RECORD OF DECISION

SELECTED REMEDIAL ALTERNATIVE
FOR THE

OCONOMOWOC ELECTROPLATING COMPANY, INC. SITE
ASHIPPUN, WISCONSIN

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Oconomowoc Electroplating Company, Inc., Ashippun, Wisconsin, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the administrative record file 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 in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or to the environment.

Description of the Selected Remedy

This ROD addresses four Operable Units, or discrete actions at the Site. The selected remedies are final remedies for the first three operable units, and will address the principal threats at the site - the ground water contaminant plume and its source (i.e., contaminated soils and sludge lagoons). The selected remedy for the fourth operable unit is an interim remedy and will address contamination in Davy Creek and the wetlands. The selected remedy consists of the following components:

- Clean close the RCRA subtitle C lagoons by excavation of approximately 650 cubic yards of lagoon sludge and surrounding soils to be treated and disposed of at an off-site RCRA Subtitle C facility. Treatment of 72,000 gallons of contaminated lagoon water at a ground-water treatment system installed on site;

- Excavation of approximately 700 cubic yards of contaminated soil and debris at the site. The contaminated soil will be treated and disposed of at an off site RCRA Subtitle C disposal facility;

— Extraction of the ground water contaminant plume to State ground water quality standards with subsequent treatment. The treated water shall be discharged into the adjacent Davy Creek in compliance with the substantive requirements of the Wisconsin Pollutant Discharge Elimination System (WPDES);

— Excavation of approximately 6,000 cubic yards of contaminated wetland and Davy Creek sediment to be treated and disposed of at a RCRA Subtitle C disposal facility. Additional monitoring of Davy Creek and the wetland will be performed after the remediation to determine the effectiveness of the remedy.

Statutory Determinations

The first three operable units, which deal with the lagoons, contaminated soil, and contaminated ground water, are protective of human health and the environment, comply with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and are cost-effective. The wetland operable unit is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective, within the limited scope of the interim action. This action utilizes permanent solutions and alternative treatment technology, to the maximum extent practicable, given the limited scope of the action. Because this action does not constitute the final remedy for Davy Creek and the Wetlands, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed at the time of the of the final response action. To the extent practicable, treatment is used as part of the interim action. Subsequent actions are planned to address fully the principal threats posed by Davy Creek and the Wetlands.

State Concurrence

The State of Wisconsin concurs with the selected remedy. The Letter of Concurrence is attached to this Record of Decision.

FOR Valdas V. Adamkus
Regional Administrator

9/20/90
Date

Decision Summary

I. Site Location and Description

The Oconomowoc Electroplating Company Inc. (OEC) Site encompasses an active electroplating facility located at 2572 West Oak Street, Ashippun, Wisconsin and the adjacent wetlands area located to the southwest. The cities of Oconomowoc and Watertown are approximately 8 miles south and 10 miles west of the site, respectively. Milwaukee lies approximately 35 miles to the southeast (Figure 1-1). The OEC site occupies approximately 10.5 acres (which includes 5 acres of the OEC facility) in the northwest 1/4 of the southeast 1/4 of Section 30, Township 9 North, Range 17 East in the town of Ashippun, in Dodge County, Wisconsin. A small creek, Davy Creek, is located approximately 500 feet south of the site. Davy Creek, which flows through the wetlands, is a tributary to the Rock River (Figure 1-2). Davy Creek is a warm water sport fishery.

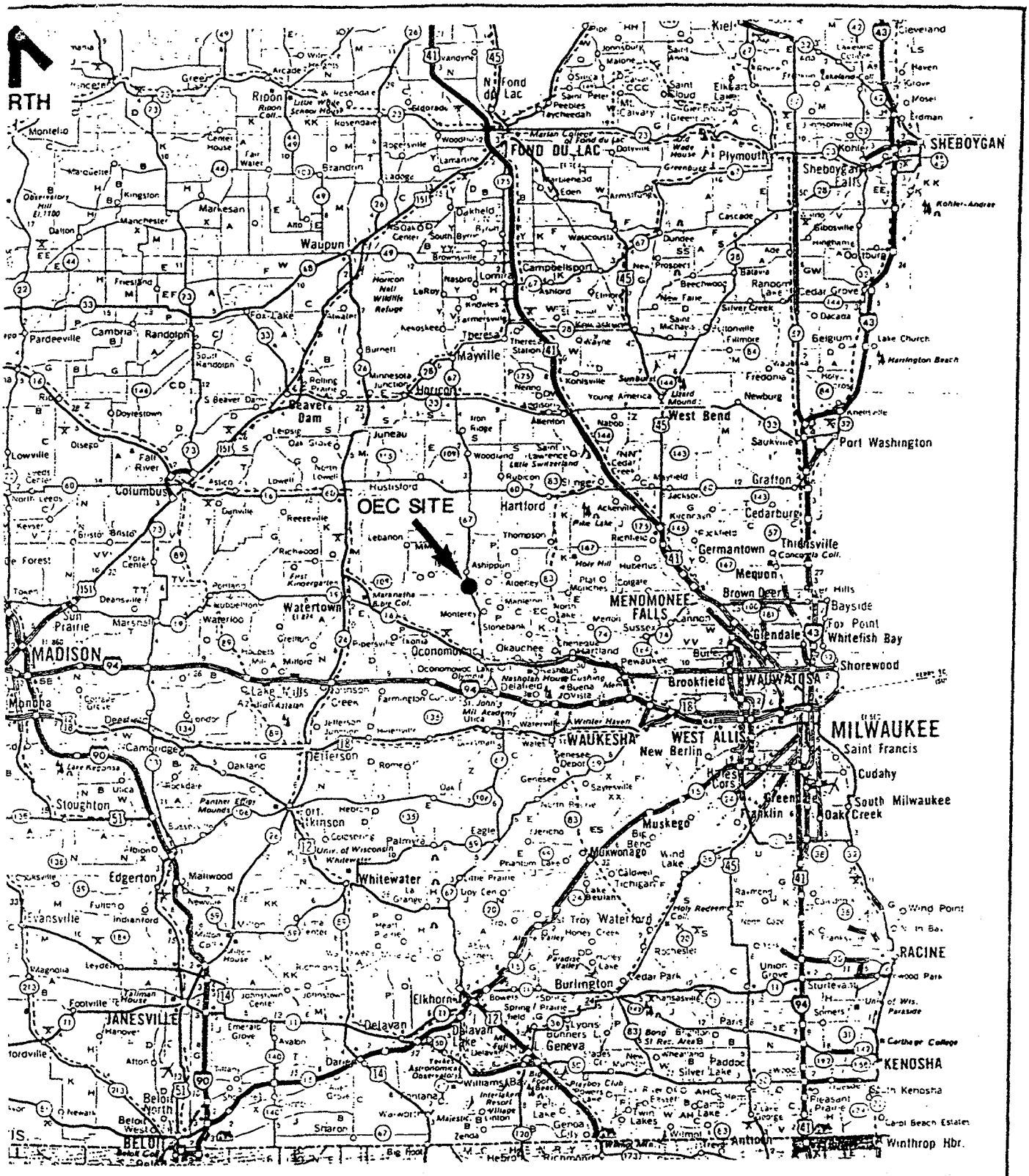
The OEC site is bordered on the north by Eva and Oak Streets and on the south by Davy Creek and the property occupied by the Ashippun Town Garage (Figure 1-3). Several small businesses line Oak Street to the northwest, and back up to the Chicago and North Western Railroad tracks. Residential areas are west (200 ft) and northwest of the site (200 ft) beyond Eva Street, and southeast of the site (1400 ft) beyond the Town Garage facilities. Residents in these areas rely on groundwater for their source of drinking water. The aquifer is classified as a class IIA aquifer. Two parks with facilities for playing baseball, skeet shooting, and picnicking are also near the site. One park with a playground is adjacent to the Town Garage between Oak Street and Elm Street, and the other is beyond the residential block to the northwest.

The natural resource areas associated with the site are the adjacent wetlands, Davy Creek, and the wildlife associated with them.

The OEC facility consists of a main building which houses the office and process lines; a wastewater treatment building (to the west); parking area (to the north and east); two formerly used wastewater treatment lagoons (to the south); various storage tank and container deposit areas; and a fill area and a lowlands area between the main building and the Town Garage property. The site plan is shown in Figure 1-3.

II. Site History and Enforcement Activities

OEC has been in operation since 1957. Electroplating processes performed at the facility used nickel, chrome, zinc, copper, brass, cadmium, and tin. Finishing processes have included chromate conversion, coating, and anodizing.



