and remediation of non-aqueous phase contaminants found on top of the bedrock.

This Record of Decision is for the final remedy at the site. The purpose of this Record of Decision is to address contamination at all areas of the site not previously addressed in the Record of Decision for the Goldcamp Disposal Area. These remaining areas: the Tar Plant, the Coke Plant, the Lagoons, and Ice Creek, are collectively referred to as the Coke Plant and Lagoons Area (CPLA).

IV. Summary of Site Characteristics

The Allied Chemical and Ironton Coke site has been the subject of a number of extensive studies and site investigations. The purpose of these studies has been to characterize the nature and extent of contamination associated with the site, and the impact of this contamination on human health and the environment. Each of these reports is contained in the Administrative Record, and is available for review at the information repository. Key site investigations are described in detail in the following reports:

1) Initial Site Assessment and Remedial Investigation of the Allied Chemical/Ironton Coke Site, Ironton Ohio, Phase I Report, D'Appolonia, 1984,
2) Remedial Investigation for Allied Chemical/Ironton Coke Site, IT Corp., 1986,
3) CPLA Soil and Lagoon Sampling and Analysis Program, IT Corp., 1989, and
4) Investigation of Neoplasia Occurrences in Ice Creek Fish Populations, Ironton, Ohio, IT Corp., 1990.

Extensive field investigations have been performed as part of these studies (see figures 1-3 and 1-4, attached), including:

1) the installation and sampling of over 45 monitoring wells,
2) collection and analysis of over 200 groundwater samples,
3) collection and analysis of over 200 soil samples,
4) collection and analysis of over ten surface water samples,
5) continuous sampling and analysis of air samples during sampling and excavation,
6) excavation and sampling of over 20 test pits, and
7) collection and analysis of over 1000 samples of fish

tissue.

The results of these investigations are summarized below.

Coke Plant and Tar Plant Soils

The coke plant area (see figure 1-2) once contained the site administration building, a coke battery with associated processing facilities, storage tanks, and piping, and a network of railroad lines used for transporting coal and coke.

The coke plant has now been partially dismantled, so that all that remains is the brick structure of the coke batteries themselves. The majority of the piping and processing facilities have been removed pursuant to a legal agreement between Allied and the U.S. EPA. The area formerly containing the network of rail lines is covered by a thin layer of coal, totalling approximately 30,000 cubic yards. The administration building is still in use.

The tar plant is still in operation.

The Remedial Investigation and subsequent sampling and analysis have indicated that there are three zones within the coke plant area and four zones within the tar plant area which are contaminated and require cleanup. These areas are indicated in figure ES-1 and Figure 1-4 (attached), and are estimated to total 38,000 cubic yards within the Coke Plant area and 2,000 cubic yards within the Tar Plant area. The analysis of these samples taken from these areas indicated the presence of Benzo(a)pyrene at levels exceeding the soil and waste cleanup standards given in Table 2 (attached). A summary of the analysis results for these contaminated soil areas is given in Tables B.1 through B.5 (attached).

More complete information on these contaminated soil areas may be found in appendix B of the Feasibility Study and in section 4.2.1.2 of the Remedial Investigation.

Coke Plant Lagoons

A series of five lagoons were constructed in the early 1970s in a marshy area between the coke plant and Ice Creek (see Figure ES-1). Prior to the construction of the lagoons, wastewater from the coke plant operations was discharged directly to this marshy area. Once completed, these lagoons were used to receive the liquid waste discharge from the coke plant, stormwater runoff from the coke plant area, and several types of hazardous solid wastes. The use of these lagoons was discontinued in 1982, when the coke plant was shut down.

The lagoons are composed of waste materials from the coking

operations, including waste coal and coke, tar, lime sludge, and decanter tank tar sludge, and dredged river sediment and soil and general debris.

Portions of lagoons 2, 3 and 4 are currently inundated with water. The remaining surface of the lagoons area has become overgrown with vegetation. Ground surface elevations within lagoons 1 through 4 are below the Ohio River 100-year flood stage.

Lagoons 1 through 4

Lagoons 1 through 4 are mainly composed of waste coal and coke, but also include general debris including bricks, pieces of metal, and tar. Lagoons 1 and 3 contain Lime Kiln Sludge (K060), which is listed as a Hazardous Waste per RCRA based upon cyanide, naphthalene, phenolic compounds and arsenic content (40 CFR 261.32). Analysis of the materials within lagoons 1 through 4 is summarized in Table C.4, (sampling locations shown in Figure C.1), and Table B.6 (sampling locations shown in figure 2). These analyses indicate that the lagoon sediments are contaminated with widely varying concentrations of polynuclear aromatic hydrocarbons, ammonia, cyanide, phenolics, and sulfate, benzene and arsenic.

Lagoon 5

Lagoon 5 was used for the disposal of Decanter Tank Tar Sludge (K087), which is a listed Hazardous Waste per the Resource Conservation and Recovery Act (RCRA), based upon phenol and naphthalene content (40 CFR 261.32). It is also believed that waste coal and coke materials were deposited in Lagoon 5. Analysis of the wastes in Lagoon 5 indicated the presence of very high concentrations of carcinogenic Polynuclear Aromatic Hydrocarbons. While the solubility and mobility of these PAHs is low, they are potent carcinogens. The analysis of Lagoon 5 waste materials is summarized in table B.6.

Lagoon 5 is approximately 40 feet deep, and is estimated to contain approximately 122,000 cubic yards of waste materials. Approximately 5-15 feet of the Lagoon 5 waste materials are below the water table.

Ice Creek

The sediments of Ice Creek downstream of the site are contaminated due to the past discharge of wastewater from the Coke Plant operations. Samples of sediments from Ice Creek were collected as part of the Remedial Investigation by installing 19 borings at 12 locations along Ice Creek (see figure D.1 for locations). The results of this analysis are given in Appendix D

of the Remedial Investigation, and are summarized in Table D.2 (attached).

This analysis indicated that phenolics, Polynuclear Aromatic Hydrocarbons (PAHs) in the form of naphthalene, ammonia and cyanide are present in the sediments. These contaminants are attributable to the Allied/Ironton site.

The Ice Creek sediment samples were also analyzed for permeability and leaching characteristics in order to determine whether these sediments are a likely source of contamination to the local groundwater. This physical testing showed that the sediments are of varying permeability, including layers of material of extremely low permeability (on the order of 10^{-6} to 10^{-8} cm/sec). These low-permeability sediments are thickest near the mouth of the stream, become thinner upstream, and eventually pinch out just upstream of the coke plant lagoons. The leach testing indicated that trace concentrations (less than 10 parts per billion) of PAHs can leach from the sediments.

Groundwater levels measured at wells near Ice Creek in the vicinity of the Third Street Bridge show that the effects of pumping at the Coal Grove well field are primarily limited to the area south of Ice Creek. This indicates a substantial hydraulic connection between the creek and the aquifer, and that the creek supplies a portion of the flow of water to the Coal Grove well field. Groundwater modeling performed as part of the RI indicated that approximately 27% of the water drawn from wells within the Coal Grove well field originates from Ice Creek.

The area of Ice Creek sediments which is contaminated with wastes from the Allied Chemical and Ironton Coke site is considered a valuable wetland, the destruction of which (for example, through dredging) would be considered a negative environmental impact. The lagoons themselves are constructed in a former channel of Ice Creek. The Creek was rechanneled when the lagoons were constructed. The wetlands themselves were created upon the construction of a dam in the Ohio River, which resulted in the raising of the water level in the Ohio River by over 20 feet. Thus what had previously been a narrow stream channel became a broad, swampy area.

The PAHs which are present in the Ice Creek sediments are potentially hazardous to aquatic life. A common health effect in fish associated with exposure to PAHs in stream sediments is the formation of liver neoplasia, a type of tumor. Therefore, rather than relying upon modeling or calculations to determine whether the fish are being endangered, the U.S. EPA decided to have samples of fish taken from Ice Creek and the Ohio River, and to have the livers of these fish examined by a pathologist for the presence of neoplastic lesions. The results of this investigation are given in Appendix C of the FS, Investigation of

Neoplasia Occurrences in Ice Creek Fish Populations, Ironton, Ohio, IT Corp, April 1990. A total of 214 fish were collected, and no neoplastic lesions were observed. Therefore, it was concluded from this and additional observations that the concentrations of site-related contaminants present in the Ice Creek stream sediments do not have an adverse effect on fish.

The water quality in Ice Creek was tested during the Aquatic Ecological Studies at Allied Chemical's Ironton, Ohio Coke Site, Battelle, 1984. This analysis indicated that concentrations of chloride and ammonia were greater downstream of the site than upstream, but were still well below U.S. EPA Water Quality Criteria. The water was analyzed for PAHs at this time and none were detected.

Groundwater

A variety of contaminants have been detected in the groundwater underneath and surrounding the site, particularly phenolics, ammonia, cyanide, chloride, naphthalene and benzene. The pattern of groundwater contamination is indicative of a number of small, localized sources on-site. The flow of groundwater was modeled in great detail as part of the Remedial Investigation. Figure 4-12 shows the groundwater surface contours and flow paths resulting from the field data and computer simulation. This indicates that groundwater from underneath the site will flow toward Ice Creek and the Ohio river. The potential impacts of contaminated groundwater on the local populations are through the Coal Grove Well Field, which is the primary source of drinking water to approximately 2840 residents of the Village of Coal Grove, through the Ironton Public Water Supply Intake in the Ohio River, and through the Amcast production wells.

The Amcast production wells were addressed in the 9/88 Record of Decision for the Goldcamp Disposal Area. Bottled water for drinking is currently being provided by Allied to Amcast.

Site modeling and actual analysis of Coal Grove well water support the assessment that no drinking water standards are being exceeded in the Coal Grove wellfield as a result of this Site. The results of computer simulation of groundwater flow indicated that leakage from Ice Creek may account for approximately 27 percent of the water pumped at the Coal Grove well field, and that the primary pathway for leakage from the creek is through the channel sides where lower-permeability sediments are believed to be fairly thin or absent. Very little of the flow to the Coal Grove well field is believed to originate from infiltration through the contaminated Ice Creek sediments. The modeling indicated that approximately 29 percent of the water pumped from the Coal Grove well field will originate from the Ohio River, which is contaminated with cyanide, phenolics, benzene and

naphthalene at relatively low concentrations. The modeling also indicated that approximately 41 percent of the water extracted from the Coal Grove well field is derived from the aquifer in the area southeast of the well field, away from the Site. Approximately three percent of the water drawn from the Coal Grove well field may be derived from Site groundwater which flows underneath Ice Creek, according to the modeling.

The hydraulic connection between the Ohio River and the aquifer underlying the Site, and observed groundwater gradient toward the river, necessarily result in the groundwater discharge of site-derived contaminants to the Ohio River. This discharge was not detectable in the river, however, which contains contaminants similar to those found in the Site groundwater both upstream and downstream of the Site. Modeling of contaminant loading has also indicated that, while there is probably a discharge of contaminated groundwater from the site to the Ohio River, it would not be detectable in the City of Ironton drinking water intake.

The Atmosphere

Testing of the atmosphere was conducted under the circumstances expected to pose the worst threat to the atmosphere. Four test pits were dug into Lagoon 5, which is the most highly contaminated area on the site. Monitoring was conducted at the at the pit perimeter for 20 minutes while the backhoe was being used to disturb these Lagoon 5 materials. Air contaminants were not detected at the perimeter of this test pit.

VI. Summary of Site Risks

An Endangerment Assessment was conducted in order to determine the extent of the threat to public health under present conditions, and to determine which aspects of the site merit remediation (Endangerment Assessment, Allied/Signal Ironton Coke Site, Ironton, Ohio, Menzel-Shoaf, Inc. 1990).

Selection of Contaminants of Concern

One of the initial tasks in the performance of the endangerment assessment was the selection of a limited list of Contaminants of Concern, or those compounds which are representative of the greatest environmental impacts at the Site. Analysis of groundwater, surface water, soil, and lagoon sediments indicated the presence of eighty-six chemicals on or near the Site. Ammonia, cyanide, phenolics, sulfate, and naphthalene were selected as representative examples of the non-carcinogenic chemicals (chemicals which do not cause cancer). Benzene was chosen as a representative example of a chemical which is known to cause cancer in humans. Chloride was used as an indicator in the modeling of site groundwater, and was carried over from the

groundwater modeling as a Contaminant of Concern. Benzo(a)anthracene, benzo(a)pyrene, chrysene, and dibenzo(a,h)anthracene were selected as the polynuclear aromatic hydrocarbons (PAHs) of greatest concern, based on toxicity, carcinogenicity, and expected mobility in groundwater.

Assumptions and Constants Used

The potency factors used for the calculation of risk from carcinogenic compounds, and the slope factors used in the calculation of hazard indices for non-carcinogenic compounds, are given in Worksheets 7-1C, 7-2C and 7-3C (attached). An example of the assumptions and calculations used in determining exposures is given in Table 4-25b (attached).

Baseline Risk Assessment

A baseline risk assessment was performed assuming that no action was taken at the site. This evaluation was performed to determine whether action should be taken at the site, and to determine which contaminants and exposure pathways need to be addressed.

In assuming that no action was taken, a "reasonable worst case" scenario was developed. In this scenario, we assumed that the site was converted to residential use, and on-site residents, including children, were exposed to contaminated soil and contaminated groundwater. The results of this scenario showed that unacceptably high risks of cancer could occur if the site was not cleaned up and was converted to residential use. The excess cancer risk to hypothetical future onsite residents was calculated to be 5.7×10^{-3} for children and 3.4×10^{-3} for adults. This risk is mainly due to concentrations of polynuclear aromatic hydrocarbons in the soil, and benzene and arsenic in the groundwater.

> note- An excess cancer risk of 5.7×10^{-3} is approximately 6 incidences of cancer per 1000 people. The range of excess cancer risk which is considered acceptable at Superfund sites ranges from one in ten thousand to one in a million (1×10^{-4} to 1×10^{-6}), with a target risk of one in a million.

The adverse effects other than cancer (non-carcinogenic effects) which would be caused by contaminants from the site were also calculated for the "reasonable worst case" scenario. The result of these calculations is called a "hazard index", which is a measure of the severity of the non-carcinogenic health effects. A total hazard index of greater than one indicates that a non-carcinogenic public health hazard exists. The subchronic (short-term) hazard indices for hypothetical future onsite residents was calculated to be 7.1 for children and 3.3 for adults. The chronic (long-term) hazard index for hypothetical adults living

on the site was calculated to be 4.0. These chronic and subchronic risks are almost entirely due to the presence of cyanide in the site groundwater. The non-carcinogenic risks posed by the site to hypothetical future on-site residents are of concern over both the short term and the long term.

Evaluation of Current Risks

In addition to the baseline risk assessment, current risks were evaluated. These current risks are associated with exposure of contamination originating from the site to Coal Grove Residents via the media of air, groundwater, surface water, soil, and fish consumption. The lifetime excess cancer risks to Coal Grove residents due to current conditions was calculated to 1.0×10^{-5} for children and 2.6×10^{-5} for adults. This calculated risk is primarily due to the presence of arsenic in the Coal Grove Drinking Water at less than 1 part per billion. This level of arsenic is far below the current U.S. EPA drinking water limit of 50 parts per billion, however.

The non-carcinogenic risks posed via consumption of groundwater by Coal Grove residents were also calculated. The total subchronic (short term) hazard index for Coal Grove residents consuming groundwater was calculated to be .163 for children and .0709 for adults. The total chronic (long term) hazard index for Coal Grove residents consuming groundwater was calculated to be .0596. Again, a total hazard index of greater than one would indicate that a non-carcinogenic public health hazard exists. These results indicate that non-carcinogenic contaminants do not presently pose a significant hazard to users of the Coal Grove water supply.

Conclusions of the Endangerment Assessment

The results of the Endangerment Assessment indicate that remediation is needed at this site to address potential future exposures. The Endangerment Assessment also indicates that current populations in Coal Grove are apparently not being adversely impacted by the site at significant levels. Therefore, remediation must address potential exposure to hypothetical future site residents, and the potential migration of site chemicals to groundwater.

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

VII. Description of Alternatives

Alternatives for the remediation of the Coke Plant/Lagoons Area have been evaluated in a Feasibility Study (FS), which is available for review by the public at the Briggs Lawrence County Public Library. The alternatives listed below were selected for detailed evaluation from a much longer list of alternatives. In the early stages of the production of the Feasibility Study, many alternatives were screened out for various reasons, as described in Chapter 2 of the Feasibility Study. The numbering of the alternatives which were retained for detailed analysis reflect gaps left by those alternatives which were screened out. The retained alternatives are summarized below:

Alternative 1)

No Action

In order to evaluate the advantages and disadvantages of the various alternatives for remediation at the site, it is necessary for the Agencies to determine the effects on human health and the environment which would be expected to result from taking no action at the site. Therefore this Feasibility Study includes an evaluation of the No Action Alternative.

Alternative 8)

Estimated Capital Cost: $12,271,000
Estimated Total O&M Cost: $148,849,000
Total Estimated Cost: $161,120,000
Estimated Time to Implement: 46 years

Lagoons- On-site Incineration/Off-site Waste Fuel Recovery

Under this alternative, all of the materials in the lagoons would be excavated, and segregated by their value as fuel. Those materials which have a sufficient fuel value would be shipped off-site to be burned for waste fuel recovery. This means that the energy value of the waste would be recovered in the form of steam. Those materials which do not have fuel value sufficient to render waste fuel recovery economical would be burned in an on-site incinerator, which would be constructed especially for this purpose. Incinerator ash would be disposed of in a lined disposal cell on-site after testing to assure that disposal requirements are met.

Coke and Tar Plant Soil Areas- On-site Incineration/Off-site Waste Fuel Recovery

Contaminated soils areas would be treated similarly to the lagoon materials, in that they would be shipped off-site for waste fuel recovery or incinerated depending on their fuel value.

Ice Creek Sediments- Limited Action

The groundwater potentially affected by the contaminants in the Ice Creek sediments would be monitored, and if contamination was found to be emanating from the sediments at levels sufficient to cause an exceedance of applicable standards, accelerated monitoring and groundwater remediation would be triggered.

Ground Water- Management Control

Under this alternative, and all of the following alternatives, all of the groundwater flowing away from the site will be controlled by a series of pumping wells positioned downgradient of the site. These wells will serve to collect the contaminated groundwater. Contaminants present in this collected groundwater will be removed in an on-site treatment plant which will be built especially for this purpose, and discharged in compliance with applicable limits to the Ohio River.

Alternative 11A)

Estimated Capital Cost: $11,044,000
Estimated Total O&M Cost: $110,701,000
Total Estimated Cost: $121,745,000
Estimated Time to Implement: 34 years

Lagoons- Partial Bioremediation/On-site Incineration

Under this alternative, all of the materials in the lagoons would be excavated and segregated by their amenities to bioremediation and to incineration. Those lagoon materials which are less amenable to bioremediation will be burnt in an on-site incinerator. The remaining lagoon materials would be returned to the lagoons and biologically treated using a series of wells which would inject oxygen and nutrients into the ground, thereby encouraging the growth of bacteria, which would break down the organic contaminants.

Coke and Tar Plant Soil Areas- Partial Bioremediation/On-site Incineration

Soils in the Coke and Tar Plant areas would be segregated by their amenability to bioremediation and to incineration, and would then be either incinerated on-site or biologically treated along with the lagoon materials.

Ice Creek Sediments- Limited Action

Same as Alternative 8.

Ground Water- Management Control

Same as Alternative 8.

Alternative 12A)
Estimated Capital Cost: $11,142,000
Estimated Total O&M Cost: $120,586,000
Total Estimated Cost: $131,728,000
Estimated Time to Implement: 34 years

Lagoons- Partial Bioremediation/On-site Incineration
Same as Alternative 11A.

Coke and Tar Plant Soil Areas- Partial Bioremediation/On-site Incineration
Same as Alternative 11A.

Ice Creek Sediments- Bioremediation
Under this alternative, the sediments in Ice Creek would be dredged, placed in the lagoon area, and bioremediated along with the lagoon materials. (The alternatives which consider remediation of Ice Creek sediments were in place prior to the completion of the sampling of fish for neoplasia.)

Groundwater- Management Control
Same as Alternative 8.

Alternative 12B)
Estimated Capital Cost: $7,057,000
Estimated Total O&M Cost: $70,521,000
Total Estimated Cost: $77,578,000
Estimated Time to Implement: 44 years

Lagoons- Partial Bioremediation/Off-site Waste Fuel Recovery
All of the contaminated materials in the lagoons would be excavated and segregated by their amenities to bioremediation and to waste fuel recovery. Then the materials amenable to bioremediation would be returned to the lagoons and treated as in option 11A, and the remaining materials would be shipped off-site for waste fuel recovery as in option 8.

Coke and Tar Plant Soil Areas- Partial Bioremediation/Off-site Waste Fuel Recovery
The contaminated soils in the Coke and Tar Plant areas would be segregated based upon their amenability to bioremediation or to waste fuel recovery, and would be treated accordingly, along with the materials from the lagoons.

Ice Creek Sediments- Bioremediation
Same as Alternative 12A.

Ground Water- Management Control
Same as Alternative 8.

Alternative 15B)
Estimated Capital Cost: $7,405,000
Estimated Annual O&M Cost: $78,272,000
Total Estimated Cost: $85,677,000
Estimated Time to Implement: 42 years

Lagoons- Partial Off-site Waste Fuel Recovery, Solidification/Stabilization
Under this alternative, all of the materials in the lagoons would be excavated, and those materials which have a fuel value sufficient to merit incineration for waste fuel recovery would be shipped off-site and burnt. The remaining materials would be solidified/stabilized in such a manner that the contaminants of concern are immobilized, and placed back into the lagoons area.

Coke and Tar Plant Soil Areas- Partial Off-site Waste Fuel Recovery, Solidification/Stabilization
Those contaminated soil materials which have a fuel value which makes them amenable to waste fuel recovery would be burned off-site. The remaining materials would be solidified in a manner such that the contaminants of concern are immobilized, along with the lagoon materials.

Ice Creek Sediments- Solidification/Stabilization
Under this alternative, the Ice Creek sediments would be solidified in a manner such that the contaminants of concern are immobilized, and placed in the lagoons, along with the solidified/stabilized lagoon materials.

Ground Water- Management Control
Same as Alternative 8.

Alternative 18)
Estimated Capital Cost: $21,056,000
Estimated Total O&M Cost: $28,472,000
Total Estimated Cost: $49,528,000
Estimated Time to Implement: 35 years

Lagoons- Partial Bioremediation/On-site Waste Fuel Recovery
An incinerator equipped for recovery of waste heat would be constructed on-site under this alternative, and the materials in lagoon 5 would be burned for waste fuel recovery. The remaining materials would be left in place, and bioremediated in-situ in a manner similar to that described for option 11A.

Coke and Tar Plant Soils- Partial Bioremediation/Multi-media Cap

The contaminated soils on the Tar plant would be covered using a layered cap of asphalt and plastic. The Coke plant soils would be bioremediated by spreading them on a specially-prepared portion of the site and periodically aerating and adding nutrients to encourage bacterial growth.

Ice Creek Sediments- Limited Action
Same as Alternative 8.

Ground Water- Management control
Same as Alternative 8.

Alternative 19)
Estimated Capital Cost: $16,581,000
Estimated Total O&M Cost: $14,365,000
Total Estimated Cost: $30,946,000
Estimated Time to Implement: 34 years

Lagoons- Cap and Slurry Wall
The lagoons would be covered with a layered cap composed of clay, sand, plastic, and concrete. A slurry wall would be installed around the lagoons to limit migration of contaminated groundwater.

Coke and Tar Plant Soils- No Action
Same as Alternative 1.

Ice Creek Sediments- Limited Action
Same as Alternative 8.

Ground Water- Management Control
Same as Alternative 8.

Modifiers)

In addition to the alternatives listed above, the Feasibility Study includes an evaluation of the costs of off-site disposal of the ash, scrubber wastes and the coke and tar plant materials proposed to be treated by bioremediation as solid wastes and as hazardous wastes. The Feasibility Study also evaluates land treatment bioremediation of the Tar Plant soils.

VIII. Summary of Comparative Analysis of Alternatives

The remedial alternatives developed during the Feasibility Study were evaluated by the U.S. EPA using the following 9 criteria. The advantages and disadvantages of each alternative were then

compared to determine which alternative provided the best balance among these 9 criteria. These criteria are set forth in the National Contingency Plan, 40 CFR Part 300.430.

1. Overall Protection of Human Health and the Environment addresses whether of not a remedy provides adequate protection and describes how risks are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

2. Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) of other environmental statutes and/or provide grounds for invoking a waiver.

3. Long-term Effectiveness and Permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

4. Reduction of Toxicity, Mobility or Volume is the anticipated performance of the treatment technologies a remedy may employ.

5. Short-term Effectiveness involves the period of time needed to achieve protection and any adverse impact on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of goods and services needed to implement the chosen solution.

7. Cost includes capital and operation and maintenance costs.

8. State Acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State of Ohio concurs, opposes, or has no comment on the preferred alternative.

9. Community Acceptance will be assessed in the Record of Decision following a review of the public comments received on the FS report and the Proposed Plan.

Each alternative was evaluated against these nine criteria. The selected alternative was a slight modification of Alternative 18. A discussion of how the alternatives compare to each other based upon these criteria follows.

Criterion 1. Overall Protection of Human Health and the Environment

All of the remedial alternatives considered for the Site, except for the no action alternative, are protective of human health and the environment. This protection is achieved by eliminating, reducing or controlling risks through various combinations of treatment, engineering controls and institutional controls. As the no action alternative does not provide protection of human health and the environment, it is not eligible for selection and shall not be discussed further in this document.

All alternatives would provide protection to users of groundwater, because all alternatives include a groundwater pump and treat system designed to capture any contaminated groundwater leaving the site. Through destruction of the wastes, all incineration, waste fuel recovery and bioremediation options would greatly reduce the threats that these materials pose to human health and the environment. Solidification/stabilization would limit the potential for exposure of the wastes to humans and to the environment. Capping would limit the potential for human contact with the wastes.

Criterion 2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of SARA requires that remedial actions meet legally applicable or relevant and appropriate requirements (ARARs) of other environmental laws. These laws may include: the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the Clean Air Act (CAA), the Safe Drinking Water Act (SDWA), and any state law which has more stringent requirements than the corresponding Federal law. "Legally applicable" requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site. "Relevant and appropriate" requirements are those requirements that, while not legally applicable to the remedial action, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the remedial action.

Non-promulgated advisories or guidance documents issued by federal or state governments do not have the status of ARARs; however, where no applicable or relevant and appropriate requirements exist, or for some reason may not

be sufficiently protective, non-promulgated advisories or guidance documents may be considered in determining the necessary level of clean up for protection of human health and the environment.