WISCONSIN

ASHIPPUN

0 5 10

SCALE IN MILES

E: STATE MAP

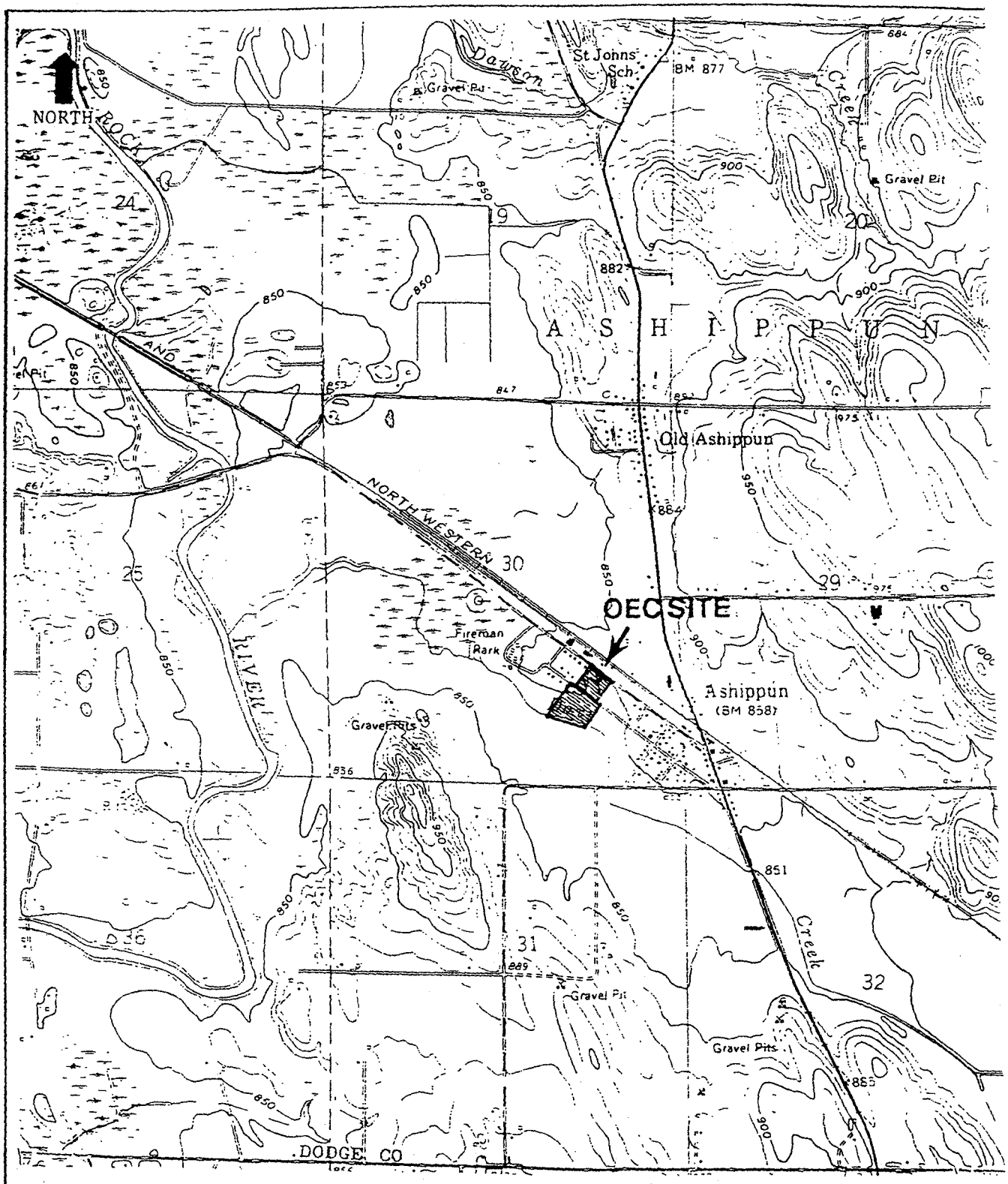
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-1,

SITE LOCATION MAP

EBASCO SERVICES INCORPORATED



CONTOUR INTERVAL IS 10 FEET
DATUM IS MEAN SEA LEVEL

0 1000 2000

SCALE IN FEET

SOURCE: USGS IXONIA QUADRANGLE 1959

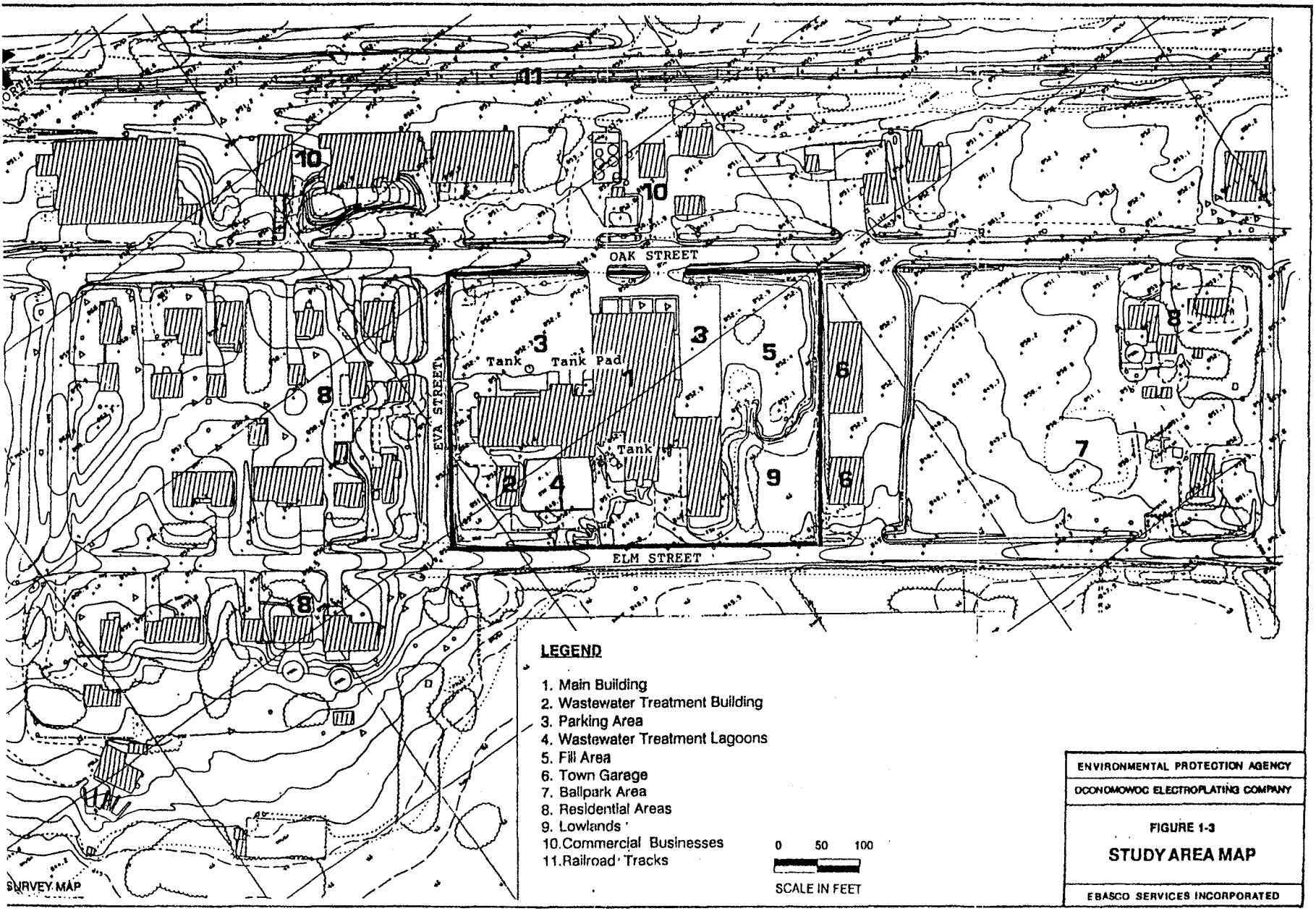
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPAN

FIGURE 1-2

SITE VICINITY MAP

EBASCO SERVICES


OAK STREET
EVA STREET
ELM STREET
Tank
Tank Pad
Tank
11
10
10
8
3
3
5
6
8
1
2
4
9
6
7
8
LEGEND
1. Main Building
2. Wastewater Treatment Building
3. Parking Area
4. Wastewater Treatment Lagoons
5. Fill Area
6. Town Garage
7. Ballpark Area
8. Residential Areas
9. Lowlands
10. Commercial Businesses
11. Railroad Tracks
0 50 100
SCALE IN FEET
SURVEY MAP
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-3
STUDY AREA MAP
EBASCO SERVICES INCORPORATED

Contaminants in the effluent from the electroplating processes are believed to originate from several sources. Spent process solutions, the drag-out of various processing baths into subsequent rinses, accidental spills, leaks, plating tanks filter systems, and sludges from the bottom of plating baths all contribute to the waste stream.

Wastewaters formerly generated at the OEC facility can be divided into three categories: 1) cyanide-bearing (from rinses following zinc, copper, nickel, brass, and cadmium plating); 2) chromium-bearing (from chrome and chrome conversion operations); and 3) acid-alkaline (from rinses following cleaning, anodizing, and plating operations). Tin plating was suspended at the facility in 1981 and chromium, copper, and nickel plating in 1982. Plating of cadmium ceased in October 1984, and as of February 1985, OEC had suspended all cyanide plating processes (WDNR, 1986a). Presently OEC only utilizes a zinc plating process.

In conjunction with the electroplating process, degreasing operations were also performed at the OEC site and contributed to the waste stream. A number of volatile organic compounds are believed to have been used by OEC and include: chloroform; 1-1-dichloroethane; 1-2 dichloroethane; 1,1-dichloroethylene; tetrachloroethylene; 1,1,1-trichloroethane, and trichloroethylene. These contaminants become incorporated in both sludge bottoms and wastewater streams.

In 1972, OEC constructed two unlined settling lagoons to supplement their wastewater treatment system. Each lagoon is 60 foot long by 40 foot wide with a sidewall depth of 5 feet (Figure 1-3). The walls are concrete on two sides and sloped gravel on the others. There is a concrete divider running lengthwise between the two lagoons. Over the years, both lagoons have accumulated large volumes of plating sludges. In the past, untreated plating sludges have overflowed the settling lagoons and accumulated in the wetlands between the OEC site and Davy Creek, which is also known as the Davy Creek wetlands.

Prior to 1972, untreated wastewaters were discharged directly into the wetland area south of the OEC property. In November 1973, after installation of a wastewater treatment system, a Wisconsin Pollution Discharge Elimination System (WPDES) Permit was issued for discharging treated wastewater to the creek. Spills from the wastewater treatment unit are well documented in the Wisconsin Department of Natural Resources (WDNR) files. In August 1978, OEC was denied a WPDES Permit by the WDNR; however, since the facility has appealed the permit denial it is still operational.

In 1979, the effects of the wastewater discharge and sludge overflow were investigated by the Solid Waste Management Division of the WDNR. Analytical results of stream sediment samples

collected from Davy Creek downstream of the OEC's discharge point confirmed the presence of high concentrations of heavy metals specifically cadmium, chromium, copper, and nickel. An analysis of surface soil samples collected from the wetlands area adjacent to the facility showed comparable concentrations of metals.

In 1980, OEC contracted with Waste Management, Inc. to remove the lagoons' sludge. Approximately one million pounds of sludge were removed and disposed. However, OEC did not have sufficient funds to complete the job. These lagoons are now approximately one-third full of electroplating sludges. Because these sludges are wastewater treatment sludges from electroplating operations, they are defined as listed hazardous waste (F006) by the Resource Conservation and Recovery Act (RCRA) 40 CFR Part 261 Subpart D-261.31.