ARARs pertinent to this site are listed in an attachment to this Record of Decision. Several specific ARARs are discussed below.

a) Ohio Administrative Code (OAC) 3745-57-03, Landfill Design and Operating Requirements. The selected alternative involves leaving hazardous waste (K060) in place in a unit that does not specifically meet the requirements of this rule, such as a liner to prevent migration of materials out of the landfill and a leachate collection system. However, the pumping and treatment of the ground water will effectively contain the contaminants while bioremediation occurs. Upon review and approval of the final design of this ground water management system by the Agencies, Ohio EPA will consider waiving OAC 3745-57-03 at the Allied CPLA site.

b) OAC 3745-54-18, Location Standards for Hazardous Waste Facilities. The selected alternative involves leaving hazardous waste (K060) on-site in areas that do not meet Ohio's siting requirements. Should the final design demonstrate the ability to effectively contain and treat the hazardous wastes, Ohio EPA will consider waiving OAC 3745-54-18 at the Allied CPLA site.

c) OAC 3745-27-07, Location Criteria for Solid Waste Disposal Facility. The placement of bioremediated coke and tar plant soils and/or lagoon wastes on-site would not meet the requirements of this rule. Should the final design indicate that these treated materials will be below risk-based levels for PAHs, Ohio EPA will consider waiving OAC 3745-27-07 at the Allied CPLA site.

d) OAC 3745-27-08, Construction Specifications for Sanitary Landfills. The placement of bioremediated coke and tar plant soils and/or lagoon wastes on-site in an unengineered unit would not meet the design criteria presented in this rule. Should the final design present a unit that will provide adequate cover over treated materials (that have been bioremediated to below risk-based levels), Ohio EPA will consider waiving OAC 3745-27-08 at the Allied CPLA site.

e) Waste Fuel Recovery alternatives, for which the recycling of K087 waste is exempt from RCRA regulation, must account for the continued re-use of the generated steam in order for

this exemption to remain in effect.

Criterion 3. Long-term Effectiveness and Permanence

Incineration, waste fuel recovery and bioremediation all achieve permanent reduction in the concentrations of the organic contaminants of concern. The permanence of solidification/stabilization technology for immobilization of the contaminants of concern has not been fully demonstrated, and would have to be modeled in pilot studies prior to implementation. The containment option, Alternative 19, is the least permanent option due to the fact that none of the waste is actually destroyed.

Criterion 4. Reduction of Toxicity, Mobility or Volume Through Treatment

The bioremediation portions of the alternatives will be expected to achieve a substantial reduction in the concentrations, and therefore, the toxicities of the organic contaminants of concern. A greater reduction in organic contaminant concentrations would be expected to be associated with incineration or waste fuel recovery. The reduction achieved through bioremediation is expected to be sufficient to meet human health-based cleanup goals, however. The effectiveness of solidification/stabilization has not been demonstrated for these materials, and would have to be demonstrated in pilot studies prior to remedy implementation. Alternative 19 does not involve treatment of the waste. All alternatives except No Action involve treatment of the groundwater, effectively reducing the volume of contaminated groundwater.

Criterion 5. Short-term Effectiveness

The alternatives which have the greatest short-term effectiveness are the lagoons portion of Alternative 19 and the Tar Plant Soils portion of Alternative 18, both of which involve capping and, therefore, prevent human contact with soils over the short term. Every alternative except No Action is effective in the short term for containing the groundwater. The differences in short-term effectiveness between the various alternatives are viewed by the U.S. EPA as minor, however. The U.S. EPA has this view because the institutional controls (including fencing, site security, and deed restrictions) limiting access to the site property will be maintained, limiting the potential for human contact with the soils over the short term. As the only significant short-term risks identified in the Endangerment Assessment were associated with potential consumption of contaminated soils, all of the alternatives are judged to adequately

address this risk.

Criterion 6. Implementability

Each of the alternatives considered is implementable. Those which involve solidification/stabilization are considered somewhat less preferable in terms of implementability because of the uncertainty in the development of effective solidification technology. The technologies involved in incineration and waste fuel recovery have been established and are in use at many other sites. Bioremediation of the wastes from this site has been demonstrated in bench-scale studies, and is expected to prove to be effective in the field. Bioremediation in its various forms has been conducted or is in process at many other sites.

Criterion 7. Cost

The cost of Alternative 18, while quite substantial, is considerably less than the other Alternatives which achieve similar effectiveness in relation to the above criteria.

Criterion 8. State Acceptance

The Ohio Environmental Protection Agency (Ohio EPA) has been closely involved with the development and review of all aspects of the Remedial Investigation, Feasibility Study, Endangerment Assessment, and all related documents for this Site. The Ohio EPA has also been closely involved in the remedy selection process. The Proposed Plan was issued as a joint proposal of the U.S. EPA and Ohio EPA.

A letter from the Director of the Ohio EPA indicating Ohio EPA's concurrence on this Record of Decision has been received by the U.S. EPA.

Criterion 9. Community Acceptance

The comments received during the public comment period, the discussion which occurred during the Proposed Plan public meeting, the discussion which occurred at a subsequent question and answer session held before the Ironton City Council, and questions raised during community interviews have been considered by U.S. EPA.

Several members of the community, and some members of the Ironton City Council, have expressed their preference to begin the site cleanup as soon as possible. However, there have been two requests to extend the public comment period. The first request was made at the Proposed Plan public meeting by a lawyer from outside the community. At this first request, a 30-day extension to the public comment

period was granted. At the end of this period, the Ironton City Council, through its legal representative, requested a further extension to the public comment period. The second request was for an additional four months, and asked that the ROD be delayed until the results of certain biotreatability studies were completed. However, as discussed in the Responsiveness Summary, the bioremediation results which would be developed during this four-month period would not be sufficient to make a final determination as to the effectiveness of in-situ bioremediation. Four months from now, we will not know significantly more than we know now. The U.S. EPA determined that public health and the environment would be better served by finalizing the ROD in its present form so that implementation of the many aspects of the ROD could commence, rather than waiting for an additional four months. Therefore, the U.S. EPA denied the second request for an extension of the public comment period.

In summary, the U.S. EPA has determined that the selected alternative provides the best balance with respect to the nine criteria used to evaluate remedies. Based upon the information available at this time, therefore, the U.S. EPA and the OEPA believe that the selected alternative would protect human health and the environment, would comply with ARARs as qualified above, would be cost-effective, and would utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected alternative will satisfy the statutory preference for treatment as a principal element by utilizing bioremediation and waste fuel recovery.

IX. Selected Alternative

The Selected Alternative, detailed description

The selected alternative is a slight modification of Alternative 18, with the addition of the land treatment bioremediation of Tar Plant soils and off-site disposal of the ash and scrubber wastes resulting from the waste fuel recovery.

This alternative provides for treatment of the source material and of the groundwater, and monitoring of the Ice Creek sediments. The major components of this action are:

- Excavation of the entire volume of Lagoon 5 (122,000 cubic yards (cy)),
- On-site Waste Fuel Recovery of Lagoon 5 material plus 31,000 cy of waste coal excavated from the coal overburden area (ash will be disposed of off-site at a facility permitted to accept solid

waste),

- Excavation and subsequent bioremediation on a prepared pad of approximately 40,000 cy of Coke and Tar Plant soils,
- In situ bioremediation of the remaining volume of material (475,000 cy) contained in Lagoons 1 through 4, the residual soils of Lagoon 5, and the adjacent inner and outer dikes,
- Monitoring of the Ice Creek area and development of a contingency plan in the event that contaminant migration is encountered,
- Monitoring of the site groundwater,
- Groundwater collection and treatment,
- Deed restrictions, and
- Fencing.

This alternative is comprised of several component technologies and treatment methods, each designed for effective remediation of the areas outlined above.

Waste Fuel Recovery

Lagoon 5, which contains a high-BTU content listed waste (K087 - Decanter Tank Tar Sludge), provides a source of material suited for incineration in an industrial burner equipped for the recovery of waste heat (Waste Fuel Recovery (WFR)). The material excavated from the coal overburden area is composed of coal and coke fines and will be mixed with the Lagoon 5 material to improve the material handling characteristics. Additionally, this material will further reduce the supplemental fuel requirement needed to maintain adequate combustion. Should on-site WFR of this material over a reasonable period of time be unachievable, WFR at a commercial facility permitted to accept such waste material will be evaluated. If the on-site re-use of the steam generated from the WFR unit becomes infeasible, an alternative must be developed, involving either a new method of re-use of the steam, or WFR at a commercial unit permitted to accept such waste material. The on-site Waste Fuel Recovery system considered for the purpose of developing cost estimates involves the following steps:

1) feed preparation (primary crushing and classification),
2) rotary kiln incinerator,
3) heat recovery system, and

4) emission control equipment.

The system will be designed to process over 80 tons per day of waste material. The steam generated in this process will be used in the on-site tar plant. The fuel saving cost associated with this steam generation and re-use are included in the cost estimate for this remedy.

The Waste Fuel Recovery system shall be designed and operated so that 99.99% destruction of carcinogenic polynuclear aromatic hydrocarbons is achieved. Emission control equipment shall be designed and operated so that ambient air quality and point source emission standards listed in the Applicable, Relevant and Appropriate Standards (ARARs) are met.

The waste materials will be excavated from Lagoon 5 and from the coal overburden area at a rate proportional to the processing capacity of the Waste Fuel Recovery System, in order to prevent undue accumulation of material in the segregation area. Any materials which do accumulate in the waste segregation area will be handled in accordance with the requirements of 40 CFR part 264.

The ash resulting from the Waste Fuel Recovery operation will, by exemption (40 CFR 261.3(c)(2)(ii)(B), and 40 CFR 261.6(a)(3)(vii), generate ash that is termed non-hazardous. This classification will be verified through TCLP testing prior to disposing of the materials. If non-hazardous, the ash will be disposed of as a solid waste at a permitted facility. If the ash is found to be hazardous according to the TCLP testing, Allied shall submit a plan for the management of these material to the U.S. EPA.

The materials in Lagoon 5 are believed to be visually discernable from the materials remaining in the other lagoons, and from the underlying natural stream sediments, in that Lagoon 5 contains a sludge-type material and tarry substances. Lagoon 5 materials shall be excavated until it is visibly determined, to the satisfaction of U.S. EPA, that naturally deposited stream sediments have been encountered. The five waste lagoons are presently separated by berms. Lagoon 5 is further differentiated from the other four lagoons in that it is a mound rather than a depression. The extent of Lagoon 5 which will initially be excavated is shown roughly in Figure 1-4 (attached). The excavation shall proceed laterally until the U.S. EPA is satisfied, based upon visual observation, that the full volume of materials discernable as being similar to the bulk of the Lagoon 5 materials has been removed. The berms at the boundary of Lagoon 5 are expected to be composed mainly of coal and coke fines, and soil materials.

Approximately 30,000 cubic yards of waste materials which lie

upon the surface of Lagoons 2 and 4 are potentially suitable for waste fuel recovery (Feasibility Study, Appendix B, Section 3). However, the limited number of samples of these materials which have been analyzed showed no detected levels of contaminants. These materials will be resampled to determine the concentrations of organic contaminants which are present. If these materials contain total carcinogenic PAHs at concentrations greater than .97 mg/kg, these materials will be burnt in the waste fuel recovery unit, at an added cost of approximately $535,000. If the concentrations of arsenic in these materials are greater than .56 mg/kg, they will be managed in accordance with a plan approved by the Agencies. If the concentrations of total carcinogenic PAHs and arsenic are less than the concentrations listed above, they will be moved out of the lagoons prior to the commencement of in-situ bioremediation, and will be handled in accordance with a management plan approved by the Agencies.

The Waste Fuel Recovery unit is to be used only for the destruction of waste from this Site. After the completion of Waste Fuel Recovery operations, the unit will be dismantled and removed from the Site.

In-situ Bioremediation

Lagoons 1 through 4, the soils remaining in Lagoon 5 after removal of the waste materials, and the adjacent dikes were selected for in-situ bioremediation. The organic contaminants which are present in the lagoon waste materials are known to be amenable to degradation by indigenous bacteria. These bacteria can break down the contaminants for use as a source of energy and nutrition. In order to stimulate biodegradation, it is necessary to provide nutrients and oxygen to these bacteria. This can be achieved, while leaving the wastes in place, by installing a series of injection and withdrawal wells. Water to which oxygen and nutrients has been added will be pumped into the injection wells, which will penetrate the waste materials. The water, oxygen and nutrients will flow through the waste materials, stimulating the growth of the bacteria, and the breakdown of the contaminants. The water will gradually be depleted of oxygen and nutrients as it flows through the wastes, and withdrawal wells will be positioned properly in order to remove the water after is has become depleted. It is estimated that approximately 80 to 100 injection and withdrawal wells will be required in order to evenly distribute concentrations of oxygen and nutrients sufficient to sustain biodegradation. Water which is removed from the withdrawal wells will be treated in the on-site wastewater treatment plant described below.

A spray distribution system will be installed in order to deliver nutrient-enriched water to the waste materials above the water table. This spray system will be designed and operated so that

nutrients will be provided evenly to the waste materials within the lagoons, at concentrations sufficient to stimulate bioremediation, and will be operated only in non-freezing conditions.

Treatability Study

After the signing of this Record of Decision, a pilot study will be conducted on-site within the lagoons. This study will be conducted for one year; in-situ bioremediation will be re-evaluated at the end of this one year test.

This pilot study will be conducted as a small-scale version of the in-situ bioremediation program, and will include injection wells, withdrawal wells, and a surface spray system. The waste materials within the test plot will be sampled before commencement of operation. A sufficient number of samples will be taken so that a statistically significant decrease in the concentration of polynuclear aromatic hydrocarbons will be observable. The test plot will be sampled monthly during its operation. At the end of one year of operation, the test plot will be re-sampled, and again, a sufficient number of samples will be taken so that a statistically significant decrease in the concentration of polynuclear aromatic hydrocarbons can be demonstrated. For the purposes of the treatability study, a statistically significant decrease shall mean that the lower bound of the 95% confidence interval for the difference between sample means shall be at least ten percent (10%).

Tests for normality and homogeneity of variance will be performed on the data. If these tests indicate that a Student's T-test would be applicable, then a detailed Student's T-test as described in Chapter 9 of Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods, SW-846, U.S. EPA, will be used to demonstrate a statistically significant decrease as defined above. If the criteria for normality and homogeneity of variance are not or cannot be met, then accepted non-parametric alternatives to the Student's T-test will be used.

If a statistically significant decrease in the concentration of polynuclear aromatic hydrocarbons is demonstrated in this test plot, then in-situ bioremediation may be implemented. However, if a statistically significant decrease in not observed at the end of one year of operation of this test plot, the U.S. EPA and Ohio EPA will re-examine the selection of in-situ bioremediation for these lagoon materials. This re-examination may result in the selection of a different cleanup technology for these lagoon materials.

During the performance of the testing of in-situ bioremediation, the U.S. EPA will proceed with implementation of the remaining aspects of the remedy.

Five-year Reviews

The effectiveness of the remedial action shall be evaluated by the U.S. EPA every five years after commencement of the remedial action as required by Section 121(c) of CERCLA. This evaluation shall include an analysis of the effectiveness of all aspects of the remedy, and specifically of the bioremediation systems and their ability to meet the cleanup standards. Additionally, the in-situ bioremediation system will be evaluated in terms of the rates of degradation of the contaminants of concern. If the Agencies determine that continued operation of the bioremediation system is advisable, based upon trends observed in samples of groundwater and treated soils taken during the five-year period of operation, then the system will be operated for an additional period of time to be determined by the Agencies.

Surface Bioremediation on a Prepared Pad

Waste constituents found in contaminated coke plant and tar plant soils are biodegradable and have been selected to undergo treatment in an above-grade prepared pad bioremediation system.

The areas of contaminated soil materials to be excavated shall be approximately the areas shown in Figure A. The areal extent shown for each of these areas is only approximate. The full extent of soil removal for each of these areas will be determined based upon testing of the soils remaining in the excavated area after soil removal. The soil removal shall start with the removal of the soils to the approximate extent shown in Figure A. If necessary, samples may be taken prior to the soil removal to more fully delineate the extent of contamination. If there is an apparent visible boundary to the contaminated soil, the initial excavation shall proceed to the visible boundary. After the initial excavation, the soils remaining at the bottom and sides of the excavations shall be sampled to determine whether the soil cleanup levels given in Table 2 have been met. If not, further soils shall be removed and treated until the Table 2 levels have been met.

If, during excavation of the coke plant and tar plant soils, any materials, such as tar, which are not amenable to bioremediation are encountered, these materials will be burned in the Waste Fuel Recovery unit.

A facility for bioremediation of coke plant and tar plant soils will be constructed on site. A typical cross-section of the facility is shown in Figure 5-31. Aeration of the soils will be accomplished by tilling the area on a weekly basis. At the same time, a mixture of nutrients will be added and mixed into the soil. The progress of bioremediation and nutrient levels will be monitored so that the nutrient feed rates may be adjusted to

provide the proper environment for the bacterial growth. All appropriate methods for vapor and dust suppression will be included in order to minimize potential risks to workers and the public.

Clean-up goals applicable to bioremediation

To adequately protect human health and the environment, bioremediation must achieve a reduction of carcinogenic polynuclear aromatic hydrocarbons in treated soils and wastes that attains a final cumulative cancer risk level of 10^{-4} to 10^{-6} (one in 10,000 to one in 1,000,000), with a goal of 10^{-6}, and a non-carcinogenic hazard index of less than one. These risks are based on a conservative hypothetical scenario of on-site residents, specifically children, ingesting soils. The levels of polynuclear aromatic hydrocarbons which are associated with a carcinogenic risk level of 10^{-6} are given in Table 2 (attached).

If concentrations of carcinogenic PAHs and arsenic at the end of the bioremediation program are greater than the 10^{-6} level given in Table 2, but fall within the U.S. EPA risk range of 10^{-4} to 10^{-6}, then Allied will be required to submit a contingency plan to the Agencies. This contingency plan shall propose methods to limit the potential for human contact with the soils. For example, in the lagoons area, this may involve provisions for adjustment of the elevation and contours of the lagoons such that the area will be inundated with waters from Ice Creek often enough to create a permanent wetland ecosystem, to be part of the existing Ice Creek wetland complex. In the Coke and Tar Plant soils areas, this is expected to include provision of clean cover material, so that the treated soils are covered with five feet of clean fill.

In addition to achieving cleanup levels based upon soil ingestion by humans, as given in Table 2, Allied must demonstrate that the concentrations of contaminants remaining on site after the completion of bioremediation will not cause an exceedance of the groundwater cleanup levels given in Table 1. Soil/waste cleanup levels which would be expected to be protective of the groundwater, based upon partition coefficient calculations, and including no provision for dilution, are given in Table 3. These numbers may be modified in the future based upon laboratory leach testing of treated soils/wastes, and upon field demonstrations of actual on-site dilution ratios. In addition, laboratory leach tests must be performed on treated wastes in order to demonstrate that the cleanup levels achieved through bioremediation will not result in exceedance of the groundwater cleanup levels for cyanide and arsenic.

Ice Creek

Ice Creek will receive limited action, which includes installation of additional monitoring wells in between Ice Creek and the Coal Grove wellfield, periodic analysis of groundwater quality in areas which can potentially be affected by contaminant migration from Ice Creek, and development of a contingency plan in the event that contamination is discovered in these targeted off-site areas. The contingency plan will include provisions for monitoring, evaluating and remediating any problems that are detected, and potentially providing an alternate water supply to any affected users.

Groundwater Management Control System

The Groundwater Management Control System will begin operation prior to initiation of any other remedial activities. A series of pumping wells will be installed downgradient of all areas of on-site contamination. These wells will be designed and operated so that all of the potentially contaminated groundwater which leaves the site will be captured. The water will be treated at a facility constructed on-site specifically for this purpose. Groundwater pumped from the Goldcamp Disposal Area operable unit may also be treated at this facility. The system will continually pump and treat site groundwater, with a portion being reinjected in the bioremediation area and the remainder being discharged to the Ohio River in accordance with National Pollutant Discharge Elimination System (NPDES) requirements.

Groundwater monitoring will be performed in the Coke Plant and the Tar Plant for a minimum of 30 years. The locations of wells will be determined during the design phase of the project. Monitoring shall be conducted at locations such that any contaminants potentially leaving the site would be detected, and so that the progress of site remediation may be monitored. Monitoring will be continually performed during and subsequent to remediation to assess the effectiveness of remedial activities.

A method for the analysis of polynuclear aromatic hydrocarbons (PAHs) in groundwater at extremely low concentrations (parts per trillion) is needed at the site given the high carcinogenic potency of these compounds. This method is presently in development for use at this site. Once this analysis method is complete and approved, the groundwater will be re-sampled and analyzed to determine the background concentrations of these compounds, and their concentrations in the downgradient direction.

Fencing

A fence will be maintained around the site until completion of the remedial action.

Institutional Controls

In addition to the remedial actions described for this alternative, institutional controls in the form of deed restrictions will be implemented at the site to minimize the potential for improper use of the areas of concern. The deed restrictions will be designed to prevent any future residential or recreational use of the site.

Cost

The costs of the selected remedy are approximately those of Alternative 18:

Estimated Capital Cost: $21,000,000
Estimated Total O&M Cost: $28,500,000
Total Estimated Cost: $49,500,000

Timeframe for Implementation

While the finishing touches of this site cleanup may not be complete until 35 years from now, the vast majority of the site cleanup will take place in the first 7 to 10 years. A groundwater pump and treat system to protect the Ohio River and the Coal Grove wellfield from site contaminants will be installed as soon as possible, and will be effective as soon as the pumps are turned on. A large volume of highly contaminated wastes from Lagoon 5 will be incinerated via Waste Fuel Recovery. The majority of contaminant reduction due to bioremediation is expected to occur in the first 10 to 12 years.

X. Statutory Determinations

The following is a brief description of how the selected remedy meets the statutory requirements of Section 121 of CERCLA.

Protection of Human Health and the Environment.

The Endangerment Assessment which was developed for this site indicates that the pathways through which human health and the environment may be impacted are:

1) ingestion of contaminated site soils and wastes by humans, and

2) ingestion of contaminated groundwater.

Implementation of the selected remedy will reduce and control potential risks to human health and the environment posed by exposure to these two pathways through a variety of means. The contaminated soils will be treated via bioremediation and waste fuel recovery to reduce their toxicity and carcinogenicity. Contaminated groundwater will be collected and treated, and the treatment of the contaminated soils and waste materials will be designed to eliminate the site as a source of contamination to the groundwater. Groundwater cleanup levels are given in Table 1 (attached). The soils and wastes will be treated so that risk levels associated with ingestion of contaminated soils and wastes will fall within the cumulative risk range of 10^{-4} to 10^{-6} for carcinogenic compounds and so that the cumulative hazard indices for non-carcinogens will be less than one.

Implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The selected remedy is designed to meet all applicable or relevant and appropriate requirements (ARARs) of Federal and State statutes in accordance with Section 121(d)(1) of CERCLA, except where it will be necessary to obtain waivers from the State. CERCLA Section 121(d) allows for selection of a remedy that does not attain ARARs under limited circumstances. The waivers of ARARs at the Allied site are justifiable because "compliance with such requirements is technically impracticable from an engineering perspective" and "the remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach". In addition, the selected remedy will proceed in accordance with certain Federal and State environmental criteria, guidance or policy to be considered (TBCs).

The Federal ARARs include RCRA (40 CFR Part 260-271), the Safe Drinking Water Act (40 CFR Section 141.11 and .12), the Clean Water Act (40 CFR Parts 122, 125 and 131), and the Clean Air Act (40 CFR Parts 50, 60 and 61). State ARARs include the Ohio Revised Code (ORC) Chapters 1521, 3704, 3734, 3767, 6101 and 6111. Rules for implementation of these requirements are contained in the Ohio Administrative Code (OAC) 1501 and 3745.

The following specific ARARs will be met by the selected remedy:

Air

* National Ambient Air Quality Standards (40 CFR Part 50)

* National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61)

* New Source Performance Standards (40 CFR Part 60)

Groundwater

* Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act (SDWA). These are the maximum contaminant concentrations allowed in regulated public water supplies. These levels apply at the tap to public water systems having at least 15 service connections or regularly serving at least 25 individuals. Levels are based on a chemical's toxicity, treatability, and analytical limits of detection.

* Non-Zero Maximum Contaminant Level Goals (MCLGs) for specific contaminants, such as ammonia, cyanide, phenolics, benzene, and arsenic. See attached Table 1.

Surface Water

* National Pollutant Discharge Elimination System (NPDES) Requirements. The treated groundwater discharged into the Ohio River will meet the technical requirements of Section 402 of the Clean Water Act (CWA), NPDES requirements.

Soil

* RCRA Land Disposal Restrictions (40 CFR Part 268)
The selected remedy involves in-situ treatment of contaminated soil and groundwater extraction and treatment at the site. Since in-situ treatment will occur entirely within the area of contamination, disposal will not occur as part of the selected remedy. Thus, RCRA closure requirements for clean closure and landfill closure are relevant and appropriate.

Ohio Revised Code

* ORC Chapter 3734 provides statutory authority for the regulations of solid and hazardous waste activities in the State of Ohio. As such, this chapter as a whole can be applied to any remedial action as a State ARAR.

The Ohio EPA hazardous waste regulations developed on the basis of Chapter 3734 of the ORC can be found in Section 3745-50 to

3745-59 of the Ohio Administrative Code. These regulations closely track U.S. EPA hazardous waste regulations.

ORC Chapter 6111 establishes Ohio EPA's authority to set water quality standards (Section 6111.04) and regulate water pollution sources. The rules developed and implemented by Ohio EPA based on Chapter 6111 ORC are contained in OAC Section 3745-1-03 through 3745-1-16. These ARARs also pertain to Ice Creek.

ORC Chapter 3704 provides statutory authority for the regulations of air pollution control in the State of Ohio. As such, this chapter as a whole can be applied to any remedial action as a State ARAR.

The Ohio EPA air pollution control regulations developed on the basis of Chapter 3704 of the ORC can be found in Sections 3745-15 to 3745-26 of the Ohio Administrative Code.

To Be Considered Values

* Cancer Potency Factors

* Water Quality Criteria

* Health Advisories

The Federal and State ARARs for this site are attached. In order to implement this remedy, it will be necessary to waive several State requirements, as described in Section VIII above. The remedy will meet or exceed the remaining ARARs.

Cost-Effectiveness.

An analysis of cost effectiveness of the selected remedy indicates that the remedy chosen is cost effective. While the overall cost of the remedy is high, the volume of material to be treated is also large. Innovative technologies (bioremediation) and optimization of resource recovery and its associated cost savings (waste fuel recovery) have been utilized, and have helped to increase the cost-effectiveness of the remedy. The selected remedy satisfies the appropriate ARARs and is protective.

Utilization of Permanent Solutions and Alternative Treatment (or resource recovery) Technologies to the Maximum Extent Practicable (MEP).

The U.S. EPA believes 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 final remedy at the Allied-Ironton site. Of the alternatives

that are protective of human health and the environment and comply with ARARs, U.S. EPA has determined that the selected remedy provides the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility or volume achieved through considering the statutory preference for treatment as a principal element and considering the State and community acceptance.

The two waste treatment technologies utilized at the site, bioremediation and waste fuel recovery, are applied to approximately 619,000 cubic yards of waste materials. Each of these technologies achieve permanent destruction of the waste constituents.

Preference for Treatment as a Principal Element.

The principal threats at this site are dealt with through treatment. All of the contaminated waste materials and soils to be dealt with through this remedy will be treated, either by bioremediation, or through waste fuel recovery. Therefore, the statutory preference for treatment as a principal element of the cleanup method is met.

XI. Additional Studies

Section 311 of CERCLA, 42 U.S.C. Section 9660, provides that U.S. EPA shall conduct "research, evaluation, testing, development, and demonstration of alternative or innovative treatment technologies which may be utilized in response actions to achieve more permanent protection of human health and welfare and the environment."

Bioremediation is an innovative technology which involves utilizing the indigenous microflora in the degradation of contaminants in soils and groundwater. A field test plot in which in-situ bioremediation can be evaluated will be constructed within the contaminated waste lagoons. This test plot will be operated as a smaller (15 by 15 feet) version of the in-situ bioremediation system described in Section IX above, and will be run for one year. Based on the results of this one year pilot study, bioremediation will be evaluated to determine whether statistically significant decreases are being achieved for the contaminants of concern, PAHs. Bioremediation as a preferred remedy will be reevaluated at the conclusion of the one year test pilot study.

XII. Documentation of Significant Changes

The selected alternative is identical to the Preferred Alternative as described in the Proposed Plan. If in-situ bioremediation is determined not to be a viable technology for this site as a result of the one-year treatability study, the Record of Decision will be amended accordingly.

Table 1

Allied Chemical and Ironton Coke
Superfund Site
Operable Unit 2
Coke Plant/Lagoons Area

Groundwater Cleanup Levels

PARAMETER	CONCENTRATION
Ammonia	30 mg/l
Nitrate	10 mg/l
Total Cyanide	0.2 mg/l
Phenolics	4.0 mg/l
Benzene	0.005 mg/l
Naphthalene	0.3 mg/l
Total Carcinogenic PAHs	0.005 ug/l
Arsenic	0.05 mg/l

Note- Total Carcinogenic PAHs in groundwater, for the purposes of this Record of Decision, is defined as the sum of the concentrations of Benzo(a)pyrene and Dibenzo(a,h)anthracene.

These values are based upon the site-specific risk assessment, MCLs, and Health Advisories.

Table 2

Allied Chemical and Ironton Coke

Soil/Waste Cleanup Levels

PARAMETER	CONCENTRATION
Total Carcinogenic PAHs	.97 mg/kg
Arsenic	.56 mg/kg

Note- Total Carcinogenic PAHs in soil/waste is defined, for the purposes of this Record of Decision, as the total of the concentrations of Benz(a)anthracene, Benzo(a)pyrene, Chrysene, and Dibenz(a,h)anthracene.

These values are based upon the site-specific risk assessment, assuming ingestion of contaminated soils/wastes by hypothetical future on-site residents, and represent the concentrations posing a 10^{-6} level of cancer risk to these individuals. In addition, to demonstrate compliance with a 10^{-6} risk level, the cumulative risk level must be shown not to exceed a 10^{-6} level of cancer risk to these individuals.

Table 3

Allied Chemical and Ironton Coke

Soil/Waste Cleanup Levels
For Protection of Groundwater

PARAMETER	CONCENTRATION
Total Carcinogenic PAHs	1.4 mg/kg of organic carbon
Benzene	0.485 mg/kg of organic carbon
Napthalene	650 mg/kg of organic carbon

Note- These values are based upon partition coefficient calculations, in which the concentration of a particular contaminant in the groundwater is projected based upon laboratory octanol/water partition coefficients. Actual soil cleanup levels must be corrected for the actual concentration of organic carbon remaining in the soils/wastes after treatment.

Since no partition coefficients are currently available for cyanide and arsenic, leach tests will be performed on the treated waste materials in order to determine the concentrations of cyanide and arsenic which will be protective of the groundwater. These leach tests may also be used to determine the actual field partition coefficients on treated wastes for the above contaminants.

The values in this table assume no dilution takes place. These numbers may be modified in the future based upon a field demonstration of the actual amount of dilution which takes place on the site.

Responsiveness Summary for the Record of Decision

A. Overview

Public reaction to the Proposed Plan was mixed. There were a number of expressions of support for the Preferred Alternative, but there were also some expressions of concern, particularly over the selection of in-situ bioremediation as a component of the remedy.

B. Community Relations Activities

The following are the community relations activities conducted at the Allied Chemical and Ironton Coke Superfund site (Allied site) from the completion of the Feasibility Study to the end of the public comment period.

1. U.S. EPA and Ohio EPA prepared a Proposed Plan in September 1990 for distribution to individuals on the mailing list. The Administrative Record was placed in the local information repository at the Briggs Lawrence County Public Library.

2. U.S. EPA placed a public notice in the local Ironton newspaper to announce the beginning of the public comment period on September 28, 1990, as well as to announce the public meeting which was held on October 23, 1990.

3. U.S. EPA placed a second public notice in the local Ironton newspaper on September 23, 1990 to announce the public meeting to be held that evening.

4. U.S. EPA and Ohio EPA conducted a public meeting on October 23, 1990, to explain the details of the Feasibility Study and Proposed Plan, to answer questions from interested members of the community, and to accept public comments from the community. A court reporter was present to record the meeting. U.S. EPA also prepared graphic illustrations and a hand-out to help explain the details of the Proposed Plan.

5. A request for an extension to the public comment period was made at the October 23, 1990 public meeting. As a result of this request and other community concerns, the U.S. EPA granted a 30-day extension to the public comment period.

6. U.S. EPA conducted community interviews with local officials, residents, and a local environmental interest group to assess current community concern regarding the Allied site and evaluate past community relations activities conducted in the community. The interviews were conducted November 7 and 8, 1990. The information gathered during these interviews will be used in revising the 1986 community

relations plan. In addition, U.S. EPA used the information to update the mailing list for the Allied site.

7. U.S. EPA placed a public notice in the local Ironton newspaper announcing the extension of the public comment period to November 28, 1990.

8. U.S. EPA and Ohio EPA conducted a second presentation of information regarding the Feasibility Study and Proposed Plan to the Ironton community as part of the Ironton City Council meeting on November 19, 1990. U.S. EPA prepared a "Question & Answer" fact sheet to provide easy-to-understand answers to questions raised by community members during the community interviews (see #6).

9. U.S. EPA distributed copies of the "Question & Answer" fact sheet to all individuals on the updated mailing list for the Allied site.

C. Summary of Public Comments and Lead Agency Response

Comments 1 through 11 were made by a Cleveland, OH attorney on behalf of the Ironton City Council.

1. Comment

The Record of Decision should not be executed until the results of Allied Signal's bioremediation "treatability study" have been reviewed by Ohio EPA and U.S. EPA, and only after each of those Agencies has determined that the Allied Signal treatability study conclusively establishes that bioremediation will effectively and efficiently remediate the conditions now existing at the site.

Response

The U.S. EPA believes that Public Health and the Environment will be best served by moving ahead with a Record of Decision on this site. A delay in the Record of Decision would cause a delay in the implementation of all aspects of the remedy, not just the bioremediation.

As described in the Record of Decision (see pp. 23-31), the remedy includes a groundwater pump and treat system and a large-scale Waste Fuel Recovery project. The groundwater pump and treat system will effectively provide a barrier to off-site migration of contaminated groundwater as soon as its operation commences. The Waste Fuel Recovery system will provide efficient destruction of the wastes in Lagoon 5, which are the most highly contaminated materials on the site. Public health and the environment will be better served by beginning implementation of these aspects of the

remedy while the biotreatability study described in the Record of Decision is being conducted, than by waiting until the biotreatability testing is complete.

2. Comment

The Feasibility Study fails to give adequate consideration to the fact that the bioremediation portion of the remedy will take approximately thirty-five (35) years to be fully effective. In contrast, other alternatives considered in the Feasibility Study remedy the conditions found at the site in a much quicker manner. While these other alternatives may be more expensive, they provide public health benefits much more quickly.

Response

The Feasibility Study provides adequate consideration of the time frame involved with in-situ bioremediation. This consideration is discussed in the Feasibility Study under Section 6.0, Detailed Analysis of Alternatives.

While the site cleanup may not be complete until 35 years from now, the vast majority of the cleanup will take place in the first 7 to 10 years. A groundwater pump and treat system to protect the Ohio River and the Coal Grove wellfield from site contaminants will be installed as soon as possible, and will be effective as soon as the pumps are turned on. A large volume of highly contaminated waste will be incinerated via the Waste Fuel Recovery unit. Furthermore, the majority of contaminant reduction due to bioremediation is expected to occur in the first 10 to 12 years.

To get the full picture, it is helpful to refer back to the Endangerment Assessment, which indicates that the hazards posed by the site are through ingestion of soil and contaminated groundwater by hypothetical future on-site residents, and through potential off-site migration of groundwater. People are only endangered by the site in its present condition if they trespass onto the site and consume contaminated soils on a regular basis, or if contaminated groundwater migrates off-site and is consumed.

Therefore, the U.S. EPA has designed the Selected Remedy to address these two possible scenarios for short-term risk. Once the groundwater pump and treat system is operating, and given that site security and fencing is already in place, these short-term risks are addressed. This mitigation of short-term risk has allowed U.S. EPA to select in-situ bioremediation for Lagoons 1 through 4 which, while expected to take longer than incineration, will utilize enhancement

of natural degradation processes.

3. Comment

The conditions existing in and adjacent to Ice Creek have not been fully studied.

Response

The conditions existing in and adjacent to Ice Creek have, in fact, been the subject of an extensive and exhaustive study as part of the Remedial Investigation Feasibility Study at this site. The water in the stream has been sampled and analyzed from six locations upstream and downstream of the site. Samples of the stream sediments have been collected and analyzed at eleven locations upstream and downstream of the site. An ecological study of species diversity was conducted. An extensive sampling of fish livers for tumors was conducted. The flow of groundwater into and out of Ice Creek was modeled as part of the Remedial Investigation.

These studies may be viewed in at least the following portions of the Administrative Record:

- Final Report on Aquatic Ecological Studies at Allied Chemical's Ironton, Ohio Coke Site, Battelle Columbus Laboratories, 1984 (contained as an appendix to the Endangerment Assessment)
- Investigation of Neoplasia Occurrences in Ice Creek Fish Populations, Ironton, Ohio, IT Corp., 1990 (Appendix C of the Feasibility Study)
- Technical Memorandum, Ice Creek Investigation, IT Corp. 1986 (Appendix D of Remedial Investigation)
- Technical Memorandum, Analysis of Ground Water Flow and Mass Transport, IT Corp., 1986 (Appendix F of Remedial Investigation)
- Remedial Investigation, IT Corp., 1986 (Sections 4.2, 4.3)

4. Comment

The decision to do nothing more than monitor the conditions in and around Ice Creek is unacceptable.

Response

The commenter did not give any explanation for this opinion. The commenter has also mis-stated the nature of the Preferred Alternative. As stated in the ROD, the remedy includes monitoring of groundwater flowing away from Ice Creek toward the Coal Grove Well field. The purpose of this monitoring is not just to watch for contamination. If contamination is detected, action will be taken to prevent this contamination from reaching any consumers of drinking water.

The contamination in Ice Creek could only impact human health and the environment in a limited number of ways. These are: potential groundwater contamination migrating to the Coal Grove Wellfield, potential effect on aquatic organisms living in the Creek, exposure to swimmers in Ice Creek, and migration of contamination to the Ohio River. Monitoring conducted as part of the Remedial Investigation and Feasibility Study did not indicate that Ice Creek is presently having any adverse impact on the Coal Grove well field or the Ohio River. The impact on aquatic organisms would be expected to manifest itself in the form of tumors in fish livers. Several hundred fish were collected, and no tumors were found. The Endangerment Assessment indicated that the risk to swimmers is not significant. Furthermore, the wetlands in Ice Creek are a valuable ecological resource, and any action other than monitoring would necessarily disturb the biota.

Therefore, the U.S. EPA determined that the proper thing to do with the Ice Creek sediments is to leave them in place and monitor them for potential future contamination. If contamination is detected in the future, action will be taken, as detailed in the ROD.

5. Comment

The Administrative Record does not demonstrate that bioremediation has been effective at any site where the type of *in situ* bioremediation planned for the Allied-Signal site has been used.

Response

Bioremediation is an emerging technology which shows considerable promise. However, the information available involving the progress of cleanups at specific sites is limited in availability.

The information provided in the Administrative Record shows

that bioremediation has been successful in the treatment of a variety of waste materials, using a range of methods. However, this information does not provide us with the certainty that in-situ bioremediation will be effective at this site. This is why the selected remedy includes a one-year pilot study test of bioremediation within the contaminated waste lagoons, the success of which is a prerequisite to its implementation.

6. Comment

The Administrative Record fails to describe with reasonable particularity the method(s) of bioremediation which will be used at the site.

Response

Detailed descriptions of the bioremediation systems proposed for the site are given in the Feasibility Study, Section 5.0, Detailed Description of Alternatives. The level of detail provided in the Feasibility Study is sufficient to allow U.S. EPA to compare the various alternatives. A much more detailed description of the bioremediation systems will be developed during the Remedial Design phase.

7. Comment

The materials placed in the Administrative Record in late October, 1990 concerning bioremediation at the Champion International site in Montana are irrelevant to the U.S. EPA's determination that bioremediation will be an effective remedy at the Allied-Signal site.

Response

The author of this comment requested that information supportive of the bioremediation portion of the Proposed Plan be placed in the Administrative Record. One of the components of the Proposed Plan is surface bioremediation of approximately 40,000 cubic yards of contaminated soil materials from the Coke Plant and Tar Plant areas. The method of bioremediation performed at the Champion International site is very similar to that selected for the Coke Plant and Tar Plant soils, and has shown rapid success in testing. This information is therefore very relevant to U.S. EPA's Proposed Plan and selected remedy, and directly responsive to the commenter's request made at the October 19, 1990 Public Meeting.

8. Comment

The refusal of U.S. EPA to extend the public comment period on the Feasibility Study until the City can examine the results of Allied-Signal's treatability study is arbitrary, capricious, unreasonable, contrary to the National Contingency Plan, and constitutes a denial of due process law.

Response

The denial of a second extension of the public comment period for the Allied Site is within Agency discretion under the National Contingency Plan (NCP). For remedial actions, a minimum 30 day public comment period on the proposed plan is required. The period will be extended 30 additional days upon a timely request. In order to be timely, the request should be received within two weeks of the initiation of the public comment period. The lead agency may extend the comment period on its own initiative when it is appropriate or necessary to do so or announce from the outset that it will be longer than 30 days.

The public comment period for the Allied Site began on September 28, 1990, and was scheduled to expire on October 28, 1990. The City was sent a Proposed Plan on September 28, 1990, the first day the plan was made available to the public. The Proposed Plan stated when the comment period was due to expire. It was not until October 23, at the public meeting, when interest was shown in extending the public comment period to allow additional information on bioremediation to be put into the Administrative Record. Although it was not a timely request, the Agency extended the comment period an additional 30 days until November 28, an appropriate and reasonable amount of time in keeping with the purposes of the NCP. The requested information was added to the Administrative Record on November 1, which allowed the public ample opportunity to review the documents. The City waited until November 21 to request a second extension by mail, which was not received until November 23, less than five days before the expiration of the second comment period. The Agency feels that there is no sufficient reason to justify delaying implementation of the Proposed Plan. The Agency's decision to deny the City's request for a second extension of the comment period is in full compliance with all applicable statutes, regulations, and laws.

9. Comment

Statements made to elected officials in Lawrence County, Ohio that public meetings on the Feasibility Study were going to be canceled when, in fact, these meetings actually took place on schedule, were contrary to the National Contingency Plan, and have deprived the citizens of Lawrence County of due process of law.

Response

The commenter raised this concern in two separate letters, but did not identify the identity of the elected officials in either letter.

The U.S. EPA is aware that there was a misunderstanding with the Mayor of Coal Grove regarding the date of the Public Meeting. U.S. EPA community relations representatives arranged a series of community interviews to be held in early October. One of the people with whom the U.S. EPA made an appointment with was the Mayor of Coal Grove. Unfortunately, U.S. EPA was forced to cancel these community interviews due to the fact that the Federal Budget had not been approved. A misunderstanding occurred during the cancellation of this appointment, the result of which was that the Mayor of Coal Grove believed that the Public Meeting had been cancelled, rather than just the community interviews. The Mayor of Coal Grove was invited to the Ironton City Council meeting, and has expressed that he definitely has no hard feelings over this misunderstanding.

10. Comment

Allied-Signal has indicated that it is presently performing a bioremediation treatability study. The results of this study are expected sometime in January, 1991. There has been no indication that either U.S. EPA or Ohio EPA is performing any study to determine whether bioremediation is an appropriate remedy for the Allied Chemical/Ironton Coke site; we believe it important, therefore, that Allied-Signal complete its treatability study prior to a Record of Decision being signed.

Response

The U.S. EPA and Ohio EPA will conduct a test of bioremediation over a one-year period following the signing of the ROD. These tests will be conducted within the contaminated waste lagoons at the site. The only treatability studies which are ongoing at present are being

conducted in tanks. These studies will generate some results over the next four months, but will not be sufficient to make a final determination regarding whether to implement in-situ bioremediation. Consequently, the extension requested by Ironton's attorney could not achieve its purpose.

Therefore, the U.S. EPA does not agree with the assertion that the January, 1991 results must be received and reviewed prior to the signing of a ROD.

11. Comment

We believe it to be imperative that the Record of Decision be delayed so that the City, as representative of all of the citizens of Ironton, might determine whether the Agencies and Allied-Signal have made a proper choice of remedy.

Response

The remedy is not chosen by "the Agencies and Allied-Signal". The remedy is selected by U.S. EPA, using the nine criteria as described in the Record of Decision. State Acceptance and Community Acceptance are two of these criteria, but the acceptance or non-acceptance of Allied-Signal is not considered in the choice of remedy.

The following concerns were raised in public comments:

12. Comment

It appears that the U.S. EPA has selected the least expensive remedy over tried-and-true technologies.

Response

Alternative 18 was not the least expensive alternative considered, by a margin of approximately $15 million. The U.S. EPA recognizes that there are technologies available which have been applied at a greater number of sites than bioremediation, and that there is some uncertainty as to bioremediation's effectiveness. This is why U.S. EPA has proposed to conduct a 1-year field test of bioremediation before it can be applied in the large scale. As described in the Record of Decision, if the field test is unsuccessful, an alternative remedy for lagoons 1 through 4 will be developed.

13. Comment

The remedy uses the aquifer as a treatment sump, where contaminants are flushed from the lagoons at accelerated

rates to be captured by wells. The travel time to the wells has not been determined to be sufficient to allow the nutrients to effectively treat the constituents while in the aquifer. The concern is increased waste production at the water treatment facility.

Response

The specific well spacings and flow rates will be determined during the Remedial Design phase. The waste water treatment facility will be designed to handle the amount of waste water generated. The goal is not to flush contaminants into the aquifer, but to allow bacteria to degrade the contaminants within the wastes themselves.

14. Comment

It is unclear how biotreatment will treat the K062 and K087 contaminated soils, to the extent that the waste can be de-listed.

Response

The K062 (Lime Kiln Sludge) and K087 (Decanter Tank Tar Sludge) wastes both contain polynuclear aromatic hydrocarbons (PAHs), which are known to be amenable to bioremediation. It is not anticipated that delisting of the wastes will be necessary.

15. Comment

Contaminated materials from the lagoons could be mobilized during a flood event.

Response

The potential impacts of flooding during remediation will re-evaluated during the detailed design of the remedy. The impacts of flooding were evaluated as part of the RI (Volume I). It was concluded that the water movement during a flood should not be at a velocity sufficient to significantly damage the embankment or disturb the wastes in the lagoons.

16. Comment

The actual extent of contaminated (Coke Plant) soil is presently unknown, leading to an under-estimation in the FS. Each sample location tested during the RI found soil contaminated to an extent. "Clean" levels have not yet been defined. Clean areas have not been delineated by further sampling. The design investigation will need to accomplish this task, which should continue during the removal process.

Response

The volumes used in the Feasibility Study are the best estimates available at present. If the volume of contaminated soil is greater than what was estimated, the additional volume will also be cleaned up.

"Clean" levels have now been defined in Table 2. Testing will be performed after soil removal, and possibly before soil removal, to accurately delineate the extent of soil contamination.

17. Comment

The prepared pad bioremediation process will drive off volatile constituents, such as benzene, toluene, and xylene, into the atmosphere with no apparent controls, and that there are no apparent provisions for control of dust, potentially contaminated with arsenic and cyanide.

Response

The prepared pad bioremediation will be conducted in such a manner that it will not violate air standards. At present, it is not anticipated that achievement of these standards will be a problem. This is because monitoring of the ambient air was performed during the Remedial Investigation. This monitoring included the testing of air at the perimeter of a test pit dug into the most contaminated area on the site, within Lagoon 5. Volatile organic constituents were not detected at the perimeter of this excavation, even while the backhoe was performing the digging. The materials which are to be bioremediated on the prepared pad are contaminated at considerably lower concentrations than the area of this test pit. Therefore, it is not expected that appreciable concentrations of volatile organic constituents will be detected in the ambient air during bioremediation.

However, the design of this component of the remedy will include provisions for preventing the migration of organic vapors and dust, if these are found to be a problem. This may include provision for cover materials, a tent to cover the excavation, or the application of a surface spray or foam material to limit the escape of volatile organic compounds.

Air standards which must be met during the remedial action are discussed in Sections VIII and X of the ROD, and listed in an attachment to the ROD.

18. Comment

In regard to the in-situ bioremediation of Lagoons 1 through 4, one commenter stated that the Proposed Plan is deficient as a closure plan with respect to several Ohio regulations, and that post closure care should be well-defined.

Response

Neither the Proposed Plan nor the Record of Decision is intended to be a Closure Plan as that term is used both by this commenter and in the Resource Conservation and Recovery Act (RCRA). Of course, the cleanup must meet the substantive requirements of the State's equivalent closure requirements. More detailed information regarding the methods of cleanup will be developed during the Remedial Design phase of this project. It is not anticipated that post-closure care (as that term is used in RCRA) will be required for the lagoons.

The groundwater management control system will be operated, however, until it is determined that to discontinue its operation would not result in migration of contaminants from the site.

19. Comment

In regard to the bioremediation of Lagoons 1 through 4, one commenter stated that, while RCRA surface impoundment regulations provide for two options for closure of a surface impoundment, the U.S. EPA has chosen neither, but does not request an ARAR waiver.

Response

This is correct. What U.S. EPA has selected is akin to treatment with a RCRA unit. We are anticipating, however, that the lagoons will meet the substantive requirements for clean closure at the conclusion of the bioremediation program, and that no waiver of the surface impoundment closure regulations will be needed.

20. Comment

Ohio may need to waive four location and siting criteria in order for the remedy to proceed, and that no contingencies are provided in the plan in the event Ohio refused such waiver requests.

Response

This is correct. However, the Proposed Plan was released to the public jointly by the U.S. EPA and Ohio EPA, and included a discussion of the potential necessity of the waiver of these requirements. These waiver requirements, therefore, were identified with the full concurrence of the Ohio EPA.

21. Comment

The remedy proposed is not a permanent remedy, as the potential exists for partially-treated hazardous and solid waste to be left uncovered in open pits following completion of the project.

Response

This is incorrect. The wastes must be treated until they fall within the U.S. EPA risk range of 10^{-4} to 10^{-6} as described in the ROD Clean-up goals applicable to bioremediation. If wastes, at the conclusion of treatment, fall within the U.S. EPA risk range but are at a greater than a 10^{-6} risk, then steps (e.g. installation of a cap or establishment of wetlands) will be taken to prevent human contact with the waste materials. In other words, partially treated wastes will not be left uncovered in open pits following completion of the project.

22. Comment

The Mayor of Coal Grove expressed his concern for the safety of the Coal Grove wellfield, asked that the Ohio EPA and the Ohio Department of Health inspect the Coal Grove wells as soon as possible, and asked that Allied be compelled to meet with the Mayor and City Council of Coal Grove to determine what immediate steps must be taken by Allied to assure Coal Grove residents of clean drinking water.

Response

A major driving force in the inclusion of this site on the National Priorities List, and its proposal for cleanup has been the Agencies' concern for the Coal Grove wellfield. Your request for inspection has been passed on to the Ohio EPA and the Ohio Department of Public Health.

The desire to take immediate steps to protect the Coal Grove wellfield has motivated the U.S. EPA to issue this Record of Decision now, rather than waiting until tests of bioremediation are complete, as has been proposed by the

attorney representing the Ironton City Council.

This ROD contains provisions for protection of the Coal Grove wellfield. These include: the installation and operation of a groundwater pump and treat system to prevent the migration of contaminated groundwater off of the site, and the installation of a monitoring system in between Ice Creek and the Coal Grove wellfield. Furthermore, the waste fuel recovery and bioremediation are designed to treat the wastes so that they are no longer a potential source of groundwater contamination.

23. Comment

The Hecla Water Association wrote a comment, asking the U.S. EPA to get this project moving.

Response

Issuance of this ROD is U.S. EPA's way to get this project moving.

24. Comment

Who will be doing the hiring at the site?

Response

If Allied performs the response action, the cleanup work will be performed by Allied's contractors, and the U.S. EPA will evaluate Allied's choice of contractors and oversee the work. If U.S. EPA performs the response action, the work will be performed by U.S. EPA contractors in accordance with applicable procurement regulations.

25. Comment

At the Public Meeting, an attorney from Cleveland stated: "where innovative technology such as bioremediation has been made a part of the selected alternative, the ROD should not be signed until EPA has determined to an acceptable scientific standard that the bioremediation will be effective in remedying the conditions found on the site".

Response

See response #1.

D. Remaining Concerns

Issues and concerns that the Agency was unable to address during remedial planning activities include the following:

Certain members of the community, and particularly members of the Ironton City Council, remain concerned about the selection of in-situ bioremediation and about the process in general. To address these concerns, if the community is interested, the U.S. EPA will help to form a Technical Information Committee (TIC), to facilitate community review of design documents, and of the one-year biotreatability study.

Community members may also apply for a Technical Assistance Grant (TAG).