In 1981, the WDNR inspection documented that OEC was violating the 90-day storage limit for hazardous wastes under RCRA. Although some corrective actions were taken, they were not sufficient to ameliorate the violation.

OEC is subject to regulations under RCRA for the generation and storage of hazardous waste (electroplating sludge - F006; Spent halogenated solvents - F002). In addition, the two wastewater lagoons which contain the F006 wastes are hazardous waste surface impoundments which are defined as land disposal units under RCRA. On July 22, 1980, OEC submitted a RCRA notification to EPA as a hazardous waste generator. OEC did not submit a RCRA Part A application or State permit application for interim status as a treatment, storage or disposal (TSD) facility. At that time, OEC was storing the hazardous waste described above in containers and using a surface impoundment. Therefore, OEC never received interim status as a storage or disposal facility under RCRA, nor did they receive an interim license for WDNR for those activities. Since the use of the surface impoundments was in violation of RCRA requirements, the WDNR required closure of these lagoons. On December 8, 1988, the WDNR issued a conditional closure plan approval for the lagoons. This approval required OEC to clean close these lagoons in accordance with State RCRA requirements by March, 1989. If OEC could not attain clean closure of the lagoons, the approval required RCRA closure of wastes in-place and long-term care requirements be met. To date, OEC has never closed the lagoons.

The State of Wisconsin filed suit against OEC in 1981 for alleged violations of the Wisconsin Pollutant Discharge Elimination System (WPDES) discharge permit. A guilty decision against OEC was entered in the Dodge County Circuit Court in March, 1981, but OEC continued operating its discharge system. Subsequently, in April 1982, the state moved for remedial sanctions against OEC for contempt of court. After a hearing on May 10, 1982, OEC was ordered to cease discharges. The case was finally settled by

stipulation and OEC was fined $47,000. Since this fine was levied, OEC has been involved in additional lawsuits because of WPDES permit and RCRA violations.

In 1983, in order to alleviate the local flooding problem, the Dodge County Drainage Board proposed to dredge and rechannel a 5,000 foot stretch of the Davy Creek near the OEC facility. However, the USEPA and the U.S. Army Corps of Engineers disapproved the dredging proposal because they believed that dredging would increase the migration of contaminated sediments from the wetlands into the Rock River.

A Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) preliminary assessment was performed in May, 1983 by the USEPA Field Investigation Team (FIT). The site (including the Davy Creek wetlands) received an HRS score of 31.86 and was placed on the National Priorities List (NPL). By letter dated September 18, 1985, the USEPA notified OEC that they had been identified as a Potentially Responsible Party (PRP) under CERCLA for the documented release or threatened release of hazardous substances. No other responsible parties have been named to date. On October 9, 1985, OEC informed the USEPA that they did not have the financial resources to conduct an RI/FS and formally declined to participate in the CERCLA process.

Between 1983 and 1987, the WDNR sampled residential wells in the area on seven different occasions. In 1985, three shallow monitoring wells were installed by the Wisconsin Geological and Natural History Survey (WGNHS), two near the lagoons and one southeast of the site on the Town Garage property. Sampling efforts indicated elevated concentrations of cadmium, nickel, and zinc, and revealed the presence of 1,1-dichloroethane, 1,1,1-trichloroethane, and trichloroethylene.

In December, 1985, the WDNR performed a Hazardous and Solid Waste Amendments (HSWA) initial screening, and in March, 1986, they prepared the Facility Management Plan and the Site Investigation Report. In the course of their investigations, the WDNR Horicon Area Office received an anonymous report of cyanide filled drums buried on the OEC property eleven to twelve years previously (1972 to 1973). In October, 1984, two test pits were dug following an investigation with a metal detector. Badly deteriorated sheet metal, metal scrap, and quarter inch metal wire was found in Test Pit 1, and sheet metal was found in Test Pit 2.

On April 8, 1986, a WDNR inspection reported that OEC was using wastewater treatment sludge, a listed hazardous waste (F006) under RCRA, to seal the space between the floor and walls of the wastewater treatment building. This sludge spread out of the building and into the adjacent area. Dead and stressed vegetation was observed around the building. Additionally, an

uncovered container full of electroplating sludge overflowed when snow and rain water accumulated within the container causing it to spill on the ground. WDNR stated that OEC did not report the spill or properly cleanup the area. Since that time, some soil material has been removed from the perimeter of the foundation and a new curb installed inside the building.

On June 10, 1986, OEC reported that about 10 cubic yards of sludge had been spilled onto the ground at the north lot. A month later, on July 14, 1986, the electroplating sludge waste containers were observed leaking by WDNR staff, violating state and federal hazardous waste storage and transportation regulations. The spill has remained on the ground around the containers.

During the summer of 1986, the Technical Assistance Team (TAT), a contractor to the USEPA Emergency Response Section, conducted a limited sediment sampling survey in the wetlands. The analytical results of these samples indicated high concentrations of metals and cyanide in the wetlands area immediately south of OEC. In March and April of 1987, the TAT conducted an extensive sampling program which covered approximately 300 acres of wetlands along Davy Creek. This program also included sampling of the OEC sludge lagoons and soils at the ballpark located southeast of OEC. The analytical results indicated that approximately 75,000 square feet of the wetlands adjacent to OEC is contaminated with metals and cyanide associated with the facility's electroplating process.

In early December, 1987, the U.S. Environmental Response Team (ERT) conducted a toxicity investigation in the wetlands south of the OEC site to determine if the contaminated sediments from the wetlands are toxic to aquatic organisms. The analytical results indicated severe metals and cyanide contamination of the sediments in the wetlands. As a result, the sediments from several locations were considered as being highly toxic. The toxicity data collected showed conclusively that the contamination in the wetlands was toxic to fathead minnows and algae.

CERCLA Enforcement

After OEC declined to participate in the RI/FS, the United States Environmental Protection Agency (U.S. EPA) decided to use Federal funds to perform the RI/FS due to OEC's refusal to participate. The U.S. EPA contracted with EBASCO Inc. to perform the RI/FS on December 30, 1987, under contract number 68-01-7251, work assignment number 211-5LM8. The U.S. EPA has erected a partial fence along Elm Street to minimize access to these wetland areas, also around the wastewater treatment lagoons (to the southwest) and the drum storage facility (to the northwest).

A letter was sent to the chairman of Oconomowoc Electroplating on July 30, 1990 pursuant to Section 122(a) of CERCLA via certified mail informing OEC that work would be undertaken by U.S. EPA pursuant to Section 104(a) of CERCLA because OEC appears to lack the resources to conduct the remedial design and implement the remedial action. On July 27, 1990, U.S. EPA filed a complaint in civil court against OEC for past costs associated with the RI/FS, construction of the fence as described above, and future costs for design and implementation of the remedial action along with violations of the Clean Water Act.

III. Highlights of Community Participation

An information repository has been established at the F&M Bank, 533 North Highway 67 in Ashippun, Wisconsin. In accordance with the requirements of Section 113(k)(1) of CERCLA, the Administrative Record file is available to the public at the F&M Bank.

The RI Report for three of the operable units, the lagoons, the contaminated soils adjacent to the manufacturing buildings and the ground water, became final on March 23, 1990. A public meeting to discuss the results of this RI was held on March 28, 1990.

The FS became final on July 9, 1990 and the Proposed Plan was available for public comment from July 23, 1990 to August 22, 1990. On July 25, 1990 a public meeting was held to present the proposed plan. Comments received during that public comment period and the U.S. EPA's responses are included in the attached Responsiveness Summary, which is part of this Record of Decision (ROD). The provisions of Sections 113(k)(2)(i-v) and 117 have been met.

IV. Scope of Operable Unit

This is a complex site and as a result the site has been broken into four operable units (OUs), or discrete actions. These are:

OU One: Includes the surface water, metal hydroxide sludge and contaminated soils associated with the two RCRA Subtitle C lagoons located behind the OEC facility.

OU Two: Includes all other contaminated soil around the OEC facility not associated with the RCRA lagoons, or beneath the manufacturing buildings. This includes the fill area, the lowlands area, the drainage ditches, and the parking lot.

OU Three: Includes the contaminated groundwater associated with the site.

OU Four: Addresses the most highly contaminated sediments in the Davy Creek/Wetlands area.

The building foundation and underlying soils require further investigation. Upon further investigation a appropriate remedial action will be selected if necessary.

There are several principal threats posed by the Oconmowoc site. This ROD addresses the contamination in all four areas. Groundwater is contaminated in the shallow aquifer in the vicinity of the site. The contaminated groundwater poses a future health threat to the residents who use groundwater as a drinking water source. Contaminated soil in the fill and lowland areas poses a threat to children who play in this area and to workers who may be involved in future development in this area. The contaminated soil and the sludge lagoons also act as potential sources of groundwater contamination in the future. The contaminated sediments are also toxic to the wetland environment.

The recommended alternative will address the principal threats through:

1. Removal and treatment of the contaminated groundwater in order to eliminate any future drinking water health threat;

2. Removal, treatment, and off-site disposal of the contaminated soil in order to remove the potential ingestion health threat;

3. Removal, treatment, and off-site disposal of contaminated wetland sediments in order to minimize toxic effects to the wetland; and

4. Removal, treatment, and off-site disposal of the sources of groundwater contamination.

The remedial actions to be implemented for operable units one through three are considered the final actions for these units. However, removal of contaminated sediments from Davy Creek and the wetlands is considered to be an interim action that will be consistent with the any final remedial action selected for this Site. Removal of the major portion of contamination at this time will minimize the environmental damage posed by the contaminated wetland. Further investigation of the contaminated wetland and Davy Creek will be conducted to determine if any contaminants remaining in the wetlands subsequent to the interim action continue to pose a threat to the environment. After further investigation is performed in the wetland a final cleanup remedy for Davy Creek and the wetlands will be made after the investigation of the building is complete and further remedial action will be performed as necessary.

V. Site Characteristics

The primary contaminants of concern are associated with the past operation and maintenance activities of the Oconomowoc Electroplating Company. These contaminants include volatile organic compounds used in the degreasing operation, and inorganic contaminants derived from the electroplating processes. The nature and extent of organic and inorganic contaminants in soil, groundwater, and RCRA Subtitle C lagoon sludge and liquid in the OEC facility are discussed in the RI Report, and summarized in the following sections. Also, the extent of inorganic contaminants in wetlands sediments and surface water as described by previous investigations (Weston, 1987; Ecology and Environment, 1988), are summarized below.