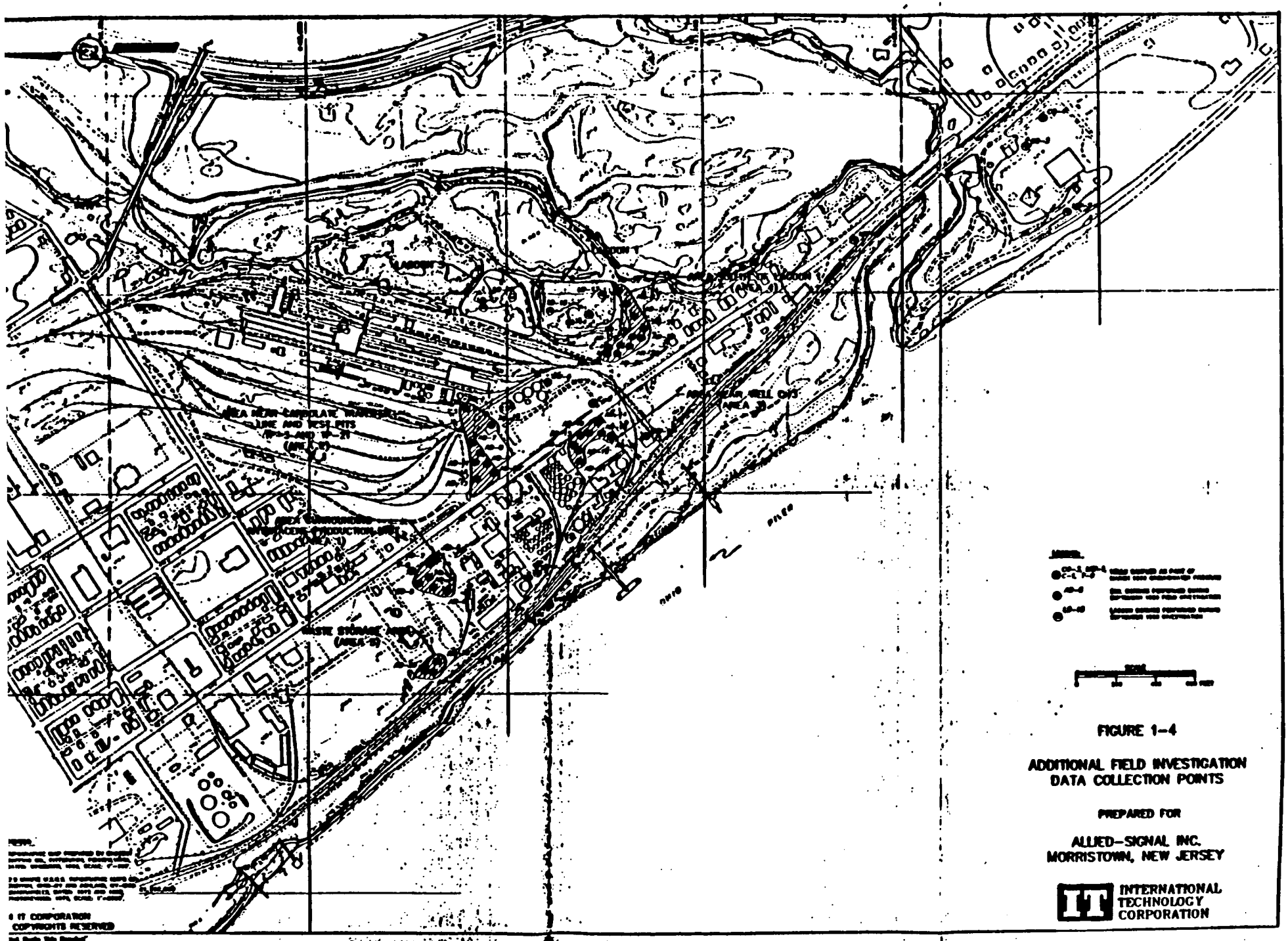

FIGURE 1-4

ADDITIONAL FIELD INVESTIGATION
DATA COLLECTION POINTS

PREPARED FOR

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MORRISTOWN, NEW JERSEY

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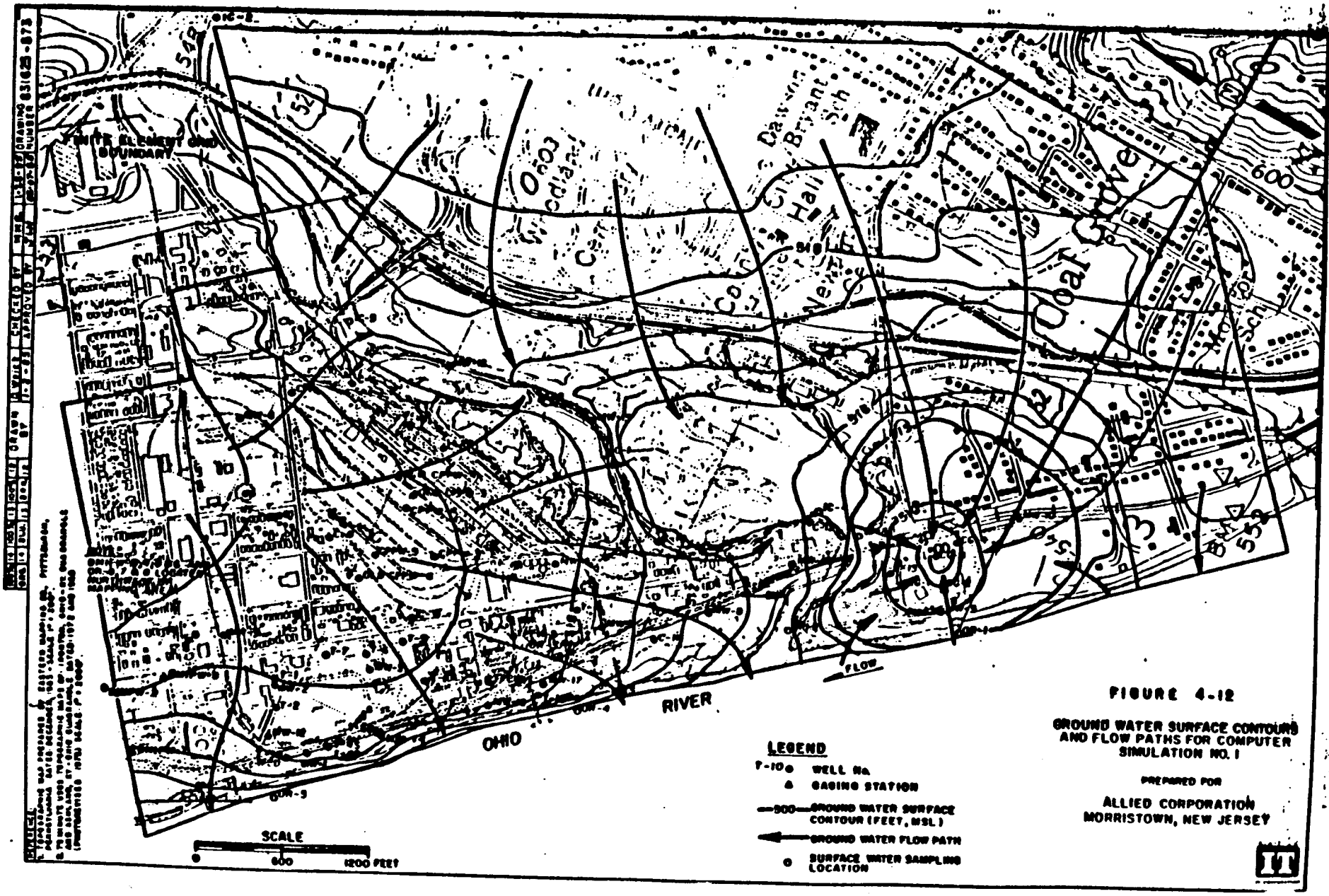

FIGURE 4-12

GROUND WATER SURFACE CONTOURS AND FLOW PATHS FOR COMPUTER SIMULATION NO. 1

PREPARED FOR

ALLIED CORPORATION
MORRISTOWN, NEW JERSEY

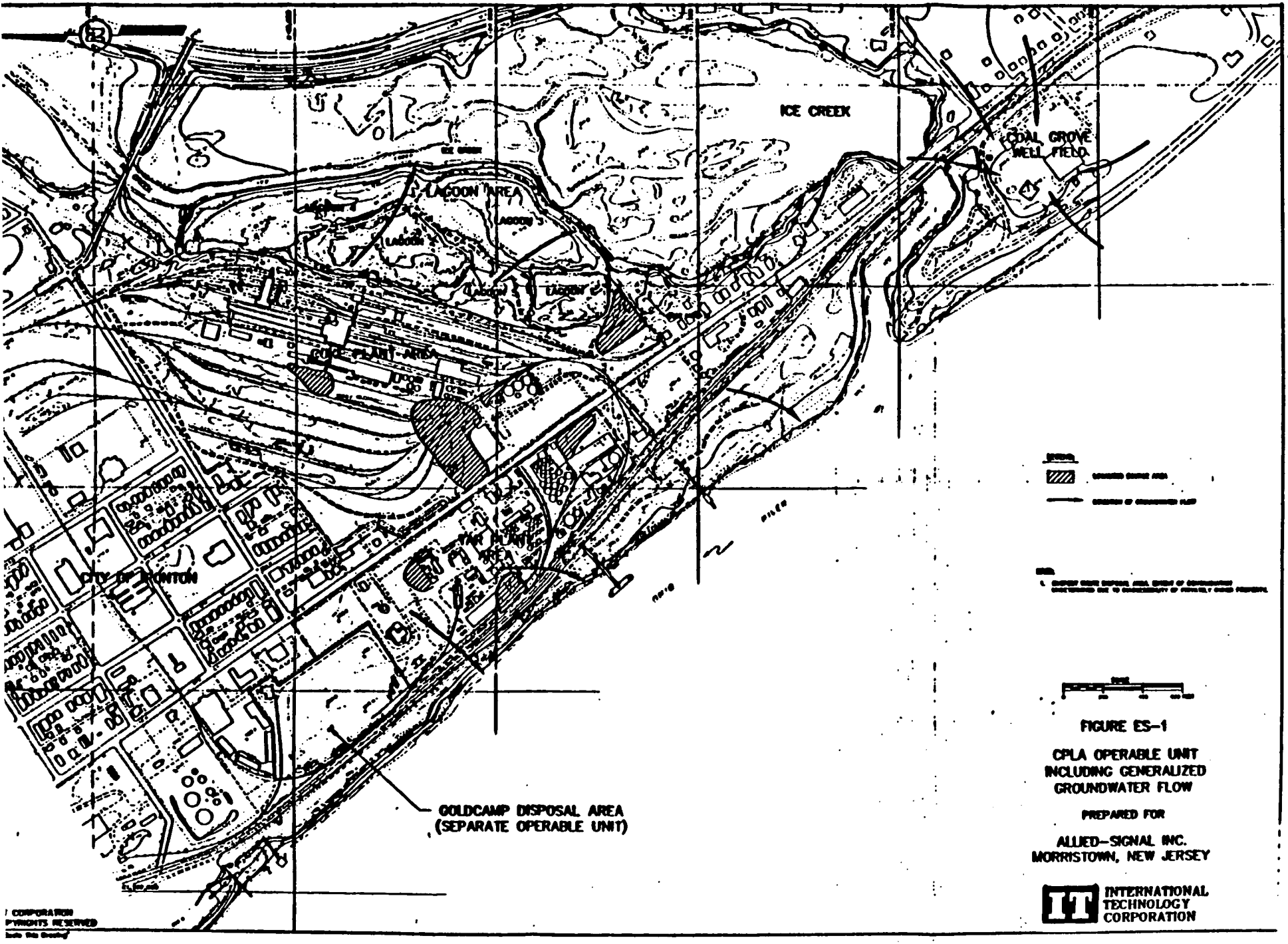

FIGURE ES-1

CPLA OPERABLE UNIT
INCLUDING GENERALIZED
GROUNDWATER FLOW

PREPARED FOR

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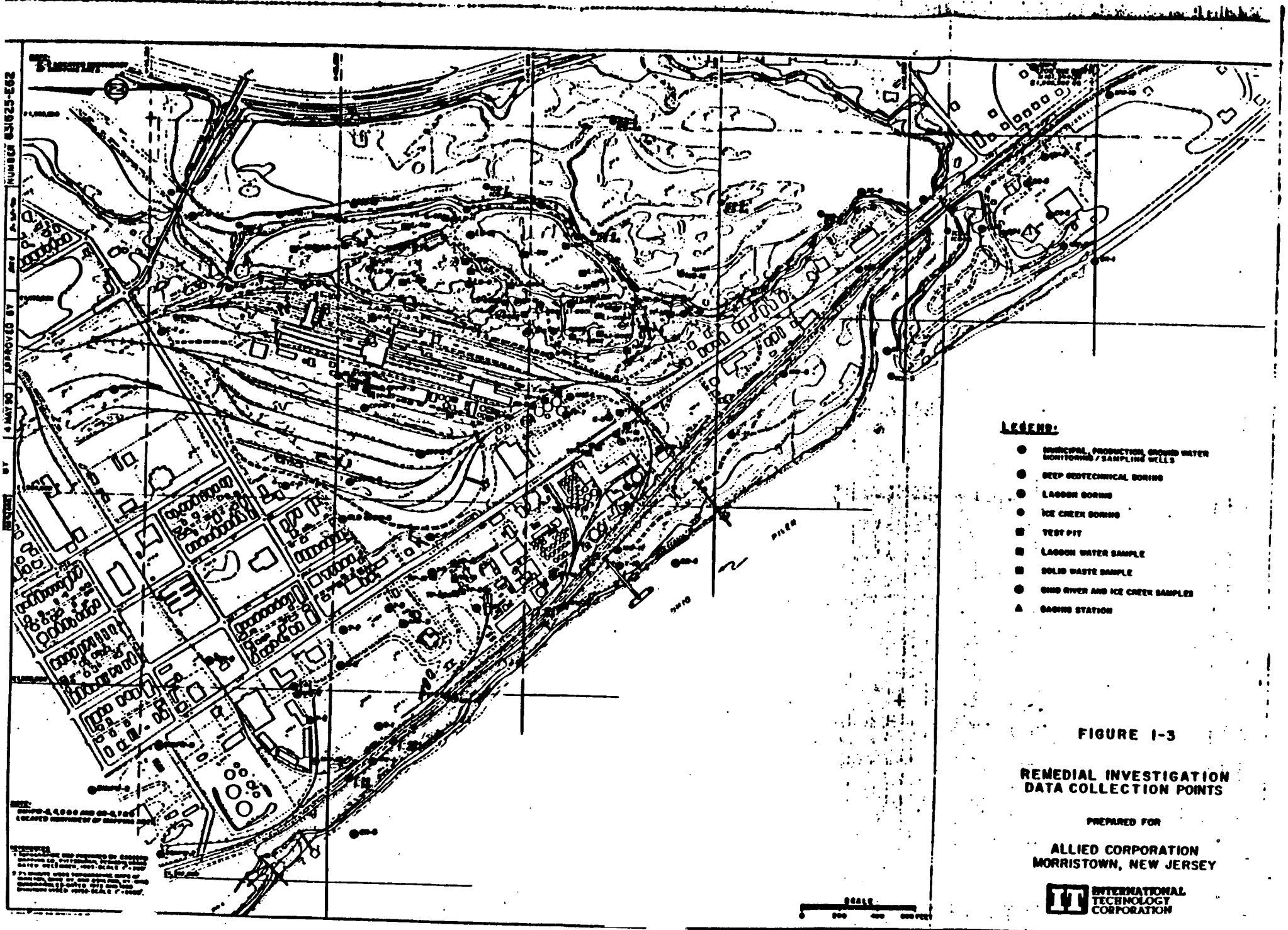

FIGURE 1-3

REMEDIAL INVESTIGATION
DATA COLLECTION POINTS

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INTERNATIONAL TECHNOLOGY CORPORATION

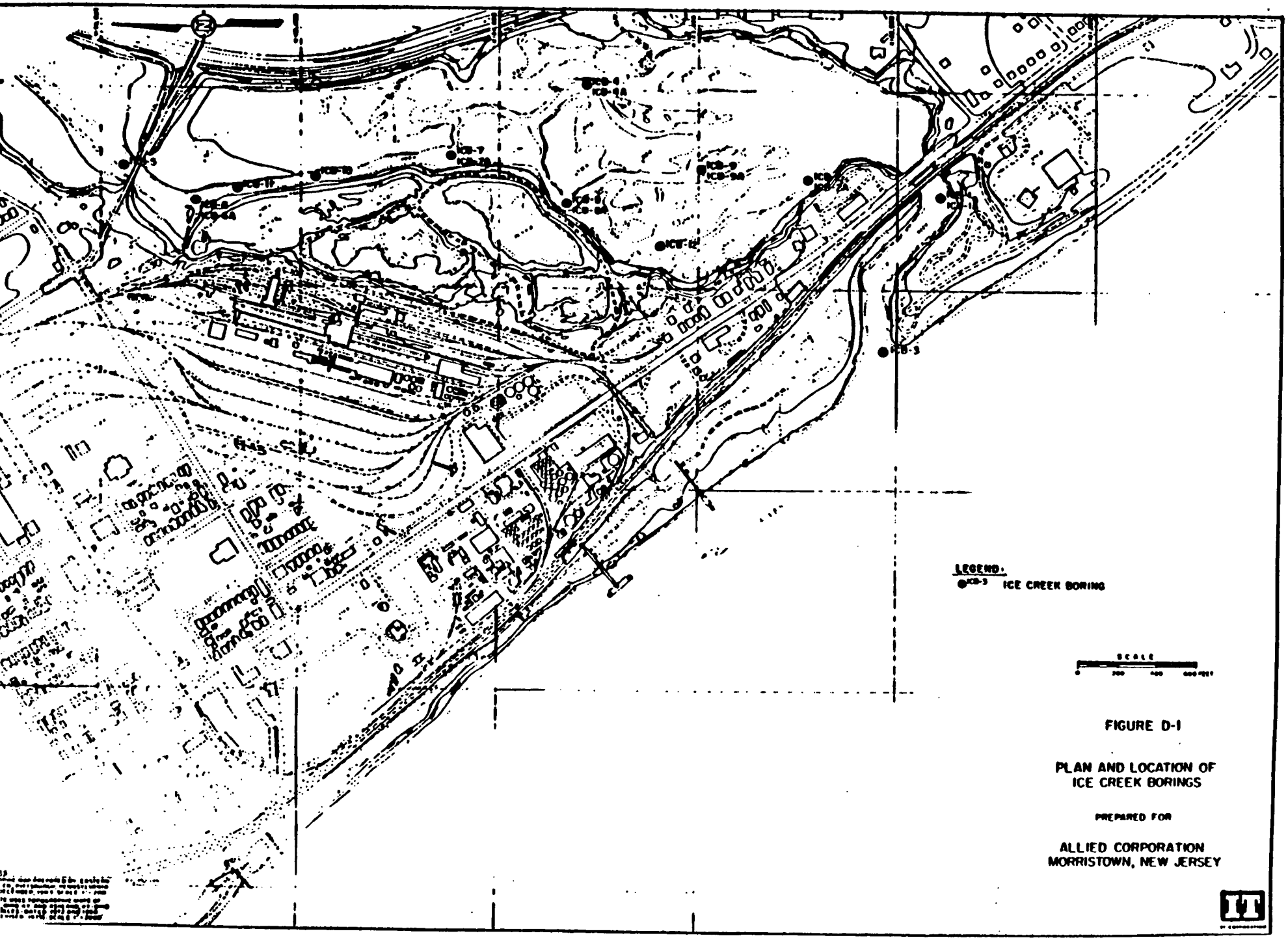

LEGEND:
ICE CREEK BORING
SCALE
FIGURE D-1
PLAN AND LOCATION OF
ICE CREEK BORINGS
PREPARED FOR
ALLIED CORPORATION
MORRISTOWN, NEW JERSEY
IT

TABLE D.2

RESULTS OF CHEMICAL ANALYSES
ICE CREEK SOIL SAMPLES

SAMPLE IDENTIFICATION	PARAMETERS						
	AMMONIA mg/kg[1] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
ICB-1C-S	41	27	ND[2]	0.58	370	ND	7.1
ICB-1H-S	210	31	5.7/6.7[3]	ND	1000	ND	12
ICB-1I-WS	25/23	40	1.3	1.0/1.1	590	ND/ND	38
ICB-1J-S	180	36	2.8	0.30	1500	ND	8.4/6.0
ICB-1K-S	5.0	45/55	ND	ND	79	ND	<1.0[4]
ICB-2C-S	250	65	5.9	0.15	360	ND	2.3
ICB-2H-S	330	40	1.2	ND	ND	ND	<1.0
ICB-2I-S	160	43/40	0.63	ND	160	ND	<1.0
ICB-2J-S	130/140	46/43	ND/ND	ND/ND	180/180	ND	ND
ICB-2K-S	23	31	ND	ND	40	ND	ND
ICB-2L-S	70	32	ND	ND	28	ND	ND
ICB-2M-S	26	29	ND/ND	0.65	51	ND	ND

See footnotes at end of table.

TABLE D.2
(Continued)

SAMPLE IDENTIFICATION	PARAMETERS: AMMONIA mg/kg[(1)] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
ICB-3C-S	460	95	0.63	ND	180	ND	<1.0
ICB-3H-S	400	88	1.3	ND	400/380	ND	<1.0
ICB-3I-S	770	110	3.1	ND	760	ND	<1.0
ICB-3J-S	670	130	0.61	0.14	270	ND	<1.0
ICB-3K-S	150	64	1.2	0.68	140/120	ND	2.1
ICB-3L-S	180/200	41	2.0	0.29	ND	ND/ND	ND/ND
ICB-4C-S	160	57	0.84	1.1	270	ND	ND
ICB-4H-S	78	36/38	ND	0.45/0.33	56	ND	ND
ICB-4I-S	3.5/3.5	14	0.83	1.1/1.2	11	ND	ND
ICB-5C-S	13	26	1.4	2.0	55	ND	<1.0
ICB-5H-S	9.8	20	1.0	2.0	240/260	ND	ND
ICB-6C-S	220	54	13	2.4	710	ND	16
ICB-6H-S	120	31	0.74/0.66	2.4	280	ND	6.3
ICB-6I-S	15	51	4.8/3.2	0.15/0.13	550	ND	<1.0
ICB-6J-S	10	18	ND	0.10	90	ND	<1.0

See footnotes at end of table.

TABLE D.2
(Continued)

SAMPLE IDENTIFICATION	PARAMETERS						
	AMMONIA mg/kg[(1)] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
ICB-7C-S	75	43	1.2/1.2	1.2	290	ND	1.0
ICB-7H-S	38	33	0.75	0.24	310	ND	1.3
ICB-7I-S	79	33	ND	0.85	260/260	ND	ND
ICB-8C-S	280/260	190/180	2.6/3.2	0.94	540	ND	5.0
ICB-8H-S	210	97	0.73	3.0	380	ND/ND	<1.0
ICB-8I-S	120/130	69/66	0.67	1.1	200	ND	<1.0
ICB-9C-S	200	110/110	8.7	0.43	480	ND	2.0
ICB-9H-S	390	270	2.9/2.9	1.8	660	ND	12
ICB-9I-S	67	87/87	0.50	0.20	25	ND	<1.0
ICB-9J-S	81	110/110	ND	0.99	25	ND	ND
ICB-10C-S	160	23/24	ND	0.86	35	ND	ND
ICB-10H-S	130	28/31	ND/ND	0.77	5.0	ND	ND/ND
ICB-10I-S	41	20	ND	0.71	70	ND	ND

TABLE D.2
(Continued)

SAMPLE IDENTIFICATION	PARAMETERS						
	AMMONIA mg/kg[1] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
ICB-11C-S	31	18	ND	0.69	20	ND	ND
ICB-11H-S	9.9	18/17	ND	1.1/0.93	85	ND	ND/<1.0
ICB-12C-S	130/130	310/300	3.6/3.2	1.5	360	ND	4.3
ICB-12C-W[5]	0.22	14	0.06	0.85	9.5	ND	ND
ICB-12H-S	130	120/130	ND	0.62	100	ND	ND
ICB-12I-S	110	150/140	ND	1.3	70	ND	ND

[1] mg/kg = milligrams per kilogram or parts per million.

[2] ND indicates none detected.

[3] The indicated sample was analyzed in duplicate.

[4] The corresponding compound was detected at less than 1 milligram per kilogram or part per million.

[5] Ground water sample: milligrams per liter or parts per million.

TABLE C.4

RESULTS OF CHEMICAL ANALYSES
LAGOON SAMPLES

SAMPLE IDENTIFICATION	PARAMETERS						
	AMMONIA mg/kg[1] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
LB-1C-WS	4.9	32	2.5/2.5[2]	ND[3]	300	ND	3.1
LB-1H-WS	92	76	0.61	ND/ND	680	ND	<1.0[4]
LB-2C-WS	44/43	420	91	1.5	210	ND	12
LB-2H-WS	89	33	6.8	99	90/79	0.57	8,300
LB-2I-WS	44/45	430	15/14	1.5	310	0.031	30
LB-3C-WS	160/170	92	2.4	23/35	660	0.071/0.067	80
LB-4C-WS	9.8	39	4.4	ND	130	ND	17
LB-4H-WS	44	61	41	0.90	2500/2200	ND	54
LB-4I-WS	69	55	0.59	1.2	740	ND	ND
LB-4C-W[5]	5.6	27	ND	0.32	1000	<0.010[6]	0.32
LB-5C-WS	6.0/6.0	11	1.8	0.54	680/490	ND	16
LB-5H-WS	30	22	7.5/6.8	ND	90/120	ND	2.2

See footnotes at end of table.

TABLE C.4
(Continued)

SAMPLE IDENTIFICATION	PARAMETERS: AMMONIA mg/kg[1] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
LB-6C-WS	8.5	32/35	1.2	ND	700	ND	11
LB-6H-WS	39	76	1.9/2.5	3.3	150	0.038/0.020	720
LB-6I-S	120	70/75	3.8/4.2	0.29	57/45	<0.010	1.3
LB-7C-WS	170/140	440	18	ND	1200	0.020	ND
LB-7H-WS	66	250	0.61/ND	ND	37	ND	ND
LB-8C-WS	62	1200	86	ND	1600	0.10/0.12	240
LB-8H-WS	190	140	27	91	320	0.043/0.057	320
LB-9C-WS	170/170	78	21/17	630/550	ND	71	17,000
LB-9H-S	3.0	17/14	4.5	0.53	90/87	0.15	16
LB-10C-WS	12/15	39	20/21	1.5/1.8	1970	ND/ND	170
LB-10H-S	21	28	2.2	0.20	49	ND	<1.0
LB-10I-W[5]	0.14/0.16	65/56	0.11	0.026	610/580	ND	0.078
LB-11C-WS	14	120	8.8	0.99	5200	IS[7]	23
LB-11H-S	35	58	ND	1.6/1.5	140	ND	<1.0
LB-11C-W[5]	0.12	21	0.16	0.046	72/74	<0.010	0.062

See footnotes at end of table.

TABLE C.4
(Continued)

SAMPLE IDENTIFICATION	PARAMETERS						
	AMMONIA mg/kg[1] NH_3-N	CHLORIDE mg/kg	TOTAL CYANIDE mg/kg	PHENOLICS mg/kg	SULFATE mg/kg SO_4	BENZENE mg/kg	NAPHTHALENE mg/kg
LB-12G-WS	90/90	12	37	4.5/3.2	2200	ND	<1.0
LB-12H-S	22	15/14	ND	0.27	270	ND	ND
LB-12G-W[5]	6.3	10/8.9	0.48	0.023	120/120	ND	ND/0.028

[1] mg/kg = milligrams per kilogram or parts per million.
[2] The indicated sample was analyzed in duplicate.
[3] ND indicates none detected.
[4] The corresponding compound was detected at less than 1 milligram per kilogram or part per million.
[5] Water quality sample: concentrations shown are milligrams per liter or parts per million.
[6] The corresponding compound was detected at less than 10 micrograms per liter or parts per billion.
[7] IS indicates that there was insufficient sample to perform the analysis due to sample breakage during shipment.

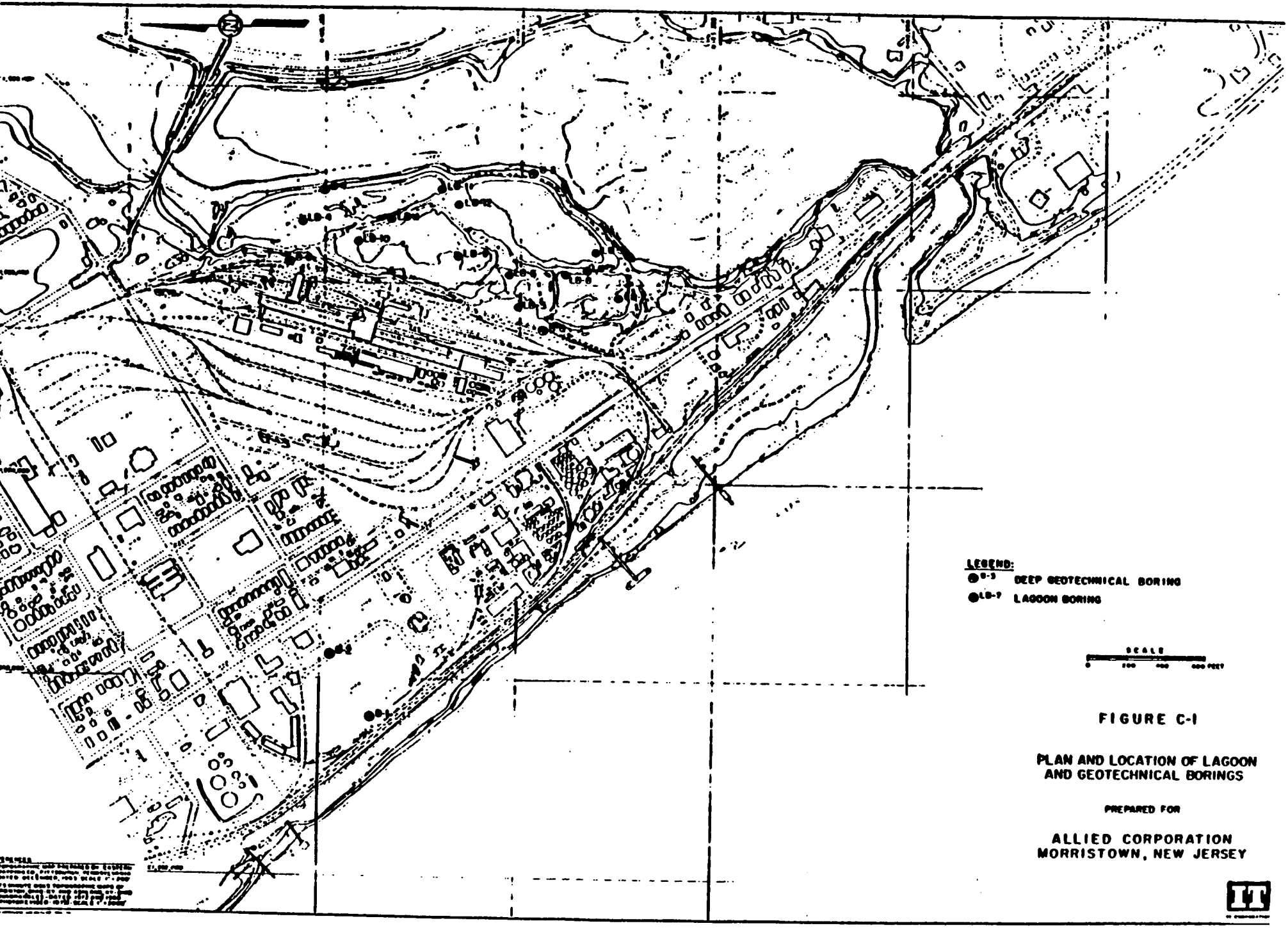


FIGURE C-I

PLAN AND LOCATION OF LAGOON AND GEOTECHNICAL BORINGS

PREPARED FOR

ALLIED CORPORATION
MORRISTOWN, NEW JERSEY

TABLE B.1
SOIL AREA 1 ANALYTICAL RESULTS - SEPTEMBER 1989
CPLA FS

AREA 1	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB1-1 (0.0'-1.0')	1.3U	6U	0.8	4,500	46,000	11/12
AB1-3 (2.5'-5.0')	1.2U	6U	0.6U	780U	780U	41
AB1-5 (7.5'-10.0')	1.1U	5U	0.5U	720U	720U	5.8
AB1-7 (12.5'-15.0')	1.1U	5U	0.5U	700U	700U	1.1U
AB2-1 (0.0'-1.0')	1.2U	6U[1]	3.1	30,000	13,000	15/15
AB2-3 (2.5'-5.0')	1.2U	6U[2]	0.6U	790U	1,600	41
AB2-5 (7.5'-10.0')	1.1U	6U	0.6U	740U	740U	5.1
AB2-7 (12.5'-15.0')	1.1U	5U	0.8	740U	740U	5.5
AB3-1 (0.0'-1.0')	1.1U	6U	9.8/9.8	19,000	100,000	45
AB3-3 (2.5'-5.0')	1.2U	6U	1.2	770U	770U	1.2

See footnotes at the end of the table.

TABLE B.1
(Continued)

AREA 1	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB3-5 (7.5'-10.0')	1.1U	6U	0.5U	720U	800	5.8
AB4-1 (0.0'-1.0')	1.1U	6U	2.8	4,200	30,000	16
AB4-3 (2.5'-5.0')	1.2U/1.2U	6U	0.6U	770U	770U	17
AB4-5 (7.5'-10.0')	1.1U	5U	0.6	730U	730U	15
AB5-1 (0.0'-1.0')	16	6U	1.8	4,000U	25,000	3.5
AB5-3 (2.5'-5.0')	1.2U	6U	0.6U	780U	780U	30
AB5-5 (7.5'-10.0')	1.1U	6U	0.6U	740U	740U	16/16
AB6-1 (0.0'-1.0')	1.1U	6U	1.6/1.7	32,000	150,000	6.3
AB6-3 (2.5'-5.0')	1.2U	6U	0.6U	760U	760U	5.9
AB6-5 (7.5'-10.0')	1.1U	6U	0.6U	740U	740U	3.9

U = Compound or analyte was analyzed but not detected.

[1]All internal standards exhibit low response, indicating possible matrix interference or cracked purging tube. Subsequent reanalysis yielded same result of 6U.

[2]Internal standard that benzene is based on is within QC limits. (However, another internal standard is outside the QC limits.) Subsequent reanalysis yielded same result of 6U.

TABLE B.2
SOIL AREA 2 ANALYTICAL RESULTS - SEPTEMBER 1989
CPLA FS

AREA 2	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB7-1 (0.0'-1.0')	1.1U	18U	1.0	3,700U	15,000	2.5
AB7-3 (2.5'-5.0')	1.2U	6U	0.6U	770U	770U	4.8
AB7-5 (7.5'-10.0')	1.1U	5U	0.6U	750U	750U	82
AB8-1 (0.0'-1.0')	1.2U/1.2U	29U	1.4	3,900U	60,000	2.7
AB8-3 (2.5'-5.0')	1.2U	6U	0.6U	790U	2,000	2.4
AB8-5 (7.5'-10.0')	1.1U	6U	1.0/0.5U	730U	730U	1.1
AB9-1 (0.0'-1.0')	1.1U	5U	0.5U	490J	23,000	1.5/2.1
AB9-3 (2.5'-5.0')	1.1U/1.1U	5U	0.6U	760U	760U	1.1U
AB9-5 (7.5'-10.0')	1.1U	5U	0.5U	720U	720U	1.8

See footnotes at the end of the table.

TABLE B.2
(Continued)

AREA 2	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB10-1 (0.0'-1.0')	1.1U	5U	0.7	1,500U	10,000	1.7
AB10-3 (2.5'-5.0')	1.1U	5U	0.6U	750U	1,300	1.9
AB10-5 (7.5'-10.0')	1.1U	6U	3.8	710U	710U	1.1U
AB11-1 (0.0'-1.0')	1.1U	6U	0.6/0.7	2,900J	51,000	1.7
AB11-3 (2.5'-5.0')	1.2U	6U	0.5U	760U	760U	1.1U
AB11-5 (7.5'-10.0')	1.1U	5U	0.6U	710U	710U	1.6
AB12-1 (0.0'-1.0')	1.2U	24U	2.1	3,900U	21,000	6.3
AB12-3 (2.5'-5.0')	1.2U	1J	0.6U	770U	770U	3.1
AB12-5 (7.5'-10.0')	1.1U	5U	56	1,000	710U	88
AB12-7 (12.5'-15.0')	1.1U	5U	560	700U	700U	4.0

See footnotes at the end of the table.

TABLE B.2
(Continued)

AREA 2	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB13-1 (0.0'-1.0')	1.2U	6U/6U	1.5	190J	13,000	4.4
AB13-3 (2.5'-5.0')	1.1U	6U	0.5U	760U	760U	1.5
AB13-5 (7.5'-10.0')	1.1U	5U	0.6U	710U	710U	1.4
AB32-1 (0.0'-1.0')	1.3U	6U	8.4	830U	1,900	8.8
AB32-3 (2.5'-5.0')	1.2U	5U	0.6U	760U	760U	64.0
AB32-5 (7.5'-10.0')	1.1U	8	0.6U	730U	730U	18

U = Compound or analyte was analyzed but not detected.

J = Compound detected but below the contract required detection limit, (the value given is an estimate), but above the instrument detection limit.

TABLE B.3
SOIL AREA 3 ANALYTICAL RESULTS - SEPTEMBER 1989
CPLA FS

AREA 3	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB14-1 (0.0'-1.0')	1.1U/1.1U	5U	0.6	3,700U	29,000	4.8
AB14-3 (2.5'-5.0')	4.5	6U	1.3	1,500U	21,000	3.0
AB14-5 (7.5'-10.0')	3.2	5U	0.5U/0.5U	700U	700U	1.0U
AB15-1 (0.0'-1.0')	1.1U	5U	1.5	3,600U	18,000	3.6
AB15-3 (2.5'-5.0')	1.1U	6U	0.6U	1,500U	19,000	2.1
AB15-5 (7.5'-10.0')	1.1U	5U	0.5U	710U	710U	1.3
AB16-1 (0.0'-1.0')	1.1U	6U	0.6U	750U	750U	3.2
AB16-3 (2.5'-5.0')	1.2U	6U	0.6	770U	770U	150
AB16-5 (7.5'-10.0')	1.1U	5U	0.5U	740U	740U	1.7

See footnotes at the end of the table.

TABLE B.3
(Continued)

AREA 3	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB17-1 (0.0'-1.0')	1.1U	5U	1.6	43,000	24,000	2.0
AB17-3 (2.5'-5.0')	1.1U	5U	1.1	730U	730U	1.4
AB17-5 (7.5'-10.0')	1.1U	5U	0.5U	710U	710U	1.1U
AB18-1 (0.0'-1.0')	1.1U	6U	0.6U	750U	8,100	3.2/5.2
AB18-3 (2.5'-5.0')	1.2U	6U	0.6U	770U	770U	1.2U
AB18-5 (7.5'-10.0')	1.1U	5U	0.5U	720U	720U	1.1U
AB19-1 (0.0'-1.0')	1.0U	5U	1.0	17,000U	130,000	1.0U
AB19-3 (2.5'-5.0')	1.1U	5U	0.5U	710U	710U	1.1U
AB19-5 (7.5'-10.0')	1.1U	5U	0.7	720U	720U	1.1U

See footnotes at the end of the table.

TABLE B.3
(Continued)

AREA 3	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB20-1 (0.0'-1.0')	1.1U	6U	0.7	750U	750U	3.4
AB20-3 (2.5'-5.0')	1.1U	6U	0.6U/0.6U	760U	760U	1.1U
AB20-5 (7.5'-10.0')	1.1U	5U	0.5	720U	720U	1.1U
AB21-1 (0.0'-1.0')	1.1U	5U	4.4	28,000U	330,000	1.1U
AB21-3 (2.5'-5.0')	1.1u	6U	1.9	14,000U	82,000	1.1U
AB21-5 (7.5'-10.0')	1.2U/1.2U	5U	0.6	770U	770U	1.2U

U = Compound or analyte was analyzed but not detected.

TABLE B.4
SOIL AREA 4 ANALYTICAL RESULTS - SEPTEMBER 1989
CPLA FS

AREA 4	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB22-1 (0.0'-1.0')	1.5	5U	1.1U	15,000	96,000	13
AB22-3 (2.5'-5.0')	60	5J	1.1/0.7	4,500	7,900	50/43
AB22-5 (7.5'-10.0')	23	2J	1.5	3,100	3,000	190
AB24-1 (0.0'-1.0')	9.7	6U	0.6U	1,400	11,000	9.6
AB24-3 (2.5'-5.0')	13/13	30U	7.6	58,000	67,000	6.0
AB24-5 (7.5'-10.0')	3.1	7U	0.9	9,600	6,200	8.8
AB25-1 (0.0'-1.0')	1.2U	7U	0.6U	800U	800U	2.5
AB25-3 (2.5'-5.0')	1.2U	7U	0.6U	760U	760U	2.4
AB25-5 (7.5'-10.0')	1.1U	5U	0.7	720U	720U	1.1U/1.1U

See footnotes at the end of the table.

TABLE B.4
(Continued)

AREA 4	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB26-1 (0.0'-1.0')	13	7U	0.8/0.6U	790U	200J	5.3
AB26-3 (2.5'-5.0')	1.2U	7U	0.6U	770U	770U	1.2U
AB26-5 (7.5'-10.0')	1.1U	5U	0.5U	710U	710U	1.1U
AB27-1 (0.0'-1.0')	140	7U	0.6U	3,100J	28,000	8.5
AB27-3 (2.5'-5.0')	1.3	7U	0.6U	800U	800U	1.2U
AB27-5 (7.5'-10.0')	1.1U	5U	0.5U	710U	710U	1.1U
AB28-1 (0.0'-1.0')	40	22U	1.4	2,400J	43,000	2.7
AB28-3 (2.5'-5.0')	1.2U	6U	0.6U	780U	4,900	1.2U
AB28-5 (7.5'-10.0')	1.1U	5U	0.6U	700U	700U	1.1U
AB29-1 (0.0'-1.0')	1.2U	7U	1.2	780U	780U	3.4

See footnotes at the end of the table.

TABLE B.4
(Continued)

AREA 4	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB29-3 (2.5'-5.0')	1.2U	6U	0.6U	760U	760U	1.2U
AB29-5 (7.5'-10.0')	1.1U	5U	0.5U	710U	120J	1.1U
AB30-1 (0.0'-1.0')	6.5	25U	1.0	340J	6,000	2.8
AB30-3 (2.5'-5.0')	1.2U	6U	0.6U	800U	800U	1.2U
AB30-5 (7.5'-10.0')	1.1U	5U	0.5U	150J	720U	1.1U
AB31-1 (0.0'-1.0')	1.2U/1.2U	26U/30U	0.6U/0.6U	3,000	27,000	2.1
AB31-3 (2.5'-5.0')	1.2U	6U	0.6U	780U	780U	1.4/2.4
AB31-5 (7.5'-10.0')	1.1U	5U	0.5U	700U	700U	1.0U

U = Compound or analyte was analyzed but not detected.

J = Compound detected but below the contract required detection limit, (the value given is an estimate), but above the instrument detection limit.

TABLE B.5
SOIL AREA 5 ANALYTICAL RESULTS - SEPTEMBER 1989
CPLA FS

AREA 5	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)
AB33-2 (2.5'-5.0')	1.2U	6U	1.3	15,000U	28,000	2.4
AB33-4 (7.5'-10.0')	1.1U	5U	0.5U	690U	690U	1.1
AB34-3 (2.5'-5.0')	1.2U	6U	1.9	3,200J	39,000	2.7
AB34-5 (7.5'-10.0')	1.0U	6U	0.5U/0.5U	680U	680U	1.2
AB35-3 (2.5'-5.0')	1.1U	6U	0.6U	740U	140J	12.4
AB35-5 (7.5'-10.0')	1.1U	5U	0.9	690U	690U	4.6

U = Compound or analyte was analyzed but not detected.

J = Compound detected but below the contract required detection limit, (the value given is an estimate), but above the instrument detection limit.

TABLE B.6

LAGOON ANALYTICAL RESULTS - SEPTEMBER 1989
CPLA FS

LAGOONS	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)	1:1 pH	ARSENIC (mg/Kg)
LB13-1 (0.01'-1.0')	62*	6U	4.8	4,300	20,000	5/7	7.40	7.9/7.3
LB13-3 (4.5'-9.5')	22*	6U	1.7	690J	760U	72	8.75	0.92J
LB13-4 (9.5'-14.5')	NA	NA	NA	53,000	840U	NA	9.50	NA
LB14-1 (0.0'-1.0')	55*	8U	3.9	7,700	14,000	5	7.75	11.2
LB14-4 (8.5'-10.5')	11*	7U	0.6	120J	770U	150	8.85	3.4S
LB14-11 (26.0'-28.5')	1.3*U	17	0.6U	1,000	850U	210	9.35/9.35	2.6
LB14-12 (28.5'-33.5')	3.7	28	0.6U	1,400	830U	110	8.85	9.1*
LB14-14 (38.5'-43.5')	1.4	22	0.6U	1,100	820U	53	8.15	6.8*/5.6*
LB14-16 (48.5'-50.0')	1.2U	6U	0.6U	300J	800U	56	8.35/8.35	4.9*

See footnotes at the end of the table.

TABLE B.6
(Continued)

LAGOONS	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)	1:1 pH	ARSENIC (mg/Kg)
LB15-1 (0.0'-1.0')	470	8U	5.1	1,300	4,500	19	7.20	26.1*S
LB15-3 (4.5'-9.5')	3.3	6U	1.8	750U	750U	46	8.05/8.05	3.3*
LB15-4 (9.5'-14.5')	NA	NA	NA	950	730U	NA	NA	NA
.B16-1 (0.0'-1.0')	10*	7U	34	11,000,000	2,000,000	21	7.15	8.7
.B16-4 8.0'-10.0')	6.3*	5J/2J	2.4/2.4	4,800J	48,000	23	8.15	6.3
.B16-7 18.0'-20.0')	4.9*/13*	18U/17U	8.5	7,700J	450,000	12	7.65/7.55	5.7S/6.2
B16-10 28.0'-33.0')	21*	7J/7U	3.8	4,700	12,000	70	7.50	9.5
B16-13 38.0'-43.0')	13*	23U	3.5	8,200	6,400	200	7.45	6.0
B16-18 58.0'-63.0')	1.2U	2J	0.7	5,400	1,300	54	NA	NA
316-20 58.0'-73.0')	1.3U	3J	1.7	23,000	8,100	37	NA	NA

ee footnotes at the end of the table.

TABLE B.6
(Continued)

LAGOONS	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)	1:1 pH	ARSENIC (mg/Kg)
LB17-1 (0.0'-1.0')	3.3	20U	0.6	1,400J	15,000	3	NA	NA
LB17-3 (8.5'-10.5')	3.2	25U	2.8	120,000	43,000	6	NA	NA
LB17-6 (18.5'-23.5')	200	49	4.3	170,000	100,000	25	NA	NA
LB17-8 (28.0'-33.5')	35	640	57	280,000	33,000	100	NA	NA
LB17-10 (38.5'-43.5')	2.5	9J	2.9	10,000	11,000	71	NA	NA
LB17-13 (48.5'-53.5')	1.3U	8U	0.6U	860U	860U	22	NA	NA
LB17-14 (53.5'-58.5')	NA	NA	NA	810U	110J	NA	NA	NA
LB17-15 (58.3'-63.5')	1.3U	5U	0.6U	840U	840U	25	NA	NA
LB17-16 (63.5'-68.5')	NA	NA	NA	820U	820U	NA	NA	NA

See footnotes at the end of the table.

TABLE B.6
(Continued)

LAGOONS	TOTAL CYANIDE (mg/Kg)	BENZENE (µg/Kg)	PHENOLICS (mg/Kg)	NAPHTHALENE (µg/Kg)	BENZO(a)PYRENE (µg/Kg)	AMMONIA (mg/Kg)	1:1 pH	ARSENIC (mg/Kg)
B17-17 68.5'-73.5')	1.2U	7U	1.0	780	1,800	26	NA	NA

= Duplicate analysis is not within control limits.

= Compound or analyte was analyzed but not detected.

= Compound detected but below the contract required detection limit (the value given is an estimate), but greater than the instrument detection limit.

A = Not analyzed.

= The reported value was determined by the method of standard additions.

OTE: Samples LB13-4, LB15-4, LB17-4, and LB17-6 were originally archived, but later analyzed for naphthalene and benzo(a)pyrene to provide additional information.

Table 4–25b. Soil Ingestion Hazard for Lagoon 1, Child (a)

	Concentration (b)			Daily Intake						Hazard Index	
Chemical	Range	Rep. (c)	Freq. (d)	Subchronic (e)	Carcinogen (f)	ADI (g)	AIC (g)		PF (h)	Short-Term (i)	Carcinogenic Risk (i)
Ammonia	5–160	49	7/7	7.2E-04	1.5E-05						
Chloride	33–440	300	3/3	2.0E-03	9.0E-05						
Cyanide	0.6–470	91	7/7	2.1E-03	2.7E-05	2.0E-02	2.0E-02	k		1.1E-01	
Phenolics	ND–99	25.0	6/7	4.5E-04	7.5E-06	6.0E-01	6.0E-01	k		7.4E-04	
Sulfate		500	3/3	5.4E-03	1.5E-04						
Benzene	ND–0.57	0.3	2/7	2.6E-06	9.0E-06				2.9E-02	k	2.6E-09
Naphthalene	ND–11000	3200	6/7	5.0E-02	9.6E-04	4.0E-01	4.0E-01	k		1.2E-01	
Benz(a)anthracene	16–35	26	5/5	1.6E-04	8.4E-06				1.2E+01	l	9.7E-05
Benzo(a)pyrene	4.5–2000	250	9/9	9.0E-03	7.5E-05				1.2E+01	l	8.6E-04
Chrysene	16–35	26	5/5	1.6E-04	8.4E-06				1.2E+01	l	9.7E-05
Dibenz(a,h)anthracene	1.6–6.6	3.4	5/5	2.7E-05	1.0E-06				1.2E+01	l	1.2E-05
Arsenic	7.6–28	17	9/9	1.3E-04	5.1E-06	1.0E-03	1.0E-03	k	2.0E+00	m	1.3E-01	1.0E-05
									TOTAL		3.8E-01	1.1E-03

(a) Data from boring LB-7G (lagoon 1, 6.0–7.0 feet), LB-2G (inner dike, 3.0–3.5 feet),LB-2H (inner dike, 4.5–5.0), LB-13 (0–1 foot), LB-14 (0–1 foot), LB-15 (0–1 foot), and LB-16 (0–1 foot).

(b) In mg/kg. Concentrations have been taken at face value and have not been verified by M&E.

(c) Representative concentration derived from the arithmetic mean of all detectable concentrations at depths from 0–5 feet. Subchronic intake derived from maximum concentration. Chronic noncarcinogenic/carcinogenic intake derived from representative concentration.

(d) Frequency of contaminant detection in samples.

Table 4-25b. Continued

(e) (f)
Calculated as:

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times UCF \times FI \times EF \times ED \times UCF}{BW \times AT}$$

Where:

CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg soil/day)
UCF = Unit Conversion Factor (10-6 kg/mg)
FI = Fraction Ingested from Contaminated Source (unitless)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (period over which exposure is averaged - days)

For a child IR = 200 mg/day; FI = 1; EF = 130 days/year; UCF = 10E-6 kg/mg; ED = 5 years; BW = 16kg; and AT = 1825 days for subchronic and 25,550 days for carcinogens.

(g) Acceptable Daily Intake in mg/kg/day.
(h) Potency Factor in (mg/kg/day)-1.
(i) Derived from subchronic daily intake divided by the acceptable daily intake.
(j) Derived from potency factor multiplied by chronic carcinogen intake.
(k) Source for value is Health Effects Assessment Summary Tables, First Quarter, FY 1989.
(l) Source for value is Health Effects Assessment Summary Tables, First Quarter, FY 1989.
(m) Telephone conversation with J. Van der Kloot, US EPA, 7-20-90.

Worksheet 7–3C. Calculation of Risk from Potential Carcinogens

Total Exposure Point: Future residences on the Coke Plant site (Adult)

Chemical	Exposure Route	CDI (mg/kg/day)		Carcinogenic Potency Factor (mg/kg/day)^–1		Route-specific Risk	Total Chemical-specific Risk
Benzene	Oral, Water	7.20E–03	(a)	0.029		2.09E–04	2.09E–04
	Oral, Soil	1.09E–07	(b)	0.029		3.16E–09	
	Inhalation	7.29E–08	(c)	0.029		2.11E–09	
Benz(a)anthracene	Oral, Water			11.5			
	Oral, Soil	7.63E–05	(b)	11.5		8.77E–04	8.78E–04
	Inhalation	8.62E–09	(c)	6.1		5.26E–08	
Benzo(a)pyrene	Oral, Water			11.5			7.27E–04
	Oral, Soil	6.32E–05	(b)	11.5		7.27E–04	
	Inhalation	1.02E–08	(c)	6.1		6.21E–08	
Chrysene	Oral, Water			11.5			8.78E–04
	Oral, Soil	7.63E–05	(b)	11.5		8.77E–04	
	Inhalation	8.62E–09	(c)	6.1		5.26E–08	
Dibenz(a,h)anthracene	Oral, Water			11.5			1.58E–04
	Oral, Soil	1.37E–05	(b)	11.5		1.58E–04	
	Inhalation	1.65E–09	(c)	6.1		1.00E–08	
Arsenic	Oral, Water	2.81E–04	(a)	2	(d)	5.62E–04	5.69E–04
	Oral, Soil	3.49E–06	(b)	2	(d)	6.98E–06	
	Inhalation	8.62E–09	(c)	50		4.31E–07	

TOTAL UPPER BOUND RISK 3.42E–03

(a) Taken from Worksheet 5–7C.
(b) Taken from Table 7–3.
(c) Taken from Worksheet 5–7C.
(d) Telephone conversation with J. Van der Kloot, US EPA, 7–20–90.

rksheet 7-3C. Calculation of Risk from Po) Carcinogens

1. Exposure Point: Future residences on the Coke Plant site (Child)

Chemical	Exposure Route	CDI (a) (mg/kg/day)	Carcinogenic Potency Factor (mg/kg/day)^-1	Route-specific Risk	Total Chemical-specific Risk
Benzene	Oral, Water	2.63E-03 (a)	0.029	7.63E-05	7.63E-05
	Oral, Soil	2.50E-07 (b)	0.029	7.25E-09	
	Inhalation	6.11E-08 (c)	0.029	1.77E-09	
Benz(a)anthracene	Oral, Water		11.5		1.38E-03
	Oral, Soil	1.20E-04 (b)	11.5	1.38E-03	
	Inhalation	7.23E-09 (c)	6.1	4.41E-08	
Benzo(a)pyrene	Oral, Water		11.5		1.61E-03
	Oral, Soil	1.40E-04 (b)	11.5	1.61E-03	
	Inhalation	8.54E-09 (c)	6.1	5.21E-08	
Chrysene	Oral, Water		11.5		2.07E-03
	Oral, Soil	1.80E-04 (b)	11.5	2.07E-03	
	Inhalation	7.23E-09 (c)	6.1	4.41E-08	
Dibenz(a,h)anthracene	Oral, Water		11.5		3.68E-04
	Oral, Soil	3.20E-05 (b)	11.5	3.68E-04	
	Inhalation	1.38E-09 (c)	6.1	8.42E-09	
Arsenic	Oral, Water	1.03E-04 (a)	2.0 (d)	2.06E-04	2.22E-04
	Oral, Soil	8.00E-06 (b)	2.0 (d)	1.60E-05	
	Inhalation	7.23E-09 (c)	50	3.61E-07	
			TOTAL UPPER BOUND RISK		5.73E-03

(a) Taken from Worksheet 5-7C.
(b) Taken from Table 7-3.
(a) Taken from Worksheet 5-7C.
(d) Telephone conversation with J. Van der Kloot, US EPA, 7-20-90.