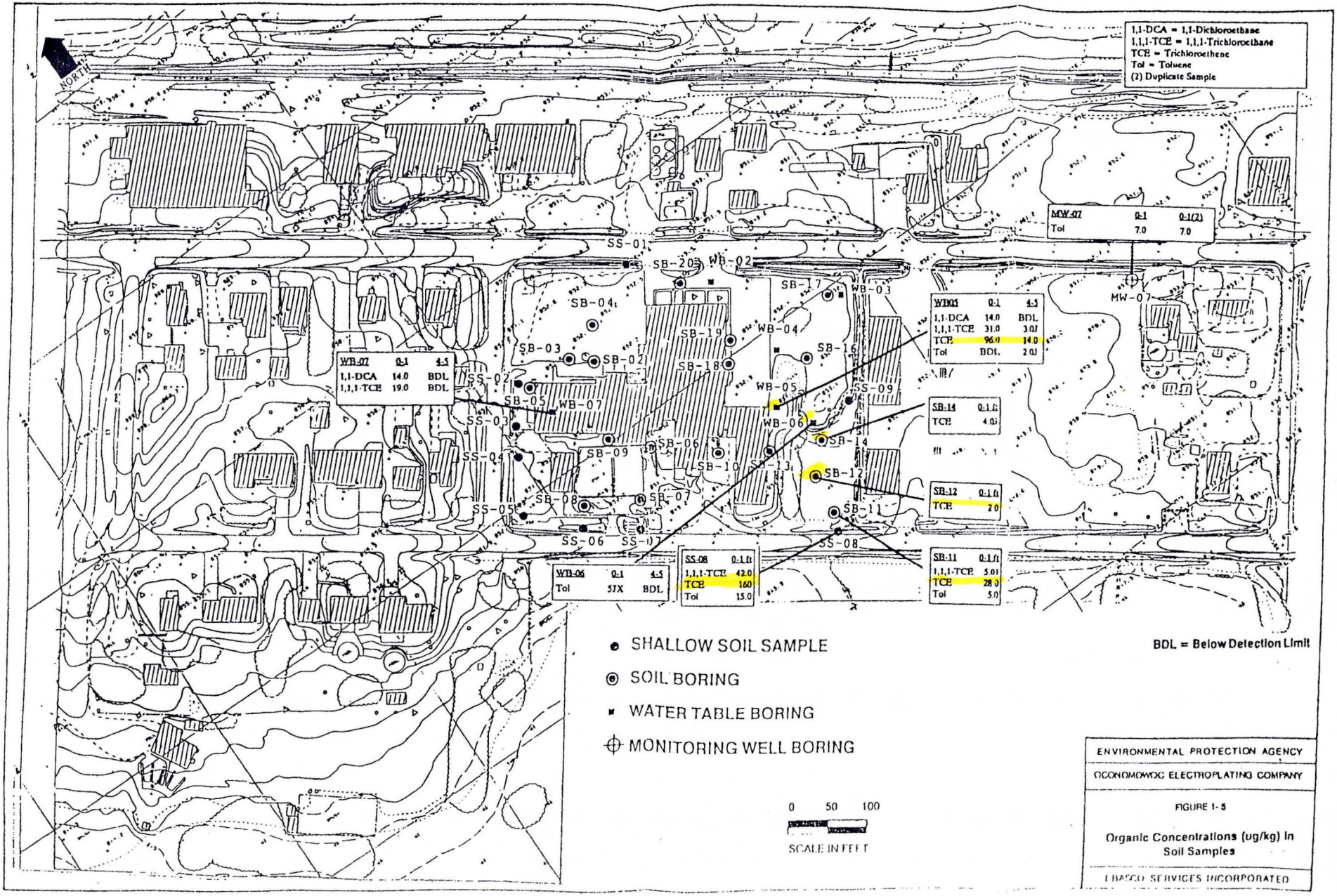
A. Soil Contamination

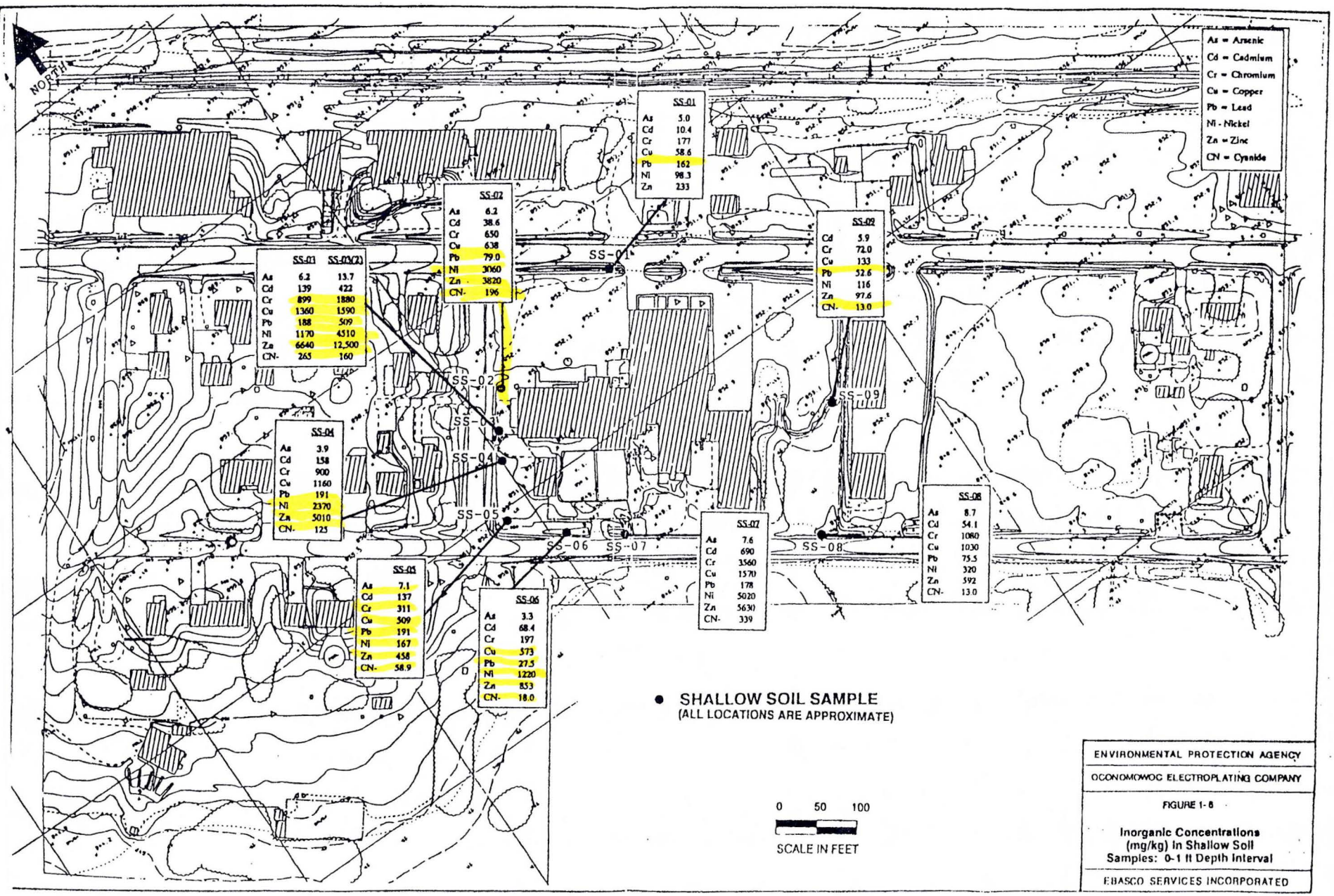
Soil samples were collected from three depth intervals between ground surface and the water table (approximately 5 feet), and from a depth interval greater than 5 feet. A total of 61 soil samples (including 5 duplicates) were collected from three depth intervals above the water table (0 to 1, 2 to 3, and 4 to 5 feet), and 21 samples (including 1 duplicate) were collected below the water table. The soil samples collected above the water table were analyzed for full target compound list (TCL) organics, and full target analyte list (TAL) inorganics. The soil samples collected below the water table were analyzed only for inorganics (not including cyanide).

A.1 Depth Interval of 0 to 1 Foot

Analytical results for organics in the soil samples collected from 0 to 1 foot depth indicated the presence of four volatile organic contaminants, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, and toluene. The concentration distribution of these organics are shown in Figure 1-5. The highest concentration levels and the largest number of volatile compounds were reported in the northern corner of the lowlands area (south of the fill area) on the eastern edge of the main production building, and in the far southern corner of the lowlands area in the drainage pathway. The organic contamination in the lowlands area is probably from the OEC laboratory which is located on the eastern side of the main production building.

Soil contaminated with arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide was found to be widespread over the entire site area. The distributions of these inorganics are shown in Figure 1-6 through 1-9. Certain areas in the OEC property, in particular the southwestern corner of the fill area on the eastern edge of the main production building, exhibited high concentrations of these inorganics. The source of these


1,1-DCA = 1,1-Dichloroethane
1,1,1-TCE = 1,1,1-Trichloroethane
TCE = Trichloroethene
Tol = Toluene
(2) Duplicate Sample
NORTH
SS-01
SS-02
SS-03
SS-04
SS-05
SS-06
SS-07
SS-08
SS-09
SB-01
SB-02
SB-03
SB-04
SB-05
SB-06
SB-07
SB-08
SB-09
SB-10
SB-11
SB-12
SB-13
SB-14
SB-15
SB-16
SB-17
SB-18
SB-19
SB-20
WB-01
WB-02
WB-03
WB-04
WB-05
WB-06
WB-07
MW-07
WB07 0-1 4-5
1,1-DCA 14.0 BDL
1,1,1-TCE 19.0 BDL
WB05 0-1 4-5
1,1-DCA 14.0 BDL
1,1,1-TCE 31.0 3.0J
TCE 96.0 14.0
Tol BDL 2.0J
MW-07 0-1 0-1(2)
Tol 7.0 7.0
SB-14 0-1 ft
TCE 4.0J
SB-12 0-1 ft
TCE 2.0
WB-06 0-1 4-5
Tol 57X BDL
SS-08 0-1 ft
1,1,1-TCE 42.0
TCE 160
Tol 15.0
SB-11 0-1 ft
1,1,1-TCE 5.0J
TCE 28.0
Tol 5.0
SHALLOW SOIL SAMPLE
SOIL BORING
WATER TABLE BORING
MONITORING WELL BORING
BDL = Below Detection Limit
0 50 100
SCALE IN FEET
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-5
Organic Concentrations (ug/kg) In Soil Samples
ERASCO SERVICES INCORPORATED



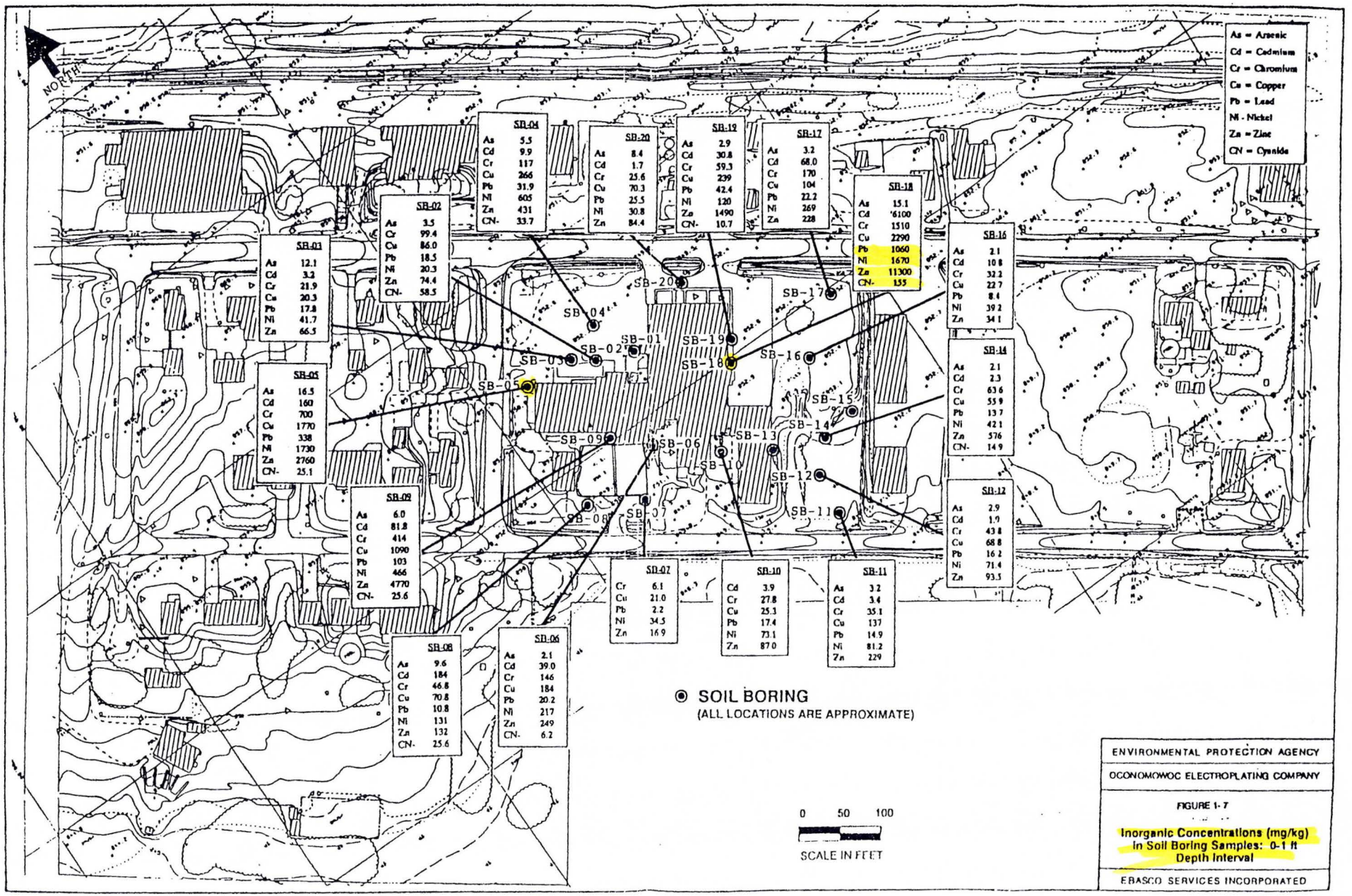
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-6

Inorganic Concentrations (mg/kg) in Shallow Soil Samples: 0-1 ft Depth Interval

EBASCO SERVICES INCORPORATED



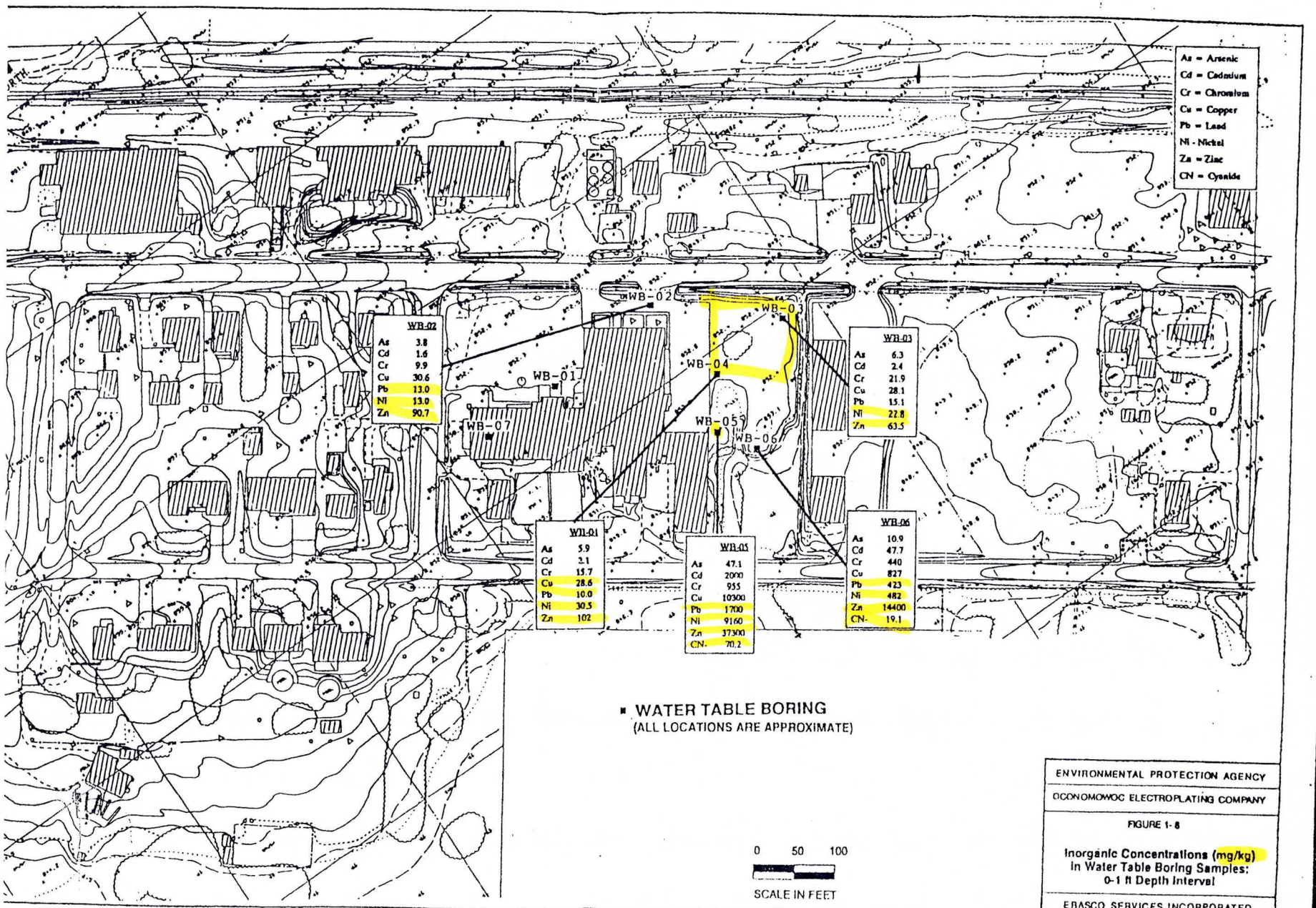
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-7