Worksheet 7-2C. Calculation of Chronic/Noncarcinogen Hazard Index

Total Exposure Point: Future residences on the Coke Plant site (Adult)

	Inhalation			Oral		
Chemical	CDI(a) (mg/kg/day)	AIC (mg/kg/day)	CDI:AIC	CDI(a) (mg/kg/day)	AIC (mg/kg/day)	CDI:AIC
Ammonia	3.48E-03	3.60E-01 (b)		1.00E+00	3.40E+01 (c)	
Chloride	8.23E-09			5.15E+00		
Cyanide	2.56E-09	ND (d)		6.58E-02	2.00E-02	3.29E+00
Phenol	5.49E-10	2.00E-02	2.74E-08	4.73E-04	6.00E-01	7.88E-04
Sulfate	1.01E-07			4.86E+00		
Benzene	1.70E-07			1.69E-02		
Naphthalene	5.85E-08	ND (d)		1.40E-02	4.00E-01	3.50E-02
Benz(a)anthracene	2.01E-08			---		
Benzo(a)pyrene	2.38E-08			---		
Chrysene	2.01E-08			---		
Dibenz(a,h)anthracene	3.84E-09			---		
Arsenic	2.01E-08	ND (d)		6.59E-04	1.00E-03	6.59E-01

Sum of Inhalation CDI:AIC Ratios = 2.74E-08

Sum of Oral CDI:AIC Ratios = 3.98E+00

Sum Total of All Ratios = 3.98E+00

(a) Taken from Worksheet 5-8C.
(b) Units of mg/m3. Based on organoleptic threshold for ammonia---not a reference dose.
(c) Units of mg/L. Based on organoleptic threshold for ammonia---not a reference dose.
(d) ND means not determined.

Worksheet 7-IC. Calculation of Subchronic Hazard Index

Total Exposure Point: Future residences on the Coke Plant site (Adult)

Chemical	Inhalation SDI (mg/kg/day)	Inhalation AIS (mg/kg/day)		Inhalation SDI:AIS	Oral SDI (a) (mg/kg/day)	Oral AIS (mg/kg/day)		Oral SDI:AIS
Ammonia		3.60E-01	(b)					
Chloride					6.58E+00	3.40E+01	(c)	
Cyanide					2.37E+01			
Phenol		ND	(d)		6.29E-01	2.00E-02		3.15E+01
Sulfate		1.10E-01			4.58E-02	6.00E-01		7.64E-02
Benzene					9.72E+00			
Naphthalene					3.43E-02			
Benz(a)anthracene		ND	(d)		3.43E-02	4.00E-01		8.58E-02
Benzo(a)pyrene					---			
Chrysene					---			
Dibenz(a,h)anthracene					---			
Arsenic		ND	(d)		9.74E-04	1.00E-03		9.74E-01

Sum of Inhalation SDI:AIS =	0
Sum of Oral SDI:AIS Ratios =	3.26E+01
Sum Total of All Ratios =	3.26E+01

(a) Taken from Worksheet 5-6C.
(b) Units of mg/m3. Based on organoleptic threshold for ammonia---not a reference dose.
(c) Units of mg/L. Based on organoleptic threshold for ammonia---not a reference dose.
(d) ND means not determined.

Worksheet 7-IC. Calculation of Subchronic Hazard Index

Total Exposure Point: Future residences on the Coke Plant site (Child)

Chemical	Inhalation SDI (mg/kg/day)	Inhalation AIS (mg/kg/day)		Inhalation SDI:AIS	Oral SDI(a) (mg/kg/day)	Oral AIS (mg/kg/day)		Oral SDI:AIS
Ammonia		3.60E-01	(b)		1.44E+01	3.40E+01	(c)	
Chloride					5.19E+01			
Cyanide		ND	(d)		1.38E+00	2.00E-02		6.88E+01
Phenol		1.10E-01			1.00E-01	6.00E-01		1.67E-01
Sulfate					2.13E+01			
Benzene					7.50E-02			
Naphthalene		ND	(d)		7.50E-02	4.00E-01		1.88E-01
Benz(a)anthracene					---			
Benzo(a)pyrene					---			
Chrysene					---			
Dibenz(a,h)anthracene					---			
Arsenic		ND	(d)		2.13E-03	1.00E-03		2.13E+00

Sum of Inhalation SDI:AIS Ratios =	0
Sum of Oral SDI:AIS Ratios =	7.12E+01
Sum Total of All Ratios =	7.12E+01

(a) Taken from Worksheet 5-6C.
(b) Units of mg/m3. Based on organoleptic threshold for ammonia---not a reference dose.
(c) Units of mg/L. Based on organoleptic threshold for ammonia---not a reference dose.
(d) ND means not determined.

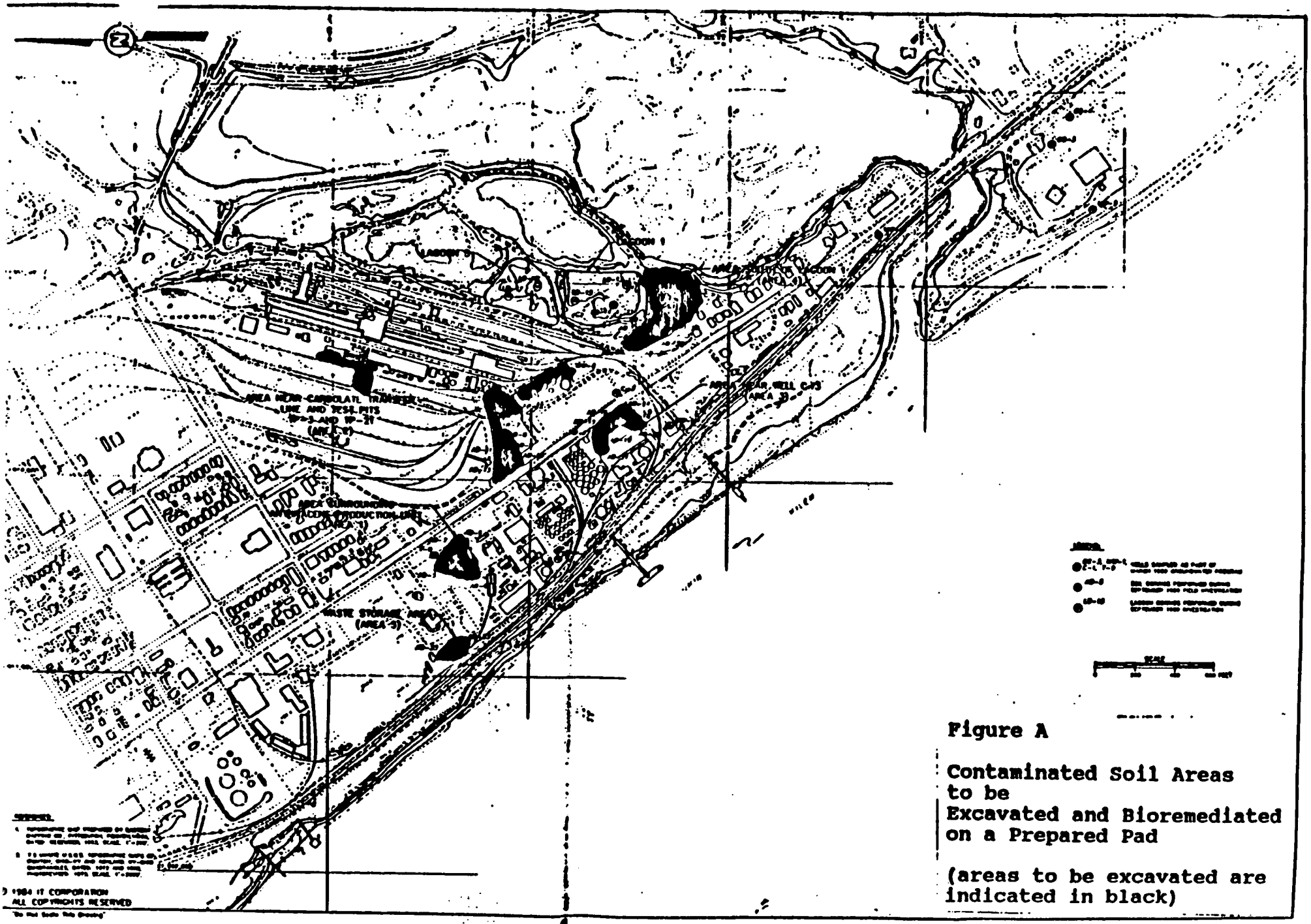
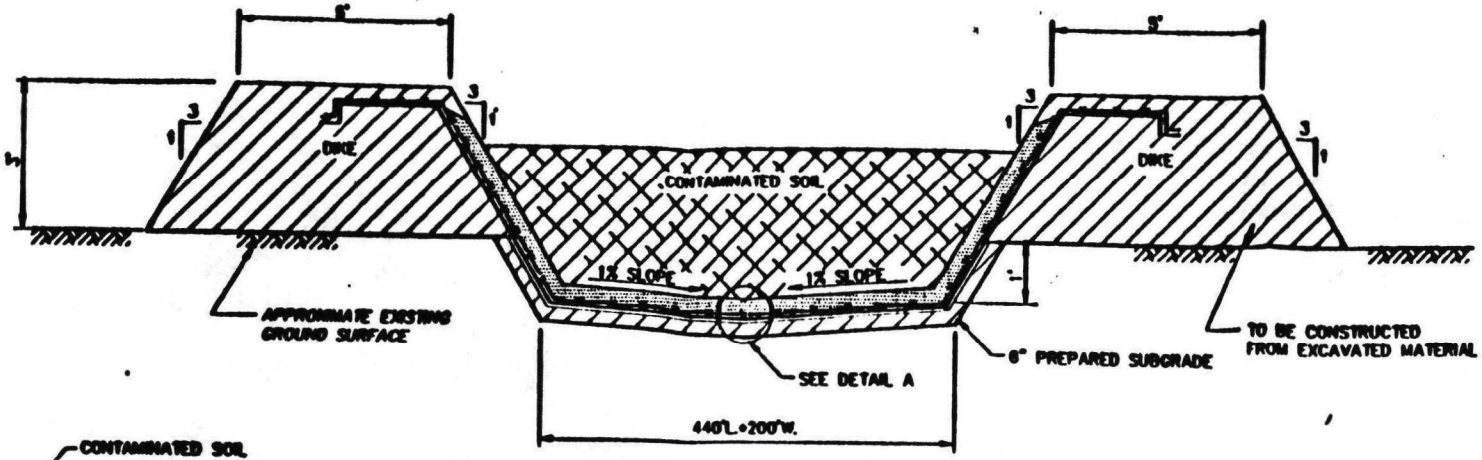


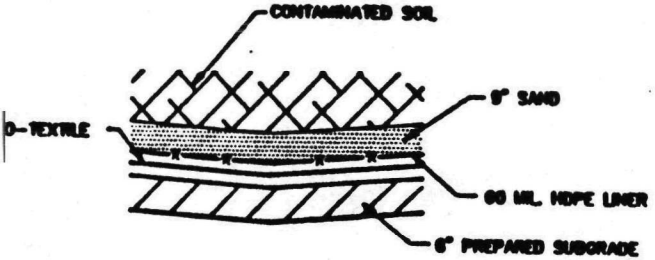
Figure A

Contaminated Soil Areas to be Excavated and Bioremediated on a Prepared Pad

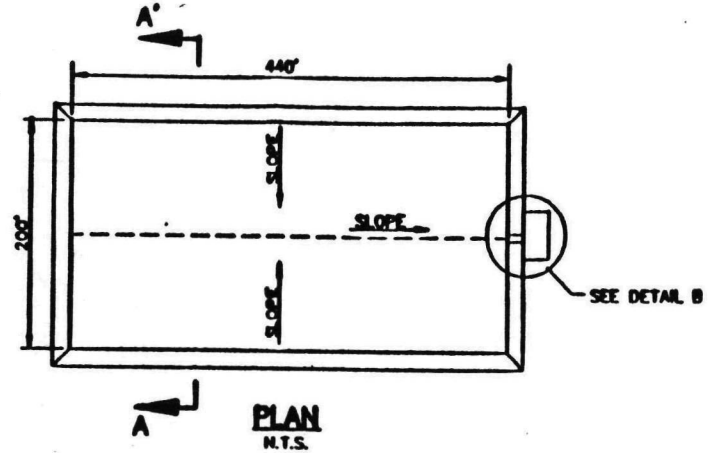
(areas to be excavated are indicated in black)



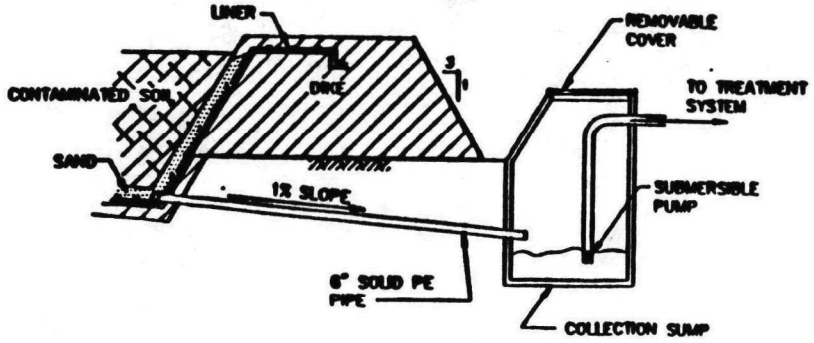
TYPICAL SECTION I–I'
N.T.S.



DETAIL A
N.T.S.



PLAN
N.T.S.



DETAIL B
N.T.S.

NOTES:

1. SEE FIGURE 5-26 FOR LOCATION OF TYPICAL SECTION I–I'.

FIGURE 5-31

CPLA
PLAN AND TYPICAL SECTION
LAND TREATMENT BIOREMEDIATION AREA
ALTERNATIVE 1B

PREPARED FOR

ALLIED-SIGNAL INC.
MORRISTOWN, NEW JERSEY

INTERNATIONAL TECHNOLOGY CORPORATION

U.S. EPA
ARARs and TBCs
Allied-Signal Inc./Ironton Coke Superfund Site
Coke Plant/Lagoons Area

For all options involving incineration or waste fuel recovery:

National Ambient Air Quality Standards (40 CFR Part 50)

National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61)

New Source Performance Standards (40 CFR Part 60)

For options involving excavation and redisposition of hazardous wastes:

RCRA Land Disposal Restrictions

40 CFR Part 268 (substantive portions)

For all options:

Chemical specific criteria:

- SDWA MCLs
- non-zero MCLGs

TBC Values

- Cancer potency factors (depending on results of Risk Assessment)
- Water Quality Criteria
- Health Advisories

OHIO REVISED CODE (ORC) ARARS FOR ALLIED CPLA

ORC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR T
1521.06		CONSTRUCTION PERMITS FOR DAMS, DIKES AND LEVEES	NO DAM MAY BE CONSTRUCTED FOR THE PURPOSE OF STORING, CONSERVING OR RETARDING WATER, OR FOR ANY OTHER PURPOSE, NOR SHALL ANY DIKE OR LEVEE BE CONSTRUCTED FOR THE PURPOSE DIVERTING OR RETAINING FLOOD WATER WITHOUT A PERMIT.	SUBSTANTIVE REQUIREMENTS OF THIS SECTION PERTAIN TO ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTION
1521.062		MONITORING, MAINTENANCE & OPERATION (DAMS,DIKES,LEVEES)	DAMS, DIKES AND LEVEES (AND ALL APPURTENANCES) SHALL BE MONITORED, MAINTAINED AND OPERATED SAFELY IN ACCORDANCE WITH STATE RULES, TERMS AND CONDITIONS OF THE PERMIT AND OTHER REQUIREMENTS ISSUED PURSUANT TO THIS SECTION OR SECTION 1521.06 OF THE ORC.	SUBSTANTIVE REQUIREMENTS OF THIS SECTION PERTAIN TO ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTION
3734.02	(F)	UNAUTHORIZED STORAGE,TREATMENT OR DISPOSAL OF HAZ WASTE	PROHIBITS STORAGE, TREATMENT OR DISPOSAL OF HAZARDOUS WASTE EXCEPT AT PERMITTED FACILITIES.	PERTAINS TO ALL ALTERNATIVES. REQUIRES THAT SUBSTANTIVE PERMIT REQUIREMENTS BE MET.	ACTION
3734.02	(H)	"DIGGING" WHERE HAZ OR SOLID WASTE FACILITY WAS LOCATED	FILLING, GRADING, EXCAVATING, BUILDING, DRILLING OR MINING ON LAND WHERE HAZARDOUS WASTE OR SOLID WASTE FACILITY WAS OPERATED IS PROHIBITED WITHOUT PRIOR AUTHORIZATION FROM THE DIRECTOR OF THE OHIO EPA.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3734.02	(I)	AIR EMISSIONS FROM HAZARDOUS WASTE FACILITIES	NO HAZARDOUS WASTE FACILITY SHALL EMIT ANY PARTICULATE MATTER, DUST, FUMES, GAS, MIST, SMOKE, VAPOR OR ODOROUS SUBSTANCE THAT INTERFERES WITH THE COMFORTABLE ENJOYMENT OF LIFE OR PROPERTY OR IS INJURIOUS TO PUBLIC HEALTH.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3734.05	(D)(6)(c)	HAZARDOUS WASTE FACILITY ENVIRONMENTAL IMPACT	A HAZARDOUS WASTE FACILITY INSTALLATION AND OPERATION PERMIT SHALL NOT BE APPROVED UNLESS IT PROVES THAT THE FACILITY REPRESENTS THE MINIMUM ADVERSE ENVIRONMENTAL IMPACT, CONSIDERING THE STATE OF AVAILABLE TECHNOLOGY, THE NATURE AND ECONOMICS OF VARIOUS ALTERNATIVES AND OTHER PERTINENT CONSIDERATIONS.	PERTAINS TO ALL ALTERNATIVES.	ACTION

OHIO REVISED CODE (ORC) ARARS FOR ALLIED CPLA

ORC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TY
3734.05	(D)(6)(d)	HAZARDOUS WASTE FACILITY MINIMUM RISK	A HAZARDOUS WASTE FACILITY INSTALLATION AND OPERATION PERMIT SHALL NOT BE APPROVED UNLESS IT PROVES THAT THE FACILITY REPRESENTS THE MINIMUM RISK OF ALL OF THE FOLLOWING: (i)CONTAMINATION OF GROUND AND SURFACE WATERS (ii)FIRES OR EXPLOSIONS FROM TREATMENT, STORAGE OR DISPOSAL METHODS (iii)ACCIDENT DURING TRANSPORTATION (iv)IMPACT ON PUBLIC HEALTH AND SAFETY (v)AIR POLLUTION (vi)SOIL CONTAMINATION	PERTAINS TO ALL ALTERNATIVES.	ACTION LI
3767.13		PROHIBITION OF NUISANCES	PROHIBITS NOXIOUS EXHALATIONS OR SMELLS AND THE OBSTRUCTION OF WATERWAYS.	PERTAINS TO ALL ALTERNATIVES.	CHEMI(
6101.19		CONSERVANCY DISTRICTS - BOARD OF DIRECTORS	BOARD OF DIRECTORS OF A CONSERVANCY DISTRICT MAY MAKE AND ENFORCE RULES AND REGULATIONS PERTAINING TO CHANNELS, DITCHES, PIPES, SEWERS, ETC.	REGULATIONS PROMULGATED PURSUANT TO THIS STATUTE MAY PERTAIN TO ANY ALTERNATIVE THAT MAY AFFECT A CONSTRUCTION WITHIN A CONSERVANCY DISTRICT.	ACTIO
6111.04		ACTS OF POLLUTION PROHIBITED	POLLUTION OF WATERS OF THE STATE IS PROHIBITED.	PERTAINS TO ALL ALTERNATIVES.	ACTI
6111.042		COMPLIANCE WITH NATIONAL EFFLUENT STANDARDS	ESTABLISHES REGULATIONS REQUIRING COMPLIANCE WITH NATIONAL EFFLUENT STANDARDS.	PERTAINS TO ALL ALTERNATIVES.	ACT:
6111.043		LIQUID DISPOSAL PERMIT	ESTABLISHES RULES GOVERNING THE INJECTION OF WASTES INTO WELLS.	PERTAINS TO ALTERNATIVES INCORPORATING BIOREMEDIATION.	ACT
6111.45		APPROVAL OF PLANS FOR DISPOSAL OF WASTE	THE DISPOSAL OF INDUSTRIAL WASTE IS PROHIBITED WITHOUT PRIOR APPROVAL BY THE DIRECTOR OF THE OHIO EPA.	PERTAINS TO ALL ALTERNATIVES.	ACT

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYP
1501:21-11	03-05	PREDESIGN INVESTIGATIONS (DAMS,DIKES,LEVEES)	PRESENTS PREDESIGN REQUIREMENTS FOR DAMS, DIKES AND LEVEES. INCLUDES ON-SITE CONSTRUCTION MATERIAL DATA, SURVEYS AND HYROLOGIC AND HYDRAULIC INVESTIGATIONS.	PRESENTS SUBSTANTIVE PREDESIGN REQUIREMENTS FOR ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTION
1501:21-13	02-06	ADDITIONAL DESIGN REQUIREMENTS FOR DAMS	PRESENTS DESIGN REQUIREMENTS SPECIFIC TO DAMS. INCLUDES SUCH CRITERIA AS DESIGN STORM AND FLOOD, SPILLWAY DESIGN, FREEBOARD REQUIREMENTS, ETC.	PRESENTS SUBSTANTIVE DESIGN REQUIREMENTS FOR ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTION
1501:21-13	10-14	ADDITIONAL DESIGN REQUIREMENTS FOR DIKES AND LEVEES	PRESENTS DESIGN REQUIREMENTS SPECIFIC TO DIKES AND LEVEES. INCLUDES CRITERIA SUCH AS DESIGN STORM AND FLOOD AND FREEBOARD REQUIREMENTS.	PRESENTS SUBSTANTIVE DESIGN REQUIREMENTS FOR ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTION
1501:21-15	06	OPERATION, MAINTENANCE AND INSPECTION MANUAL	PRESENTS THE MINIMUM INFORMATION REQUIRED IN A PLAN ADDRESSING THE OPERATION, MAINTENANCE AND INSPECTION OF DAMS, DIKES AND LEVEES.	PRESENTS SUBSTANTIVE INFORMATION REQUIRED IN O&M AND INSPECTION PLANS FOR ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTION
1501:21-21	03-04	DEFICIENCY AND O&M OF DAMS, DIKES AND LEVEES.	DAMS, DIKES AND LEVEES MUST BE OPERATED SAFELY. REPAIRS OR OTHER REMEDIAL MEASURES SHALL BE PERFORMED ON DAMS, DIKES AND LEVEES AS NECESSARY TO SAFEGUARD LIFE, HEALTH OR PROPERTY.	PERTAINS TO ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTIO
1501:21-5	02-04	DESIGN REQUIREMENTS FOR DAMS, DIKES AND LEVEES	SPECIFIES MINIMUM INFORMATION REQUIRED DURING DESIGN FOR OHIO DNR TO DETERMINE ADEQUACY OF PREPOSED DAM, DIKE OR LEVEE. INCLUDES DESIGN REPORTS, PLANS AND SPECIFICATIONS.	PRESENTS SUBSTANTIVE DESIGN REQUIREMENTS FOR ANY ALTERNATIVES THAT ADDRESS ICE CREEK SEDIMENTS OR THE DIKE BETWEEN THE LAGOONS AND ICE CREEK.	ACTIC
3745-1-03		ANALYTICAL AND COLLECTION PROTOCOLS	SPECIFIES ANALYTICAL METHODS AND COLLECTION PROCEDURES FOR SURFACE WATER DISCHARGES	PERTAINS TO ALL ALTERNATIVES INVOLVING DISCHARGES TO WATERS OF THE STATE	ACTI