Inorganic Concentrations (mg/kg) in Soil Boring Samples: 0-1 ft Depth Interval

EBASCO SERVICES INCORPORATED



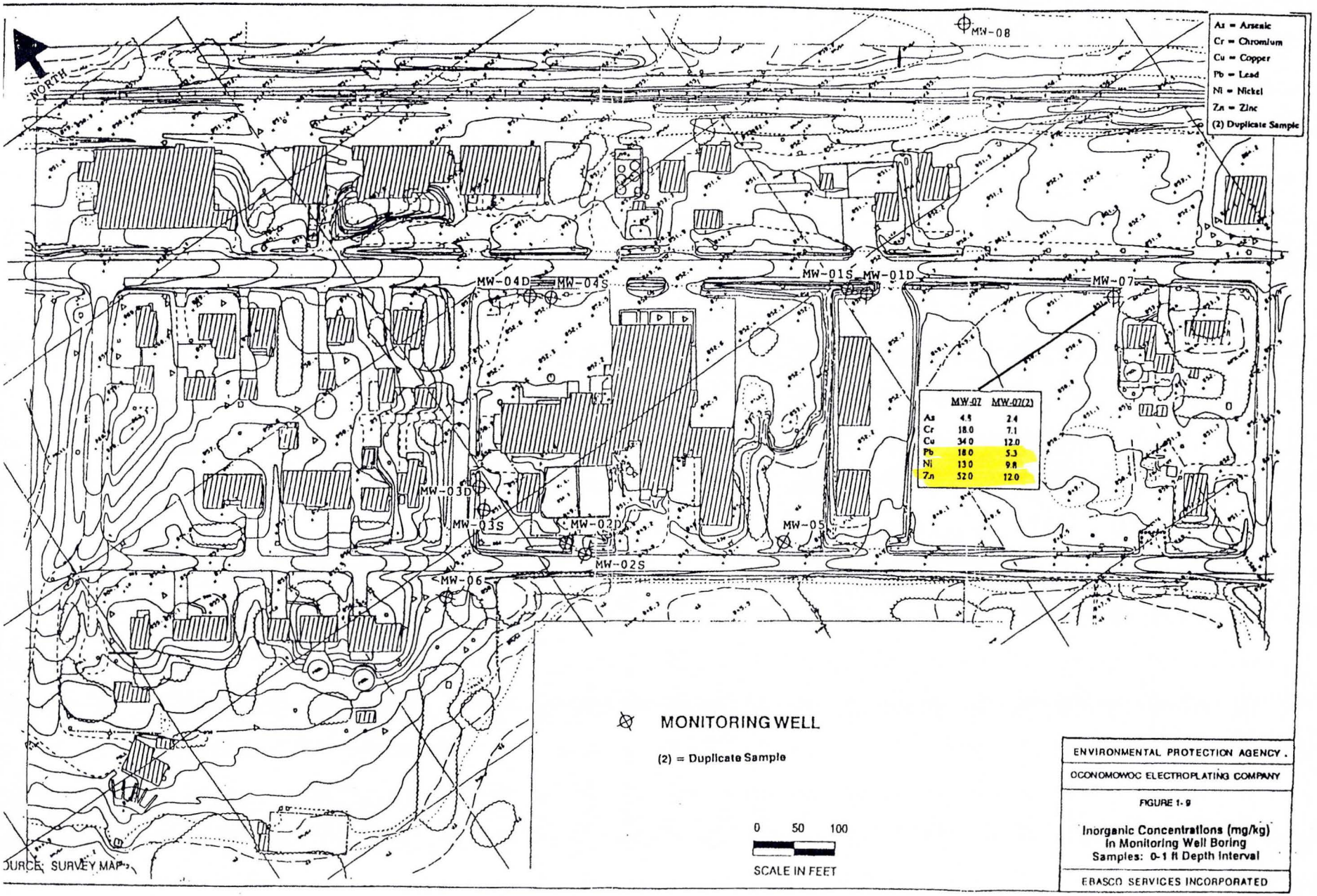
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-8

Inorganic Concentrations (mg/kg) in Water Table Boring Samples: 0-1 ft Depth Interval

ERASCO SERVICES INCORPORATED



ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-9

Inorganic Concentrations (mg/kg) in Monitoring Well Boring Samples: 0-1 ft Depth Interval

EBASCO SERVICES INCORPORATED

inorganic contaminants is likely the spent plating solution used for laboratory analysis, the wastewater treatment filter cake which was allowed to dry outside, and the leaching of inorganics from the lagoons.

A.2 Depth Interval of 2 to 3 Feet

No organic contaminants were identified in the soil samples collected from 2 to 3 foot depth interval.

Soil contaminated with arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide was found to be widespread over the entire site area. The distributions of these inorganics are shown in Figure 1-10. The eastern corner of the wastewater treatment lagoons, and the area west of the main production building contained high concentrations of these inorganics. The presence of the inorganic contaminants is likely the results of improper drying and storage of the filter cake from the wastewater treatment process, and the lagoons overflowing onto the surrounding area.

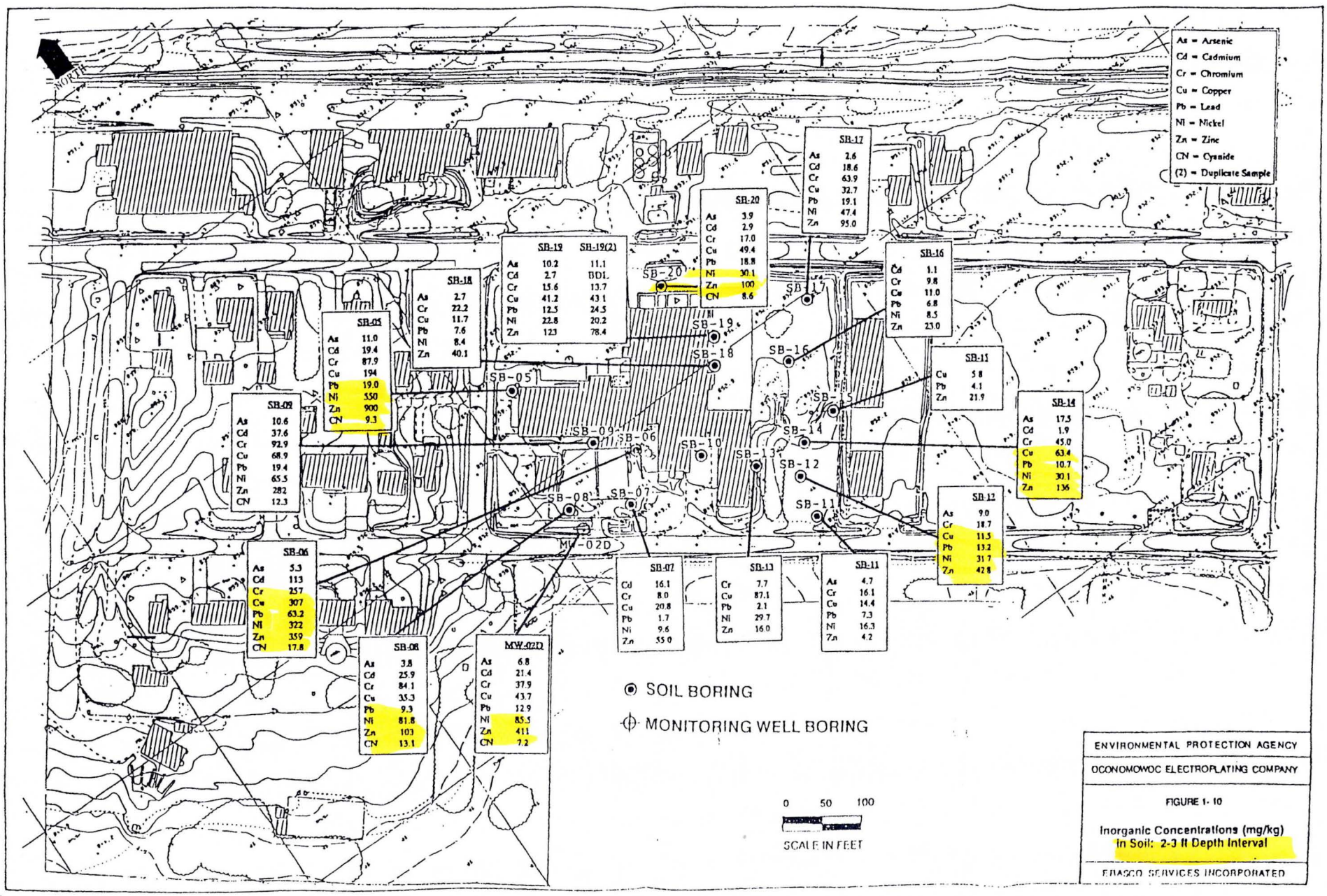
A.3 Depth Interval of 4 to 5 Feet

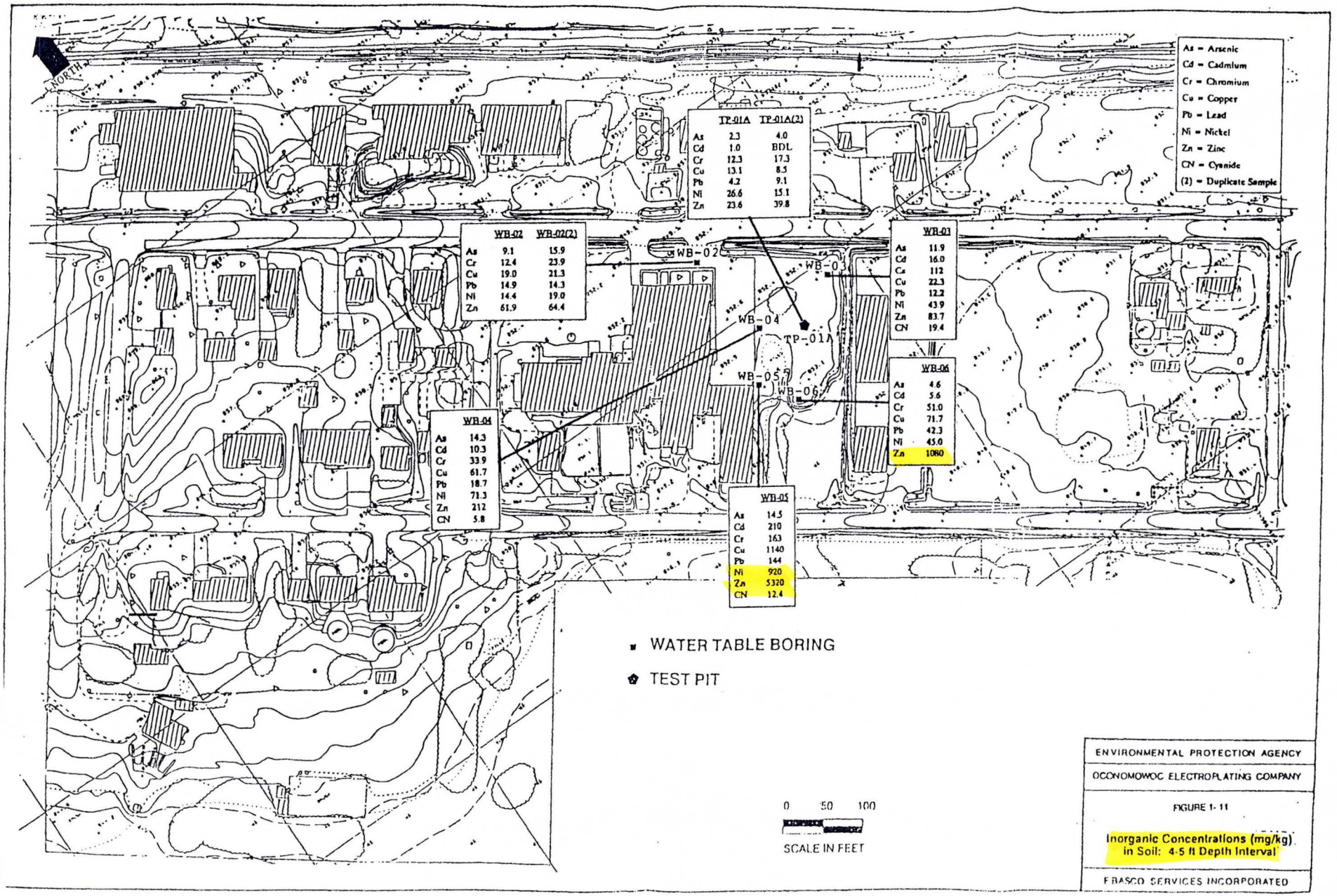
Analytical results for organics in the soil samples collected from 4 to 5 foot depth interval indicated the presence of three volatile organic contaminants, 1,1,1-trichloroethane, trichloroethene, and toluene. The concentration distributions of these organics are shown in Figure 1-5. These volatile organic compounds were detected in the southwestern corner of the fill area on the eastern edge of the main production building. This contamination is probably the result of the laboratory sink draining into the fill area.

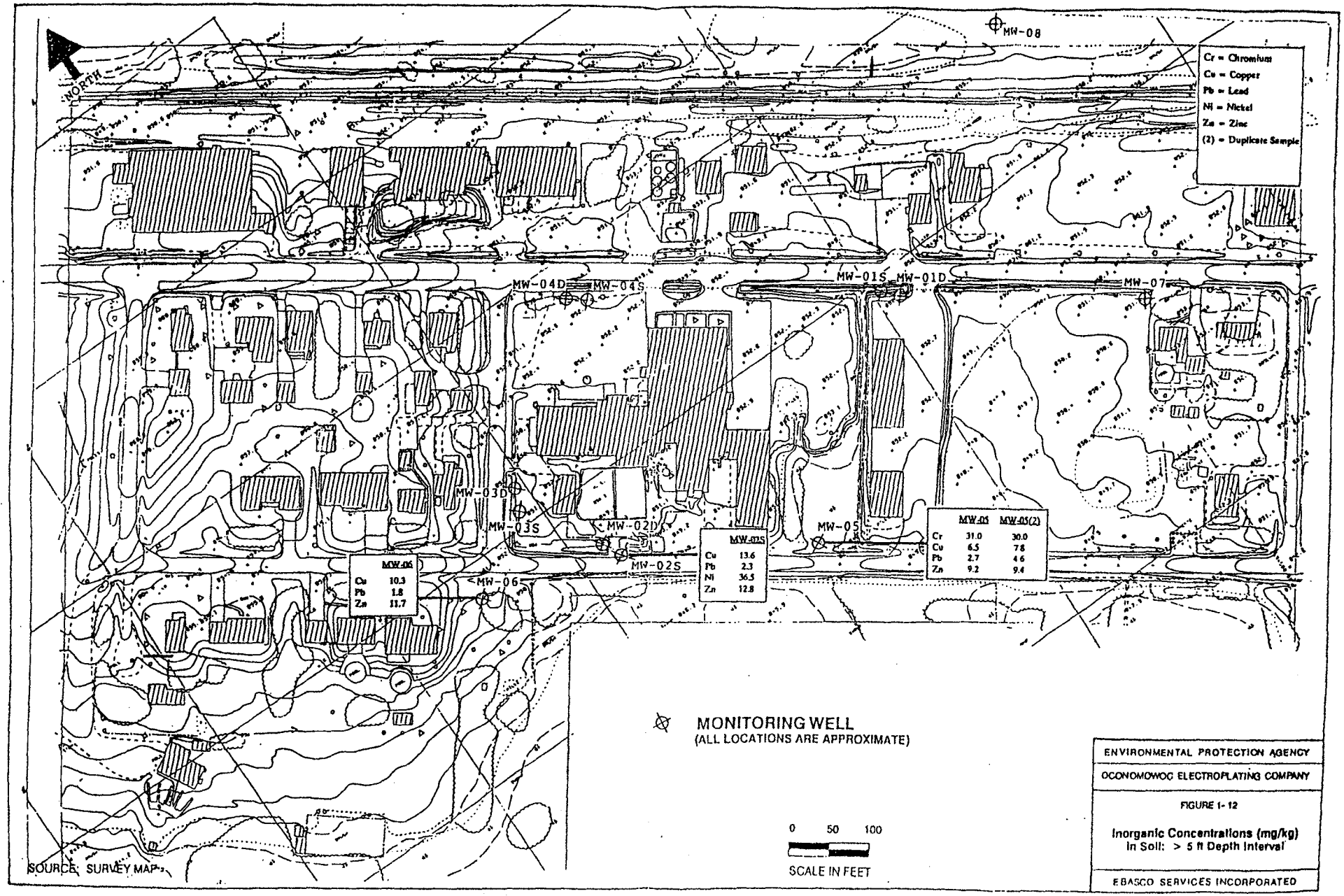
Soil contaminated with arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide was found throughout the fill area. The distributions of these contaminants are shown in Figure 1-11. The highest concentrations were reported in the southwestern corner of the fill area on the eastern edge of the main production building. The source of this contamination is likely the filter cake from the wastewater treatment process, and the OEC laboratory.

A.4 Depth Interval Greater Than 5 Feet

Soil samples collected from a depth interval greater than 5 feet were analyzed only for inorganics. Five inorganic analytes, chromium, copper, lead, nickel, and zinc, which were previously identified as contaminants were detected at low concentrations. The distributions of these inorganics are shown in Figure 1-12.


As = Arsenic
Cd = Cadmium
Cr = Chromium
Cu = Copper
Pb = Lead
Ni = Nickel
Zn = Zinc
CN = Cyanide
(2) = Duplicate Sample
NORTH
SB-17
As 2.6
Cd 18.6
Cr 63.9
Cu 32.7
Pb 19.1
Ni 47.4
Zn 95.0
SB-20
As 3.9
Cd 2.9
Cr 17.0
Cu 49.4
Pb 18.8
Ni 30.1
Zn 100
CN 8.6
SB-19 SB-19(2)
As 10.2 11.1
Cd 2.7 BDL
Cr 15.6 13.7
Cu 41.2 43.1
Pb 12.5 24.5
Ni 22.8 20.2
Zn 123 78.4
SB-16
Cd 1.1
Cr 9.8
Cu 11.0
Pb 6.8
Ni 8.5
Zn 23.0
SB-18
As 2.7
Cr 22.2
Cu 11.7
Pb 7.6
Ni 8.4
Zn 40.1
SB-05
As 11.0
Cd 19.4
Cr 87.9
Cu 194
Pb 19.0
Ni 350
Zn 900
CN 9.3
SB-11
Cu 5.8
Pb 4.1
Zn 21.9
SB-14
As 17.5
Cd 1.9
Cr 45.0
Cu 63.4
Pb 10.7
Ni 30.1
Zn 136
SB-09
As 10.6
Cd 37.6
Cr 92.9
Cu 68.9
Pb 19.4
Ni 65.5
Zn 282
CN 12.3
SB-12
As 9.0
Cr 18.7
Cu 11.5
Pb 13.2
Ni 31.7
Zn 42.8
SB-06
As 5.3
Cd 113
Cr 257
Cu 307
Pb 63.2
Ni 322
Zn 359
CN 17.8
SB-07
Cd 16.1
Cr 8.0
Cu 20.8
Pb 1.7
Ni 9.6
Zn 55.0
SB-13
Cr 7.7
Cu 87.1
Pb 2.1
Ni 29.7
Zn 16.0
SB-11
As 4.7
Cr 16.1
Cu 14.4
Pb 7.3
Ni 16.3
Zn 4.2
SB-08
As 3.8
Cd 25.9
Cr 84.1
Cu 35.3
Pb 9.3
Ni 81.8
Zn 103
CN 13.1
MW-02D
As 6.8
Cd 21.4
Cr 37.9
Cu 43.7
Pb 12.9
Ni 85.5
Zn 411
CN 7.2
SB-20
SB-17
SB-19
SB-18
SB-16
SB-05
SB-15
SB-09
SB-06
SB-10
SB-14
SB-13
SB-12
SB-08
SB-07
SB-11
MW-02D
SOIL BORING
MONITORING WELL BORING
0 50 100
SCALE IN FEET
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-10
Inorganic Concentrations (mg/kg)
in Soil: 2-3 ft Depth Interval
ERASCO SERVICES INCORPORATED


NORTH
As = Arsenic
Cd = Cadmium
Cr = Chromium
Cu = Copper
Pb = Lead
Ni = Nickel
Zn = Zinc
CN = Cyanide
(2) = Duplicate Sample
TP-01A TP-01A(2)
As 2.3 4.0
Cd 1.0 BDL
Cr 12.3 17.3
Cu 13.1 8.5
Pb 4.2 9.1
Ni 26.6 15.1
Zn 23.6 39.8
WB-02 WB-02(2)
As 9.1 15.9
Cr 12.4 23.9
Cu 19.0 21.3
Pb 14.9 14.3
Ni 14.4 19.0
Zn 61.9 64.4
WB-03
As 11.9
Cd 16.0
Cr 112
Cu 22.3
Pb 12.2
Ni 43.9
Zn 83.7
CN 19.4
WB-04
As 14.3
Cd 10.3
Cr 33.9
Cu 61.7
Pb 18.7
Ni 71.3
Zn 212
CN 5.8
WB-05
As 14.5
Cd 210
Cr 163
Cu 1140
Pb 144
Ni 920
Zn 5320
CN 12.4
WB-06
As 4.6
Cd 5.6
Cr 51.0
Cu 71.7
Pb 42.3
Ni 45.0
Zn 1080
WB-02
WB-03
WB-04
TP-01A
WB-05
WB-06
WATER TABLE BORING
TEST PIT
0 50 100
SCALE IN FEET
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-11
Inorganic Concentrations (mg/kg) in Soil: 4-5 ft Depth Interval
ERASCO SERVICES INCORPORATED