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR T
745-1-04		THE "FIVE FREEDOMS" FOR SURFACE WATER	ALL SURFACE WATERS OF THE STATE SHALL BE FREE FROM: A) OBJECTIONAL SUSPENDED SOLIDS. B) FLOATING DEBRIS, OIL & SCUM. C) MATERIALS THAT CREATE A NUISANCE. D) TOXIC, HARMFUL OR LETHAL SUBSTANCES. E) NUTRIENTS THAT CREATE NUISANCE GROWTH	PERTAINS TO BOTH DISCHARGES TO SURFACE WATERS AS A RESULT OF REMEDIATION AND ANY SURFACE WATERS AFFECTED BY SITE CONDITIONS. APPLIES TO ALL ALTERNATIVES INVOLVING ICE CREEK	CHEMICAL
745-1-05		ANTIDEGRADATION POLICY	PREVENTS DEGRADATION OF SURFACE WATER QUALITY BELOW DESIGNATED USE OR EXISTING WATER QUALITY. EXISTING INSTREAM USES SHALL BE MAINTAINED AND PROTECTED. THE MOST STRINGENT CONTROLS FOR WASTE TREATMENT SHALL BE REQUIRED BY THE DIRECTOR TO BE EMPLOYED FOR ALL NEW AND EXISTING POINT SOURCES. PRESENT AMBIENT WATER QUALITY IN STATE RESOURCE WATERS, WHICH INCLUDES WETLANDS, WILL NOT BE DEGRADED FOR ALL SUBSTANCES DETERMINED TO BE TOXIC OR TO INTERFER WITH ANY DESIGNATED USE AS DETERMINED BY THE DIRECTOR OF THE OHIO EPA.	PERTAINS TO ALL ALTERNATIVES INVOLVING POINT SOURCE DISCHARGES TO ICE CREEK	ACTION
745-1-06		MIXING ZONES	(A) PRESENTS THE CRITERIA FOR ESTABLISHING NON-THERMAL MIXING ZONES FOR POINT SOURCE DISCHARGES (B) PRESENTS THE CRITERIA FOR ESTABLISHING THERMAL MIXING ZONES FOR POINT SOURCE DISCHARGES	ESTABLISHES PTI CONDITIONS FOR DISCHARGES TO ICE CREEK	CHEMICAL
45-1-16		WATER USE DESIGNATION FOR SE OHIO TRIBUTARIES	ESTABLISHES WATER USE CRITERIA FOR ICE CREEK PER OAC 3745-1-07.	PERTAINS TO ALL ALTERNATIVES INVOLVING ICE CREEK	ACTION LOC
45-15-06	A1,A2	MALFUNCTION & MAINT OF AIR POLL CONTROL EQUIPMENT	ESTABLISHES SCHEDULED MAINTENANCE AND SPECIFIES WHEN POLLUTION SOURCE MUST BE SHUT DOWN DURING MAINTENANCE	PERTAINS TO ANY ALTERNATIVES REQUIRING AIR POLLUTION CONTROL EQUIPMENT	ACTION
45-15-07	A	AIR POLLUTION NUISANCES PROHIBITED	DEFINES AIR POLLUTION NUISANCE AS THE EMISSION OR ESCAPE INTO THE AIR FROM ANY SOURCE(S) OF SMOKE, ASHES, DUST, DIRT, GRIME, ACIDS, FUMES, GASES, VAPORS, ODORS AND COMBINATIONS OF THE ABOVE THAT ENDANGER HEALTH, SAFETY OR WELFARE OF THE PUBLIC OR CAUSE PERSONAL INJURY OR PROPERTY DAMAGE. SUCH NUISANCES ARE PROHIBITED.	PERTAINS TO ALL ALTERNATIVES THAT INVOLVE EXCAVATION, DEMOLITION, CAP INSTALLATION, METHANE PRODUCTION, CLEARING AND GRUBBING, WATER TREATMENT, INCINERATION AND ON-SITE WASTE FUEL RECOVERY	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
			PROHIBITED.		
3745-16-02	B,C	STACK HEIGHT REQUIREMENTS	ESTABLISHES ALLOWABLE STACK HEIGHT FOR AIR CONTAMINANT SOURCES BASED ON GOOD ENGINEERING PRACTICE.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION, WASTEWATER TREATMENT AND ON-SITE WASTE FUEL RECOVERY.	ACTION
3745-17-02	A,B,C	PARTICULATE AMBIENT AIR QUALITY STANDARDS	ESTABLISHES SPECIFIC STANDARDS FOR TOTAL SUSPENDED PARTICULATES.	PERTAINS TO ALL ALTERNATIVES INCORPORATING EXCAVATION, DEMOLITION, CAP INSTALLATION, CLEARING AND GRUBBING, INCINERATION AND ON-SITE WASTE FUEL RECOVERY	CHEMICAL
3745-17-05		PARTICULATE NON-DESRADATION POLICY	NON-DEGRADATION POLICY PROHIBITS SIGNIFICANT AND AVOIDABLE DETERIORATION OF AIR QUALITY.	PERTAINS TO ALL ALTERNATIVES INCORPORATING EXCAVATION, DEMOLITION, CAP INSTALLATION, CLEARING AND GRUBBING, INCINERATION AND ON-SITE WASTE FUEL RECOVERY.	CHEMICAL
3745-17-07	A-D	VISIBLE PARTICULATE EMISSION CONTROL	SPECIFIES THE ALLOWABLE OPACITY FOR PARTICULATE EMISSIONS;	PERTAINS TO ALL ALTERNATIVES INCORPORATING INCINERATION OR ON-SITE WASTE FUEL RECOVERY.	ACTION
3745-17-08	A1,A2,B,D	EMISSION RESTRICTIONS FOR FUGITIVE DUST	ALL EMISSIONS OF FUGITIVE DUST SHALL BE CONTROLLED	PERTAINS TO ALL ALTERNATIVES INCORPORATING GRADING , LOADING OPERATIONS , DEMOLITION , CONSTRUCTION AND ANY OTHER PRACTICES WHICH EMIT FUGITIVE DUST.	ACTION
3745-17-09	A,B,C	INCINERATOR PARTIC EMISSION & ODOR RESTRICTIONS	ESTABLISHES PARTICULATE EMISSION LIMITATIONS AND DESIGN-OPERATION REQUIREMENTS TO PREVENT THE EMISSION OF PARTICULATES AND OBJECTIONABLE ODORS.	PERTAINS TO ALL ALTERNATIVES INCORPORATING INCINERATION.	ACTION
3745-17-10	A,B,C	FUEL BURNING PARTIC EMISSION RESTRICTIONS	ESTABLISHES PARTICULATE EMISSION LIMITATIONS FOR FUEL BURNING EQUIPMENT.	PERTAINS TO ALL ALTERNATIVES INCOPORATING ON-SITE WASTE FUEL RECOVERY.	ACTION
3745-18-02	A,B,C,I	SULFUR DIOXIDE AMBIENT AIR QUALITY STANDARDS	ESTABLISHES PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS FOR SULFUR DIOXIDE.	PERTAINS TO ALL ALTERNATIVES INCORPORATING INCINERATION OR ON-SITE WASTE FUEL RECOVERY.	ACTION CHEMIC

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S)
3745-16-05	A	SULFUR DIOXIDE AMBIENT MONITORING REQUIREMENTS	THE DIRECTOR OF THE OHIO EPA MAY REQUIRE ANY SOURCE OF SULFUR DIOXIDE EMISSIONS TO INSTALL, OPERATE AND MAINTAIN MONITORING DEVICES, MAINTAIN RECORDS AND FILE REPORTS.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ALL ALTERNATIVES INCORPORATING INCINERATION OR ON-SITE WASTE FUEL RECOVERY.	ACTION CHEMICA
3745-18-06	A,F,G	SULFUR DIOXIDE EMISSION LIMIT PROVISIONS	ESTABLISHES GENERAL LIMIT PROVISIONS FOR SULFUR DIOXIDE	PERTAINS TO ALL ALTERNATIVES INCORPORATING INCINERATION OR ON-SITE WASTE FUEL RECOVERY.	ACTION CHEMICA
3745-18-50		LAWRENCE COUNTY EMISSION LIMITS FOR SULFUR DIOXIDE	ESTABLISHES SPECIFIC SULFUR DIOXIDE EMISSION LIMITS FOR LAWRENCE COUNTY.	PERTAINS TO ALL ALTERNATIVES INCORPORATING INCINERATION OR ON-SITE WASTE FUEL RECOVERY	ACTION CHEMICA
3745-21-02	A,B,C	AMBIENT AIR QUALITY STANDARDS FOR CARBON OXIDES	ESTABLISHES SPECIFIC AMBIENT AIR QUALITY STANDARDS FOR CARBON MONOXIDE, OZONE AND NON-METHANE HYDROCARBONS.	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF CONTAMINATED GROUND WATER, SOILS, SEDIMENTS AND LAGOON WASTES.	CHEMICAL
3745-21-05		CARBON OXIDES NON-DEGRADATION POLICY	PROHIBITS SIGNIFICANT AND AVOIDABLE DETERIORATION OF AIR QUALITY.	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF CONTAMINATED GROUND WATER, SOILS, SEDIMENT AND LAGOON WASTES.	ACTION
3745-21-07	A-J	ORGANIC MATERIAL EMISSION CONTROL : STATIONARY SOURCE	REQUIRES CONTROL OF EMISSIONS OF ORGANIC MATERIALS FROM STATIONARY SOURCES. INCLUDES A BAT REQUIREMENT.	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF CONTAMINATED GROUND WATER, SOILS, SEDIMENTS AND LAGOON WASTES.	ACTION CHEMIC
3745-21-08	B	CARBON MONOXIDE EMISSION CONTROL : STATIONARY SOURCE	REQUIRES ANY STATIONARY SOURCE OF CARBON MONOXIDE TO MINIMIZE EMISSIONS BY THE USE OF BEST AVAILABLE CONTROL TECHNOLOGIES AND OPERATING PRACTICES IN ACCORDANCE WITH BEST CURRENT TECHNOLOGY.	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF CONTAMINATED GROUND WATER, SOILS, SEDIMENT AND LAGOON WASTES.	ACTION
3745-23-01		NITROGEN DIOXIDE AMBIENT AIR QUALITY STANDARDS	ESTABLISHES A MAXIMUM AMBIENT AIR QUALITY STANDARD FOR NITROGEN DIOXIDE.	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF CONTAMINATED GROUND WATER, SOILS, SEDIMENT AND LAGOON WASTES.	CHEMICAL
45-23-04		NITROGEN DIOXIDE NON-DEGRADATION POLICY	PROHIBITS THE SIGNIFICANT AND AVOIDABLE DETERIORATION OF AIR	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S
			QUALITY BY THE RELEASE OF NITROGEN OXIDE EMISSIONS.	CONTAMINATED GROUND WATER, SOILS, SEDIMENT AND LAGOON WASTES.	
3745-23-06		NITROGEN OXIDES EMISSION CONTROL : STATIONARY SOURCE	REQUIRES THAT ALL STATIONARY SOURCES OF NITROGEN OXIDE MINIMIZE EMISSIONS BY THE USE OF THE LATEST AVAILABLE CONTROL TECHNIQUES AND OPERATING PRACTICES IN ACCORDANCE WITH BEST CURRENT TECHNOLOGY. PROHIBITS NITROGEN OXIDE EMISSIONS FROM COMBUSTION SOURCES.	PERTAINS TO ALL ALTERNATIVES INCORPORATING REMEDIATION OF CONTAMINATED GROUND WATER, SOILS, SEDIMENT AND LAGOON WASTES.	ACTION
3745-25-03		EMISSION CONTROL ACTION PROGRAMS	REQUIRES PREPARATION FOR AIR POLLUTION ALERTS , WARNINGS AND EMERGENCIES.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-27-05	A,B,C	AUTHORIZED,LIMITED & PROHIBITED SOLID WASTE DISPOSAL	ESTABLISHES ALLOWABLE METHODS OF SOLID WASTE DISPOSAL ; SANITARY LANDFILL, INCINERATION, COMPOSTING. PROHIBITS MANAGEMENT BY OPEN BURNING AND OPEN DUMPING.	PERTAINS TO ANY SITE AT WHICH SOLID WASTES WILL BE MANAGED.	
3745-27-06	B,C	REQUIRED TECHNICAL INFO FOR SANITARY LANDFILLS	SPECIFIES THE MINIMUM TECHNICAL INFORMATION REQUIRED OF A SOLID WASTE PTI. INCLUDED ARE A HYDROGEOLOGIC INVESTIGATION REPORT, LEACHATE PRODUCTION AND MIGRATION INFORMATION, SURFACE WATER DISCHARGE INFORMATION, DESIGN CALCULATIONS, PLAN DRAWINGS, CONSTRUCTION PLANS AND OPERATIONAL PLANS.	THIS PARAGRAPH PRESENTS SUBSTANTIVE REQUIREMENTS OF A SOLID WASTE PTI, WHICH PERTAIN TO ANY NEW SOLID WASTE DISPOSAL FACILITY CREATED ON-SITE AND EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS. PORTIONS ALSO PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT ARE CAPPED PER SOLID WASTE RULES. THIS RULE ESTABLISHES THE MINIMUM INFORMATION REQUIRED DURING THE REMEDIAL DESIGN STAGE.	ACTION
3745-27-07	A,B	LOCATION CRITERIA FOR SOLID WASTE DISPOSAL PERMIT	SPECIFIES LOCATIONS IN WHICH SOLID WASTE LANDFILLS ARE NOT TO BE SITED. INCLUDES FLOODPLAINS, SAND OR GRAVEL PITS, LIMESTONE OR SANDSTONE QUARRIES, AREAS ABOVE SOLE SOURCE AQUIFERS, WETLANDS, ETC.	THIS RULE LIMITS THE ESTABLISHMENT OF NEW SOLID WASTE LANDFILLS AND EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS IN CERTAIN UNFAVORABLE LOCATIONS. ALSO MAY LIMIT THE LEAVING OF WASTE IN-PLACE IN CERTAIN UNFAVORABLE LOCATIONS.	LOCATION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S)
3745-27-08	C,D,E	CONSTRUCTION SPECS FOR SANITARY LANDFILLS	SPECIFIES THE MINIMUM REQUIREMENTS FOR THE SOIL/CLAY LAYERS, GRANULAR DRAINAGE LAYER, GEOSYNTHETICS, LEACHATE MANAGEMENT SYSTEM, GAS MONITORING SYSTEM, ETC. ALSO ESTABLISHES CONSTRUCTION REQUIREMENTS FOR FACILITIES TO BE LOCATED IN GEOLOGICALLY UNFAVORABLE AREAS.	PERTAINS TO ANY NEW SOLID WASTE DISPOSAL FACILITY CREATED ON-SITE AND ANY EXPANSIONS TO EXISTING SOLID WASTE LANDFILLS. PORTIONS ALSO PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPED IN-PLACE PER SOLID THE WASTE RULES. MAY SERVE AS SITING CRITERIA.	ACTION LOCATIO
3745-27-09	C-F,I,L-O	SANITARY LANDFILL OPERATIONAL REQUIREMENTS	SPECIFIES OPERATIONAL REQUIREMENTS FOR SOLID WASTE LANDFILLS. INCLUDES LEACHATE AND AIR EMISSION MANAGEMENT, FILLING OF NEW PHASE, ACCESS ROADS, DAILY COVER, BURNING WASTE, LAYER THICKNESS, DISPOSAL OF LIQUIDS AND SURFACE WATER MANAGEMENT.	PERTAINS TO NEW SOLID WASTE DISPOSAL FACILITIES TO BE CREATED ON-SITE AND EXISTING LANDFILLS THAT WILL EXPANDED DURING REMEDIATION. PORTIONS ALSO PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT WILL BE CAPPED IN-PLACE PER SOLID WASTE RULES.	ACTION
27-10	B,C,I	SANITARY LANDFILL - GROUND WATER MONITORING	GROUND WATER MONITORING PROGRAM MUST BE ESTABLISHED FOR ALL SANITARY LANDFILL FACILITIES . THE SYSTEM MUST CONSIST OF A SUFFICIENT NUMBER OF WELLS THAT ARE LOCATED SO THAT SAMPLES INDICATE BOTH UPGRADIENT (BACKGROUND) AND DOWNGRADIENT WATER SAMPLES . THE SYSTEM MUST BE DESIGNED PER THE MINIMUM REQUIREMENTS SPECIFIED IN THIS RULE . THE SAMPLING AND ANALYSIS PROCEDURES MUST COMPLY WITH THIS RULE	PERTAINS TO ANY NEW SOLID WASTE FACILITY AND ANY EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS ON-SITE. PORTIONS ALSO PERTAIN TO EXISTING AREAS OF CONTAMINATION THAT ARE CAPPED IN-PLACE PER THE SOLID WASTE RULES.	ACTION
3745-27-11	B,G	FINAL CLOSURE OF SANITARY LANDFILL FACILITIES	SPECIFIES THE MINIMUM INFORMATION NECESSARY FOR OHIO EPA TO DETERMINE ADEQUACY OF CLOSURE METHODS FOR SOLID WASTE LANDFILLS. SPECIFIES ACCEPTABLE CAP DESIGN; SOIL BARRIER LAYER, GRANULAR DRAINAGE LAYER, SOIL AND VEGETATIVE LAYER.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY NEW SOLID WASTE LANDFILLS CREATED ON-SITE. ANY EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS ON-SITE AND ANY EXISTING AREAS OF CONTAMINATION THAT ARE CAPPED IN-PLACE PER THE SOLID WASTE RULES.	ACTION
3745-27-13	A,F-I,J	AUTH TO "DIG" WHERE HAZ OR SOLID WASTE FAC WAS OPERATED	PROHIBITS ANY FILLING, GRADING, EXCAVATING. BUILDING, DRILLING OR MINING ON LAND WHERE A	SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY SITE AT WHICH HAZARDOUS OR SOLID WASTE HAS BEEN MANAGED,	LOCATION ACTIO

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S
			HAZARDOUS WASTE FACILITY OR SOLID WASTE FACILITY WAS OPERATED WITHOUT PRIOR AUTHORIZATION FROM THE DIRECTOR. SPECIAL TERMS TO CONDUCT SUCH ACTIVITIES MAY BE IMPOSED BY THE DIRECTOR TO PROTECT THE PUBLIC AND THE ENVIRONMENT.	EITHER INTENTIONALLY OR OTHERWISE. DOES NOT PERTAIN TO AREAS THAT HAVE HAD ONE-TIME LEAKS OR SPILLS.	
3745-27-14	A	POST-CLOSURE CARE OF SANITARY LANDFILL FACILITIES	SPECIFIES THE REQUIRED POST-CLOSURE CARE FOR SOLID WASTE FACILITIES. INCLUDES CONTINUING OPERATION OF LEACHATE AND SURFACE WATER MANAGEMENT SYSTEMS, MAINTENANCE OF THE CAP SYSTEM AND GROUND WATER MONITORING.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY NEWLY CREATED SOLID WASTE LANDFILLS ON-SITE, ANY EXPANSIONS OF EXISTING SOLID WASTE LANDFILLS ON-SITE AND ANY EXISTING AREAS OF CONTAMINATION THAT ARE CAPPED PER THE SOLID WASTE RULES.	ACTION
3745-27-19	A-Q	OPERATION OF SOLID WASTE DISPOSAL FACILITIES	SPECIFIES GENERAL OPERATIONAL REQUIREMENTS FOR SOLID WASTE LANDILLS.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ANY NEWLY CREATED SOLID WASTE LANDFILL OR ANY EXPANSION OF AN EXISTING SOLID WASTE LANDFILL ON-SITE.	ACTION
3745-31-05	A,C,I	CRITERIA FOR DECISION BY THE DIRECTOR	PTI OR PLANS MUST DEMONSTRATE BAT AND SHALL NOT INTERFERE WITH OR PREVENT THE ATTAINMENT OR MAINTENANCE OF APPLICABLE AMBIENT WATER QUALITY STANDARDS OR AMBIENT AIR QUALITY STANDARDS.	PERTAINS TO ALL ALTERNATIVES INVOLVING SURFACE WATER DISCHARGES OR AIR EMISSIONS.	ACTION
3745-32-05		CRITERIA FOR DECISION BY THE DIRECTOR	SPECIFIES SUBSTANTIVE CRITERIA FOR SECTION 401 WATER QUALITY CRITERIA FOR DREDGING, FILLING, OBSTRUCTING OR ALTERING WATERS OF THE STATE.	PERTAINS TO ALL ALTERNATIVES FOR ICE CREEK.	ACTION
3745-33-04		CRITERIA FOR ISSUING NPDES PERMITS	PRESENTS SUBSTANTIVE REQUIREMENTS OF NPDES PERMIT (EFFLUENT LIMITS).	PERTAINS TO ALL ALTERNATIVES INCORPORATING SURFACE WATER DISCHARGES TO ICE CREEK.	ACTION CHEM
3745-33-05	A&-AP,B	GENERAL PERMIT CONDITIONS	ESTABLISHES GENERAL NPDES PERMIT CONDITIONS.	PERTAINS TO ALL ALTERNATIVES INCORPORATING SURFACE WATER DISCHARGES TO ICE CREEK.	ACTION
3745-50-44	A,B,C	PERMIT INFO REQUIRED FOR ALL HAZ WASTE FACILITIES	ESTABLISHES THE SUBSTANTIVE HAZARDOUS WASTE PERMIT REQUIREMENTS NECESSARY FOR OHIO EPA TO DETERMINE FACILITY	SUBSTANTIVE REQUIREMENTS PERTAIN TO ALL ALTERNATIVES WHICH WILL HAVE TREATMENT, STORAGE OR DISPOSAL OF HAZARDOUS WASTE	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC ITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S)
			COMPLIANCE. INCLUDES INFORMATION SUCH AS FACILITY DESCRIPTION, WASTE CHARACTERISTICS, EQUIPMENT DESCRIPTIONS, CONTINGENCY PLAN, FACILITY LOCATION, TOPOGRAPHIC MAP, ETC.	OCCURRING ON-SITE. THIS, ALONG WITH OTHER PARAGRAPHS OF THIS RULE, ESTABLISHES THE MINIMUM INFORMATION REQUIRED DURING THE REMEDIAL DESIGN STAGE.	
745-50-58	A,E,H-J	HAZARDOUS WASTE FACILITY PERMIT CONDITIONS	ESTABLISHES GENERAL PERMIT CONDITIONS APPLIED TO ALL HAZARDOUS WASTE FACILITIES IN OHIO. INCLUDES CONDITIONS SUCH AS OPERATION AND MAINTENANCE, SITE ACCESS, MONITORING AND MAINTENANCE, ETC.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ALL ALTERNATIVES.	ACTION
745-50-62	A,B,C,D	TRIAL BURN FOR INCINERATORS	SPECIFIES REQUIREMENTS OF A TRIAL BURN.	PERTAINS TO ALL ALTERNATIVES INCORPORATING INCINERATION.	ACTION
745-52-11	A-F	HAZARDOUS WASTE DETERMINATION	ANY PERSON GENERATING A WASTE MUST DETERMINE IF THAT WASTE IS A HAZARDOUS WASTE (EITHER THROUGH LISTING OR CHARACTERISTIC).	PERTAINS TO ALL ALTERNATIVES. ASH RESULTING FROM WASTE FUEL RECOVERY OF K087 WASTE IS NOT A LISTED HAZARDOUS WASTE.	CHEMICAL
745-54-13	A	GENERAL ANALYSIS OF HAZARDOUS WASTE	PRIOR TO ANY TREATMENT, STORAGE OR DISPOSAL OF HAZARDOUS WASTES, A REPRESENTATIVE SAMPLE OF THE WASTE MUST BE CHEMICALLY AND PHYSICALLY ANAYZED.	PERTAINS TO ALL ALTERNATIVES. ASH RESULTING FROM WASTE FUEL RECOVERY OF K087 WASTE IS NOT A LISTED HAZARDOUS WASTE.	CHEMICAL ACTION
745-54-14	A,B,C	SECURITY FOR HAZARDOUS WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST BE SECURED SO THAT UNAUTHORIZED AND UNKNOWING ENTRY ARE MINIMIZED OR PROHIBITED.	PERTAINS TO ALL ALTERNATIVES.	ACTION
745-54-15	A,C	INSPECTION REQUIREMENTS FOR HAZARDOUS WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST BE INSPECTED REGULARLY TO DETECT MALFUNCTIONS, DETERIORATIONS, OPERTAIONAL ERRORS AND DISCHARGES. ANY MALFUNCTIONS OR DETERIORATIONS DETECTED SHALL BE REMEDIED EXPEDITIOUSLY.	PERTAINS TO ALL ALTERNATIVES.	ACTION
745-54-18	A,B,C	LOCATION STANDARDS FOR HAZARDOUS T/S/D FACILITIES	LIMITS THE SITING OF HAZARDOUS WASTE FACILITIES IN AREAS OF SEISMIC ACTIVITY OR FLOODPLAINS.	PERTAINS TO ANY ALTERNATIVE THAT ADDRESSES HAZARDOUS WASTE THAT WILL EITHER REMAIN OR BE PLACED WITHIN THE FLOODPLAIN.	LOCATION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S)
3745-54-31		DESIGN & OPERATION OF HAZARDOUS FACILITIES	HAZARDOUS WASTE FACILITIES MUST BE DESIGNED, CONSTRUCTED, MAINTAINED AND OPERATED TO MINIMIZE THE POSSIBILITY OF FIRE, EXPLOSION OR UNPLANNED RELEASE OF HAZARDOUS WASTE OR HAZARDOUS CONSTITUENTS TO THE AIR, SOIL OR SURFACE WATER WHICH COULD THREATEN HUMAN HEALTH OR THE ENVIRONMENT.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-32	A,B,C.D	REQUIRED EQUIPMENT FOR HAZARDOUS FACILITIES	ALL HAZARDOUS WASTE FACILITIES MUST BE EQUIPPED WITH EMERGENCY EQUIPMENT, SUCH AS AN ALARM SYSTEM, FIRE CONTROL EQUIPMENT AND A TELEPHONE OR RADIO.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-33		TESTING & MAINTENANCE OF EQUIPMENT; HAZ WASTE FAC	ALL HAZARDOUS WASTE FACILITIES MUST TEST AND MAINTAIN EMERGENCY EQUIPMENT TO ASSURE PROPER OPERATION.	PERTAINS TO ALL ALTERNATIVES.	ACTION
-54-34		ACCESS TO COMMUNICATIONS OR ALARM SYSTEM; HAZ WASTE FAC	WHENEVER HAZARDOUS WASTE IS BEING HANDLED, ALL PERSONNEL INVOLVED SHALL HAVE IMMEDIATE ACCESS TO AN INTERNAL ALARM OR EMERGENCY COMMUNICATION DEVICE.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-35		REQUIRED AISLE SPACE AT HAZARDOUS FACILITIES	ADEQUATE AISLE SPACE SHALL BE MAINTAINED TO ALLOW UNOBSTRUCTED MOVEMENT OF PERSONNEL, FIRE EQUIPMENT, SPILL CONTROL EQUIPMENT AND DECONTAMINATION EQUIPMENT INTO ANY AREA OF THE FACILITY OPERATION IN THE EVENT OF AN EMERGENCY.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-37	A	ARRANGEMENTS/AGREEMENTS WITH LOCAL AUTHORITIES	ARRANGEMENTS OR AGREEMENTS WITH LOCAL AUTHORITIES, SUCH AS POLICE, FIRE DEPARTMENT AND EMERGENCY RESPONSE TEAMS.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-52	A-F	CONTINGENCY PLAN FOR HAZARDOUS WASTE FACILITIES	HAZARDOUS WASTE FACILITIES MUST HAVE A CONTINGENCY PLAN THAT ADDRESSES ANY UNPLANNED RELEASE OF HAZARDOUS WASTES OR HAZARDOUS CONSTIUENTS INTO THE AIR, SOIL OR SURFACE WATER. THIS RULE ESTABLISHES THE MINIMUM REQUIRED INFORMATION OF SUCH A PLAN.	PERTAINS TO ALL ALTERNATIVES.	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
3745-54-54	A	CHANGES IN THE CONTINGENCY PLAN; HAZ WASTE FACILITIES	THE CONTINGENCY PLAN MUST BE AMENDED IF IT FAILS IN AN EMERGENCY, THE FACILITY CHANGES (IN ITS DESIGN, CONSTRUCTION, MAINTENANCE OR OPERATION), THE LIST OF EMERGENCY COORDINATORS CHANGE OR THE LIST OF EMERGENCY EQUIPMENT.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-55		EMERGENCY COORDINATOR; HAZARDOUS WASTE FACILITIES	AT ALL TIMES THERE SHOULD BE AT LEAST ONE EMPLOYEE EITHER ON THE PREMISES OR ON CALL TO COORDINATE ALL EMERGENCY REPSONSE MEASURES.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ALL ALTERNATIVES.	ACTION
3745-54-56	A-I	EMERGENCY PROCEDURES; HAZARDOUS WASTE FACILITIES	SPECIFIES THE PROCEDURES TO BE FOLLOWED IN THE EVENT OF AN EMERGENCY.	SUBSTANTIVE REQUIREMENTS PERTAIN TO ALL ALTERNATIVES.	ACTION
3745-54-91	A	GROUND WATER PROGRAMS FOR HAZARDOUS WASTE FACILITIES	PRESENTS THE GROUND WATER MONITORING AND RESPONSE PROGRAMS REQUIRED OF HAZARDOUS WASTE DISPOSAL FACILITIES.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-54-92		GROUND WATER PROTECTION STANDARD; HAZ WASTE FACILITIES	COMPLIANCE MUST BE ATTAINED WITH THE CONDITIONS SPECIFIED IN THE PERMIT TO ENSURE THAT HAZARDOUS CONSITUENTS (SEE 3745-54-93) DO NOT EXCEED THE PROMULGATED LIMITS (SEE 3745-54-94).	PERTAINS TO ALL ALTERNATIVES.	ACTION CHEM
3745-54-93	A,B	HAZARDOUS CONSTITUENTS IN GROUND WATER; HAZ WASTE FAC	REQUIRES THAT PERMIT SPECIFY HAZARDOUS CONSTITUENTS TO WHICH THE GROUND WATER PROTECTION STANDARD OF 3745-54-92 APPLY. HAZARDOUS CONSTITUENTS ARE CONSTITUENTS IDENTIFIED IN THE APPENDIX OF THIS RULE THAT HAVE BEEN DETECTED IN GROUND WATER IN THE UPPERMOST AQUIFER UNDERLYING THE THE UNIT(S) AND ARE REASONABLY EXPECTED TO BE IN OR DERIVED FROM WASTE CONTAINED IN THE UNIT(S).	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-54-94	A,B	CONCENTRATION LIMITS FOR GROUND WATER; HAZ WASTE FAC	PRESENTS THE METHODOLGY FOR DETERMINING CONCENTRATION LIMITS AND ALTERNATIVE CONCENTRATION	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S
			LIMITS.		
3745-54-95	A,B	POINT OF COMPLIANCE FOR GROUND WATER; HAZ WASTE FAC	ESTABLISHES POINT OF COMPILANCE AT VERTICAL SURFACE LOCATED AT THE HYDRAULICALLY DOWNGRADIENT LIMIT OF THE WASTE MANAGEMENT AREA THAT EXTENDS DOWN INTO THE UPPERMOST AQUIFER UNDERLYING THE UNITS.	PERTAINS TO ALL ALTERNATIVES.	ACTION CHEMIC
3745-54-96	A,B,C	COMPLIANCE PERIOD FOR GROUND WATER; HAZ WASTE FAC	A COMPLIANCE PERIOD DURING WHICH THE GROUND WATER PROTECTION STANDARDS APPLY WILL BE SPECIFIED IN THE PERMIT.	PERTAINS TO ALL ALTERNATIVES.	ACTION CHEMIC
3745-54-97	A-H	GEN GROUND WATER MONITORING REQUIREMENTS; HAZ WASTE FAC	PRESENTS GENERAL GROUND WATER MONITORING PROGRAM REQUIREMENTS. INCLUDES NUMBER, LOCATION AND DEPTH OF WELLS, CASING REQUIREMENTS, SAMPLING AND ANALYSIS PROCEDURES, ETC.	PERTAINS TO ALL ALTERNATIVES.	ACTION CHEMII
3745-54-99	A-J	GROUND WATER COMPLIANCE MONITORING PROG; HAZ WASTE FAC	PRESENTS REQUIREMENTS OF GROUND WATER COMPLIANCE MONITORING PROGRAM.	PERTAINS TO ALL ALTERNATIVES.	ACTION CHEMII
3745-55-01	A-F	GROUND WATER CORRECTIVE ACTION PROGRAM; HAZ WASTE FAC	PRESENTS THE REQUIREMENTS OF A GROUND WATER CORRECTIVE ACTION PROGRAM THAT PREVENTS HAZARDOUS CONSTITUENTS FROM EXCEEDING THEIR RESPECTIVE CONCENTRATION LIMITS AT THE COMPLIANCE POINT BY EITHER REMOVAL OR TREATMENT OF THESE HAZARDOUS CONSTITUENTS.	PERTAINS TO ALL ALTERNATIVES.	ACTION CHEMII
3745-55-11	A,B,C	GENERAL CLOSURE PERFORMANCE STANDARD; HAZ WASTE FAC	REQUIRES THAT ALL HAZARDOUS WASTE FACILITIES BE CLOSED IN A MANNER MINIMIZES THE NEED FOR FURTHER MAINTENANCE, CONTROLS, MINIMIZES, ELIMINATES OR PREVENTS POST-CLOSURE ESCAPE OF HAZARDOUS WASTE, HAZARDOUS CONSTITUENTS, LEACHATE, CONTAMINATED RUN-OFF OR HAZARDOUS WASTE DECOMPOSITION PRODUCTS TO GROUND OR SURFACE WATER OR THE ATMOSPHERE.	PERTAINS TO AREAS OF HAZARDOUS WASTE CONTAMINATION AND AREAS THAT WILL BE USED FOR TREATMENT, STORAGE OR DISPOSAL OF HAZARDOUS WASTES FOR ALL ALTERNATIVES.	ACTION
3745-55-12	B	CONTENT OF CLOSURE PLAN; HAZARDOUS WASTE FACILITIES	SPECIFIES THE MINIMUM INFORMATION REQUIRED IN A CLOSURE PLAN FOR	PERTAINS TO ALL ALTERNATIVES.	ACTION

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S)
			OHIO EPA TO DETERMINE THE ADEQUACY OF THE PLAN.		
3745-55-14		DISPOSAL/DECON OF EQUIPMENT, STRUCTURES & SOILS	REQUIRES THAT ALL CONTAMINATED EQUIPMENT, STRUCTURES AND SOILS BE PROPERLY DISPOSED OF OR DECONTAMINATED. REMOVAL OF HAZARDOUS WASTES OR CONSTITUENTS MAY CONSTITUTE GENERATION OF HAZARDOUS WASTES.	PERTAINS TO ALL ALTERNATIVES.	ACTION
3745-55-16		SUBMISSION OF SURVEY PLAT FOLLOWING CLOSURE	FOLLOWING CLOSURE, A SURVEY PLAT INDICATING THE LOCATION AND DIMENSIONS OF LAND DISPOSAL UNITS WITH RESPECT TO PERMANENTLY SURVEYED BENCHMARKS MUST BE SUBMITTED TO THE LOCAL ZONING AUTHORITY AND THE DIRECTOR OF THE OHIO EPA. THE PLAT MUST CONTAIN A NOTE WHICH STATES THE OBLIGATION TO RESTRICT DISTURBANCE OF THE UNITS.	PERTAINS TO ALL ALTERNATIVES IN WHICH HAZARDOUS WASTE IS MANAGED IN LAND-BASED UNITS.	ACTION
3745-55-17	B	POST-CLOSURE CARE AND USE OF PROPERTY	SPECIFIES THE POST-CLOSURE CARE REQUIREMENTS, INCLUDING MAINTENANCE, MONITORING AND POST-CLOSURE USE OF PROPERTY.	PERTAINS TO ALL ALTERNATIVES IN WHICH HAZARDOUS WASTE IS MANAGED IN LAND-BASED UNITS.	ACTION
3745-55-18	B	POST-CLOSURE PLAN	PRESENTS THE INFORMATION NECESSARY FOR OHIO EPA TO DETERMINE THE ADEQUACY OF A POST-CLOSURE PLAN.	PERTAINS TO ALL ALTERNATIVES IN WHICH HAZARDOUS WASTE IS MANAGED IN LAND-BASED UNITS.	ACTION
3745-55-19	B	NOTICE TO LOCAL LAND AUTHORITY	REQUIRES THAT A RECORD OF THE TYPE, LOCATION AND QUANTITY OF HAZARDOUS WASTES DISPOSED OF IN EACH UNIT BE SUBMITTED TO THE LOCAL LAND AUTHORITY AND THE DIRECTOR OF THE OHIO EPA. ALSO REQUIRES THAT A NOTATION TO THE DEED TO THE FACILITY PROPERTY BE MADE INDICATING THAT THE LAND WAS USED TO MANAGE HAZARDOUS WASTES AND THAT CERTAIN USE RESTRICTIONS MAY APPLY TO THE PROPERTY.	PERTAINS TO ALL ALTERNATIVES IN WHICH HAZARDOUS WASTE IN MANAGED IN LAND-BASED UNITS.	ACTION
3745-55-71		CONDITION OF CONTAINERS	CONTAINERS HOLDING HAZARDOUS WASTE MUST BE MAINTAINED IN GOOD CONDITION (NO RUST OR STRUCTURAL DEFECTS).	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OF HAZARDOUS WASTES BEYOND 90 DAYS IN CONTAINERS PRIOR TO TREATMENT	ACTION

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
				OR DISPOSAL.	
3745-55-73		MANAGEMENT OF CONTAINERS	CONTAINERS HOLDING HAZARDOUS WASTE MUST BE CLOSED (EXCEPT TO ADD OR REMOVE WASTE) AND MUST NOT BE HANDLED IN A MANNER THAT MAY RUPTURE THE CONTAINER OR CAUSE IT TO LEAK.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OF HAZARDOUS WASTES BEYOND 90 DAYS IN CONTAINERS PRIOR TO TREATMENT OR DISPOSAL.	ACTION
3745-55-74		CONTAINER INSPECTIONS	REQUIRES AT LEAST WEEKLY INSPECTIONS OF CONTAINER STORAGE AREAS.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OF HAZARDOUS WASTES BEYOND 90 DAYS IN CONTAINERS PRIOR TO TREATMENT OR DISPOSAL.	ACTION
3745-55-75	A,B,C,D	CONTAINER STORAGE AREA CONTAINMENT SYSTEM	REQUIRES THAT CONTAINER STORAGE AREAS HAVE A CONTAINMENT SYSTEM AND SPECIFIES THE MINIMUM REQUIREMENTS OF SUCH A SYSTEM.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OF HAZARDOUS WASTES BEYOND 90 DAYS IN CONTAINERS PRIOR TO TREATMENT OR DISPOSAL.	ACTION
3745-55-78		CONTAINER CLOSURE REQUIREMENTS	SPECIFIES CLOSURE REQUIREMENTS FOR CONTAINERS AND CONTAINMENT SYSTEM.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OF HAZARDOUS WASTES BEYOND 90 DAYS IN CONTAINERS PRIOR TO TREATMENT OR DISPOSAL.	ACTION
3745-55-92	A-F	DESIGN & INSTALLATION OF NEW TANK SYSTEMS OR COMPONENTS	REQUIRES A SECONDARY CONTAINMENT SYSTEM FOR TANKS AND ASSESSMENT TO DETERMINE TANK INTEGRITY.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN TANKS BEYOND 90 DAYS.	ACTION
3745-55-93	B-E,I	CONTAINMENT AND DETECTION OF RELEASES FOR TANK SYSTEMS	REQUIRES SECONDARY CONTAINMENT AND LEAK DETECTION SYSTEMS FOR TANKS.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN TANKS BEYOND 90 DAYS.	ACTION

...TION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S)
3745-55-94	A,B,C	GENERAL OPERATING REQUIREMENTS FOR TANK SYSTEMS	SPECIFIES GENERAL OPERATING REQUIREMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN TANKS BEYOND 90 DAYS.	ACTION
3745-55-95	A-C	INSPECTIONS OF TANK SYSTEMS	REQUIRES INSPECTIONS AT LEAST ONCE EACH OPERATING DAY.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN TANKS BEYOND 90 DAYS.	ACTION
3745-55-96	A,B,C,E	RESPONSE TO LEAKS OR SPILLS OF TANK SYSTEMS	REQUIRES THAT UNFIT TANKS BE REMOVED FROM USE AND FURTHER RELEASES BE PREVENTED.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN TANKS BEYOND 90 DAYS.	ACTION
3745-55-97	A,B	CLOSURE AND POST-CLOSURE CARE FOR TANK SYSTEMS	SPECIFIES CLOSURE AND POST-CLOSURE REQUIREMENTS FOR TANK SYSTEMS.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN TANKS BEYOND 90 DAYS.	ACTION
3745-56-21	A-G	DESIGN & OPERATING REQUIREMENTS ; SURFACE IMPOUNDMENTS	PRESENTS DESIGN AND OPERATING CRITERIA FOR SURFACE IMPOUNDMENTS.	MAY PERTAIN TO ALTERNATIVES ADDRESSING LAGOONS.	ACTION
3745-56-26	A,B,C	MONITORING & INSPECTION OF SURFACE IMPOUNDMENTS	REQUIRES INSPECTION OF LINERS DURING CONSTRUCTION. ALSO REQUIRES WEEKLY AND AFTER STORM INSPECTIONS.	SAME AS ABOVE.	ACTION
3745-56-27	A-E	EMERGENCY REPAIRS & CONTINGENCY PLANS ; SURFACE IMPOUND	SPECIFIES WHEN AND HOW SURFACE IMPOUNDMENTS SHOULD BE REMOVED FROM SERVICE FOR REPAIRS.	SAME AS ABOVE.	ACTION
3745-56-28	A,B,C	CLOSURE & POST-CLOSURE OF SURFACE IMPOUNDMENTS	PROVIDES CLOSURE AND POST-CLOSURE REQUIREMENTS FOR SURFACE IMPOUNDMENTS.	SAME AS ABOVE.	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYP
3745-56-31	A	CONSTRUCTION INSPECTIONS OF SURFACE IMPOUNDMENTS	ALLOWS OHIO EPA OPPORTUNITY TO INSPECT SURFACE IMPOUNDMENTS DURING CONSTRUCTION AND INSTALLATION.	SAME AS ABOVE.	ACTION
3745-56-51	A-F	DESIGN & OPERATING REQUIREMENTS FOR WASTE PILES	SPECIFIES THE DESIGN AND OPERATION REQUIREMENTS FOR WASTE PILES. INCLUDES LINER SYSTEM, LEACHATE COLLECTION AND REMOVAL SYSTEM, WIND DISPERSAL PREVENTION AND RUN-ON/RUN-OFF CONTROL.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE THE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN WASTE PILES, EXCEPT FOR K087 WASTES STORED PRIOR TO AND AFTER WASTE FUEL RECOVERY.	ACTION
3745-56-54	A,B	MONITORING & INSPECTION OF WASTE PILES	WASTE PILES MUST BE MONITORED DURING CONSTRUCTION OR INSTALLATION AND OPERATION.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN WASTE PILES.	ACTION
3745-56-58	A,B,C	CLOSURE & POST-CLOSURE CARE FOR WASTE PILES	SPECIFIES CLOSURE AND POST-CLOSURE CARE REQUIREMENTS FOR WASTE PILES.	PERTAINS TO ANY ALTERNATIVE THAT INCORPORATES STORAGE OR TREATMENT OF HAZARDOUS WASTES IN WASTE PILES.	ACTION
3745-56-59	A	CONSTRUCTION INSPECTIONS FOR WASTE PILES	ALLOWS OHIO EPA THE OPPORTUNITY TO INSPECT WASTE PILES DURING CONSTRUCTION.	PERTAINS TO ANY ALTERNATIVE THAT WOULD INCORPORATE STORAGE OR TREATMENT OF HAZARDOUS WASTES IN WASTE PILES.	ACTION
3745-57-01	A-B	ENVIRONMENTAL PERFORMANCE STANDARDS ; LAND-BASED UNITS	SPECIFIES LOCATION, DESIGN, CONSTRUCTION, OPERATION, MAINTENANCE AND CLOSURE REQUIREMENTS FOR LANDFILLS, WASTE PILES, SURFACE IMPOUNDMENTS AND UNDERGROUND INJECTION WELLS.	PERTAINS TO ANY ALTERNATIVE THAT CREATES A LAND-BASED HAZARDOUS WASTE DISPOSAL UNIT BY REMOVING HAZARDOUS WASTES AND PLACING OR REPLACING THEM IN THE LAND. PORTIONS MAY PERTAIN TO ALTERNATIVES THAT LEAVE HAZARDOUS WASTE IN-PLACE.	LOCATION AC
3745-57-03	A-I	LANDFILL DESIGN AND OPERATING REQUIREMENTS	PRESENTS DESIGN AND OPERATING REQUIREMENTS FOR LANDFILLS. INCLUDES LINER, LEACHATE COLLECTION AND REMOVAL, RUN-ON/RUN-OFF CONTROL, ETC.	PERTAINS TO ANY ALTERNATIVE THAT CREATES A LAND-BASED HAZARDOUS WASTE DISPOSAL UNIT BY REMOVING HAZARDOUS WASTES AND PLACING OR REPLACING THEM IN THE LAND. PORTIONS MAY PERTAIN TO	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
				ALTERNATIVES THAT LEAVE HAZARDOUS WASTE IN-PLACE.	
3745-57-05	A,B	MONITORING AND INSPECTIONS OF LANDFILLS	REQUIRES INSPECTION OF LANDFILLS DURING CONSTRUCTION OR INSTALLATION AND OPERATION.	PERTAINS TO ANY ALTERNATIVE THAT CREATES A LAND-BASED HAZARDOUS WASTE DISPOSAL UNIT BY REMOVING HAZARDOUS WASTES AND PLACING OR REPLACING THEM IN THE LAND. PORTIONS MAY PERTAIN TO ALTERNATIVES THAT LEAVE HAZARDOUS WASTE IN-PLACE.	ACTION
3745-57-10	A,B	LANDFILL CLOSURE AND POST-CLOSURE CARE	SPECIFIES CLOSURE AND POST-CLOSURE REQUIREMENTS FOR HAZARDOUS WASTE LANDFILLS. INCLUDES FINAL COVER AND MAINTENANCE.	PERTAINS TO ANY ALTERNATIVE THAT CREATES A LAND-BASED HAZARDOUS WASTE DISPOSAL UNIT BY REMOVING HAZARDOUS WASTES AND PLACING OR REPLACING THEM IN THE LAND. PORTIONS MAY PERTAIN TO ALTERNATIVES THAT LEAVE HAZARDOUS WASTE IN-PLACE.	ACTION
3745-57-17	A	LANDFILL CONSTRUCTION INSPECTIONS	ALLOWS OHIO EPA OPPORTUNITY TO INSPECT LANDFILL DURING CONSTRUCTION.	PERTAINS TO ANY ALTERNATIVE THAT CREATES A LAND-BASED HAZARDOUS WASTE DISPOSAL UNIT BY REMOVING HAZARDOUS WASTES AND PLACING OR REPLACING THEM IN THE LAND. PORTIONS MAY PERTAIN TO ALTERNATIVES THAT LEAVE HAZARDOUS WASTE IN-PLACE.	ACTION
3745-57-41	A,B	WASTE ANALYSIS FOR INCINERATORS	REQUIRES WASTE ANALYSIS BE PERFORMED FOR TRIAL BURN AND FOR NORMAL OPERATION OF INCINERATOR.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	ACTION CHEMIC

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE(S
3745-57-42	A,B,C	PRINCIPAL ORGANIC HAZARDOUS CONSTITUENTS; INCINERATORS	ESTABLISHES METHOD BY WHICH POHCS WILL BE SPECIFIED.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	CHEMICAL ACTI
3745-57-43	A,B,C	PERFORMANCE STANDARDS FOR INCINERATORS	SPECIFIES PERFORMANCE STANDARDS THAT ALL INCINERATORS MUST MEET (DESTRUCTION REMOVAL EFFICIENCIES, HCL EMISSIONS, PARTICULATE EMISSIONS).	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	CHEMICAL ACTI
3745-57-44	C	INCINERATOR TRIAL BURNS - ALTERNATIVE DATA	REQUIRES TRIAL BURN TO DETERMINE FINAL OPERATING CONDITIONS.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	ACTION
3745-57-45	A-F	INCINERATOR OPERATING REQUIREMENTS	SPECIFIES GENERAL OPERATING REQUIREMENTS FOR ALL INCINERATORS.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	ACTION
3745-57-47	A,B,C	MONITORING AND INSPECTION OF INCINERATORS	REQUIRES THE MONITORING OF CERTAIN PARAMETERS ON A CONTINUOUS BASIS AND INSPECTIONS OF EQUIPMENT.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	ACTION
5-57-51		CLOSURE OF INCINERATORS	REQUIRES THAT ALL HAZARDOUS WASTE AND HAZARDOUS WASTE RESIDUES BE REMOVED FROM THE INCINERATOR SITE.	PERTAINS TO ALTERNATIVES INCORPORATING INCINERATION.	ACTION
3745-59-03		DILUTION PROHIBITED AS SUBSTITUTE FOR TREATMENT (LDR)	DILUTION OF RESTRICTED WASTE, OR RESIDUE THEREOF, AS A SUBSTITUTE FOR ADEQUATE TREATMENT IS PROHIBITED.	PERTAINS TO ALTERNATIVES ADDRESSING REMOVAL OF LAGOON WASTES FOR SUBSEQUENT TREATMENT OR REPLACEMENT. DOES NOT APPLY TO ASH RESULTING FROM BURNING OF K087 WASTES IN WASTE FUEL RECOVERY UNIT.	ACTION
3745-59-07		WASTE ANALYSIS AND RECORDKEEPING (LDR)	WASTE MUST BE TESTED TO DETERMINE IF IT IS RESTRICTED FROM LAND DISPOSAL.	PERTAINS TO ALTERNATIVES ADDRESSING REMOVAL OF LAGOON WASTES FOR SUBSEQUENT TREATMENT OR REPLACEMENT. DOES NOT APPLY TO ASH RESULTING FROM BURNING OF K087 WASTES IN WASTE FUEL RECOVERY UNIT.	CHEMICAL
3745-59-33		WASTE SPECIFIC PROHIBITIONS FIRST THIRD WASTES (LDR)	WASTES LISTED IN THIS RULE ARE PROHIBITED FROM LAND DISPOSAL UNLESS THE TREATMENT STANDARDS ARE MET.	PERTAINS TO ALTERNATIVES ADDRESSING REMOVAL OF LAGOON WASTES FOR SUBSEQUENT TREATMENT OR REPLACEMENT. DOES NOT APPLY	CHEMICAL ACTIO

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
				TO ASH RESULTING FROM BURNING OF K087 WASTES IN WASTE FUEL RECOVERY UNIT.	
3745-81-11	A,B	MAXIMUM CONTAMINENT LEVELS FOR INORGANIC CHEMICALS	PRESENTS MCLS FOR INORGANICS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-12	A,B,C	MAXIMUM CONTAMINENT LEVELS FOR ORGANIC CHEMICALS	PRESENTS MCLS FOR ORGANICS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-13	A,B	MAXIMUM CONTAMINENT LEVELS FOR TURBIDITY	PRESENTS MCLS FOR TURBIDITY.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-14	A	MAXIMUM MICROBIOLOGICAL CONTAMINANT LEVELS	PRESENTS MCLS FOR MICROBIOLOGICAL CONTAMINANTS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-21	A	MICROBIOLOGICAL CONTAMINANT SAMPLING & ANALYTICAL REQ	PRESENTS SAMPLING AND ANALYTICAL REQUIREMENTS FOR MICROBIOLOGICAL CONTAMINANTS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-22	A	TUBIDITY CONTAMINANT SAMPLING & ANALYTICAL REQUIREMENT	PRESENTS SARPLING AND ANALYTICAL REQUIREMENTS FOR TURBIDITY.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-23	A	INORGANIC CONTAMINANT MONITORING REQUIREMENTS	PRESENTS MONITORING REQUIREMENTS FOR INORGANIC CONTAMINANTS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-24	A-E	ORGANIC CONTAMINANT MONITORING REQUIREMENTS	PRESENTS MONITORING REQUIREMENTS FOR ORGANIC CONTAMINANTS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-81-27	A,B,C	ANALYTICAL TECHNIQUES	PRESENTS GENERAL ANALYTICAL TECHNIQUES FOR MCLS.	PERTAINS TO ALL ALTERNATIVES.	CHEMICAL
3745-9-04	A,B	LOCATION / SITING OF NEW GW WELLS	MANDATES THAT GROUND WATER WELLS BE: A) LOCATED AND MAINTAINED SO AS TO PREVENT CONTAMINANTS FROM ENTERING WELL. B) LOCATED SO AS TO BE ACCESSIBLE FOR CLEANING AND MAINTENANCE.	PERTAINS TO ALL GROUND WATER WELLS ON-SITE THAT EITHER HAVE BEEN OR WILL BE INSTALLED.	LOCATION
3745-9-05	A1,B-H	CONSTRUCTION OF NEW GW WELLS	SPECIFIES MINIMUM CONSTRUCTION REQUIREMENTS FOR NEW GROUND WATER WELLS IN REGARDS TO CASING MATERIAL, CASING DEPTH, POTABLE WATER, ANNULAR SPACES, USE OF DRIVE SHOE, OPENINGS TO ALLOW WATER ENTRY, CONTAMINANT ENTRY.	PERTAINS TO ALL GROUND WATER WELLS ON-SITE THAT EITHER HAVE BEEN OR WILL BE INSTALLED.	ACTION

OHIO ADMINISTRATIVE CODE (OAC) ARARS FOR ALLIED CPLA

OAC CITATION	PERTINENT PARAGRAPHS	TITLE / SUBJECT OF REGULATION	DESCRIPTION OF REGULATION	APPLICATION OF REGULATION	ARAR TYPE
3745-9-06	A,B,D,E	CASING REQUIREMENTS FOR NEW GW WELLS	ESTABLISHES SPECIFIC REQUIREMENTS FOR WELL CASINGS, SUCH AS SUITABLE MATERIAL, DIAMETERS AND CONDITION.	PERTAINS TO ALL GROUND WATER WELLS THAT EITHER WILL BE OR HAVE BEEN INSTALLED ON-SITE.	ACTION
3745-9-07	A-F	SURFACE DESIGN OF NEW GW WELLS	ESTABLISHES SPECIFIC SURFACE DESIGN REQUIREMENTS, SUCH AS HEIGHT ABOVE GROUND, WELL VENTS, WELL PUMPS, ETC...	PERTAINS TO ALL GROUND WATER WELLS THAT EITHER HAVE BEEN OR WILL BE INSTALLED ON-SITE.	ACTION
3745-9-08	A,C	START-UP & OPERATION OF GW WELLS	REQUIRE DISINFECION OF NEW WELLS AND USE OF POTABLE WATER FOR PRIMING PUMPS.	PERTAINS TO ALL GROUND WATER WELLS THAT EITHER HAVE BEEN OR WILL BE INSTALLED ON-SITE.	ACTION
3745-9-09	A-C,D1,E-G	MAINTENANCE & OPERATION OF GW WELLS	ESTABLISHES SPECIFIC MAINTENANCE AND MODIFICATION REQUIREMENTS FOR CASING, PUMP AND WELLS IN GENERAL.	PERTAINS TO ALL GROUND WATER WELLS THAT EITHER HAVE BEEN OR WILL BE INSTALLED ON-SITE.	ACTION
3745-9-10	A,B,C	ABANDONMENT OF TEST HOLES & GW WELLS	FOLLOWING COMPLETION OF USE, WELLS AND TEST HOLES SHALL BE COMPLETELY FILLED WITH GROUT OR SIMILAR MATERIAL OR SHALL BE MAINTAINED IN COMPLIANCE OF ALL REGULATIONS.	PERTAINS TO ALL GROUND WATER WELLS AND TEST HOLES THAT EITHER HAVE BEEN OR WILL BE INSTALLED ON-SITE.	ACTION