NORTH
MW-08
MW-04D
MW-04S
MW-01S
MW-01D
MW-07
MW-03D
MW-03S
MW-02D
MW-02S
MW-05
MW-06
Cr = Chromium
Cu = Copper
Pb = Lead
Ni = Nickel
Zn = Zinc
(2) = Duplicate Sample
MW-06
Cu 10.3
Pb 1.8
Zn 11.7
MW-02S
Cu 13.6
Pb 2.3
Ni 36.5
Zn 12.8
MW-05 MW-05(2)
Cr 31.0 30.0
Cu 6.5 7.8
Pb 2.7 4.6
Zn 9.2 9.4
MONITORING WELL
(ALL LOCATIONS ARE APPROXIMATE)
0 50 100
SCALE IN FEET
SOURCE: SURVEY MAP
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-12
Inorganic Concentrations (mg/kg) In Soil: > 5 ft Depth Interval
EBASCO SERVICES INCORPORATED

B. Hydrogeologic Characteristics and Groundwater Contamination

Shallow groundwater at the OEC site occurs in the saturated unconsolidated deposits which range in thickness from 30 to 60 feet. There are no known residential wells which draw water from these deposits. The unconsolidated deposits are underlain by a dolomite which is approximately 30 feet thick in the eastern portion of the site and totally disappears to the west of the site. This dolomite constitutes the upper part of the Maquoketa Shale. Several residential wells near the site are completed in this zone. The Maquoketa Shale is underlain by dolomite of the Galena-Platteville aquifer. Several residential wells in the Ashippun area appear to be withdrawing water from dolomite below the shale. See Figures 3-3 through 3-5.

Ground-water flow in the unconsolidated deposits is in the west southwest direction towards Davy Creek. Davy Creek acts as a discharge (drainage) area for the local groundwater flow system.

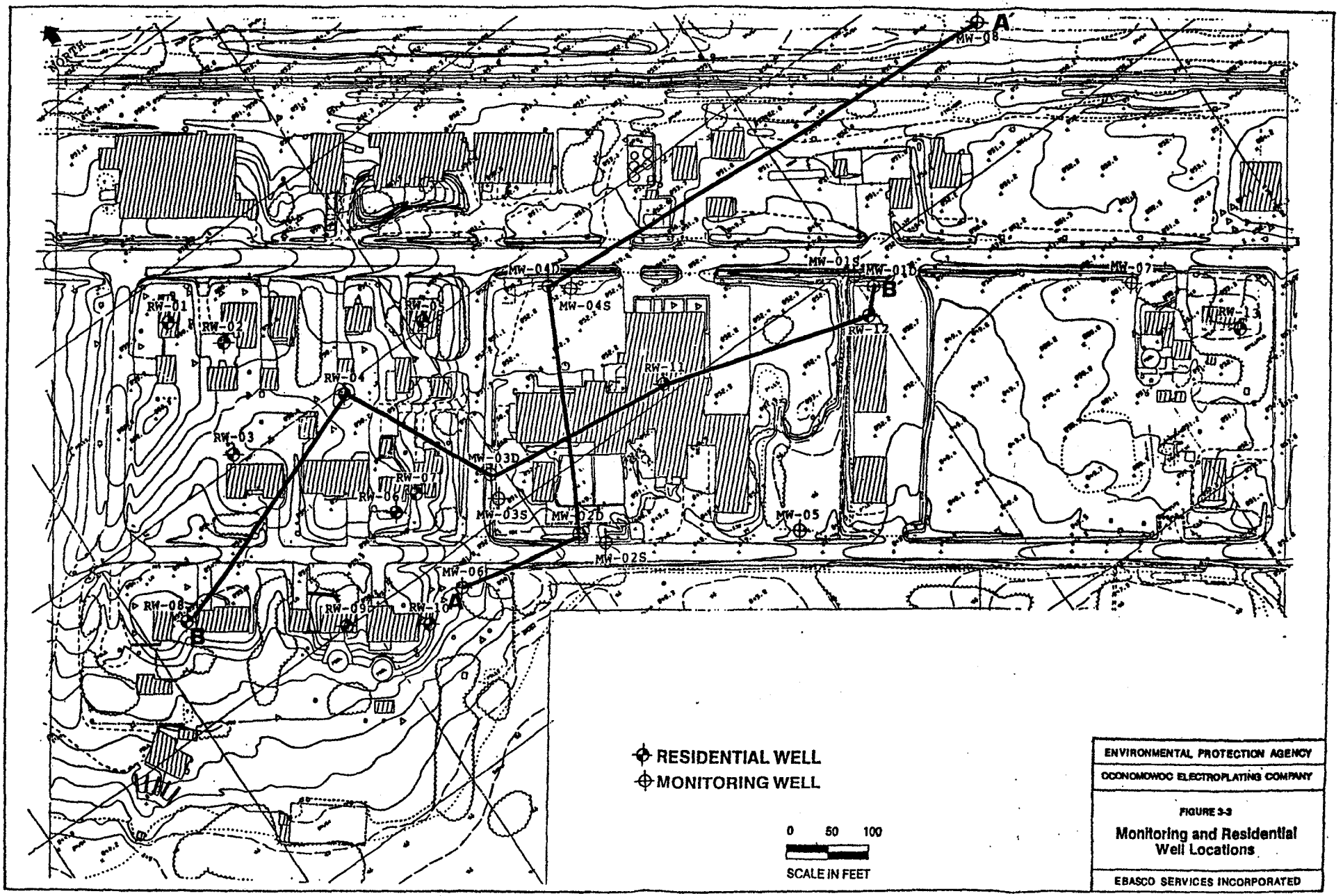
The groundwater flow system in the upper dolomite is under confined or semi-confined conditions since the water levels in the deep monitoring wells completed in this zone are above the top of the upper dolomite. The recharge to the upper dolomite is downward leakage through the unconsolidated deposits overlying the dolomite. Due to the apparent hydraulic connection between the unconsolidated deposits and the upper dolomite, it is assumed that the ground-water flow in the underlying dolomite is similar to the one in the unconsolidated deposits.

The horizontal hydraulic gradient in the unconsolidated deposits varies from 1.2×10^{-4} to 1.8×10^{-3} with an average of 9.6×10^{-4} feet/foot in the west-southwest direction. The horizontal hydraulic gradient in the upper dolomite aquifer varies from 3.3×10^{-4} to 2.4×10^{-3} feet/foot with an average gradient 1.4×10^{-3}.

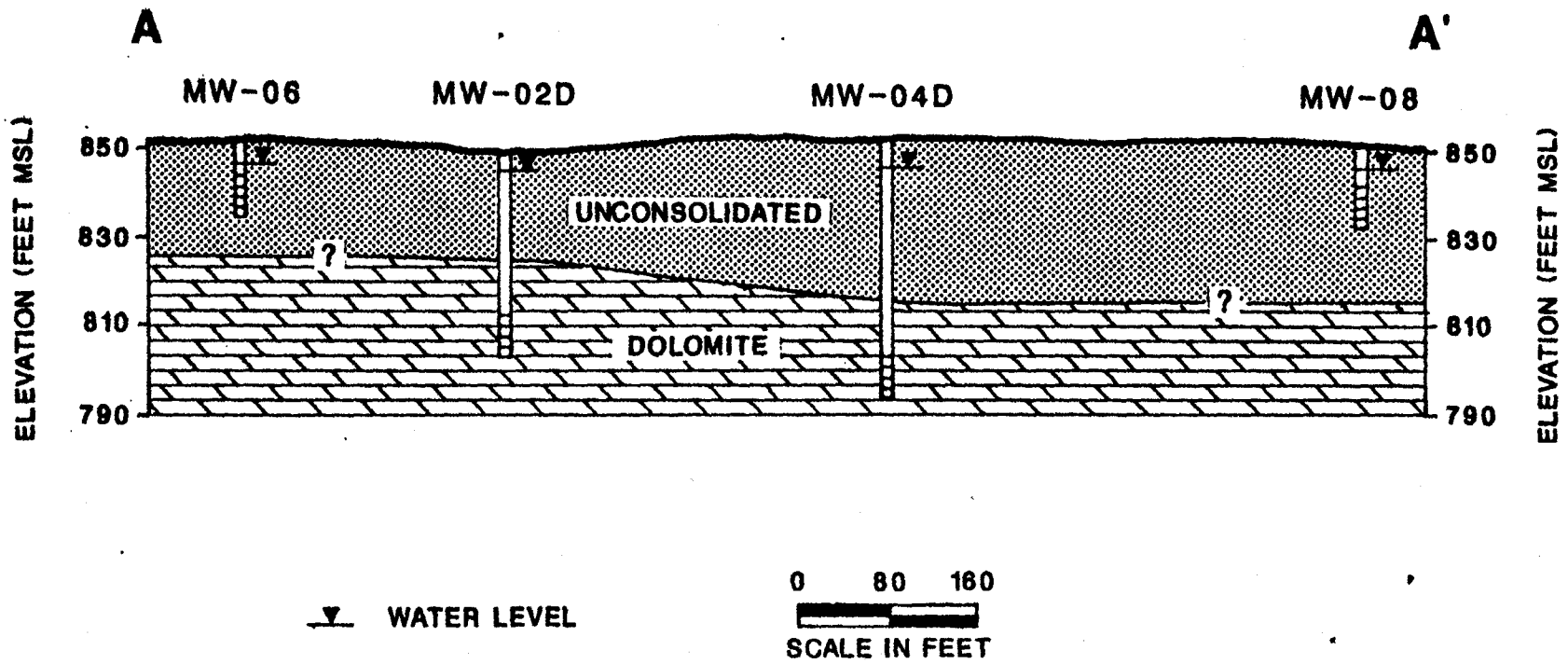
Groundwater samples were collected from all monitoring wells and nearby residential wells in two rounds of sampling. A total of 26 groundwater samples (including 3 duplicates) were collected from the monitoring wells, and 31 samples (including 6 duplicates) were collected from the residential wells. The groundwater samples were analyzed for full TCL organics and TAL inorganics, total and simple cyanide, total organics content (TOC), nitrate-nitrite, ammonia, sulfate, alkalinity, total suspended solids, and hexavalent chromium.

B.1 Monitoring Wells

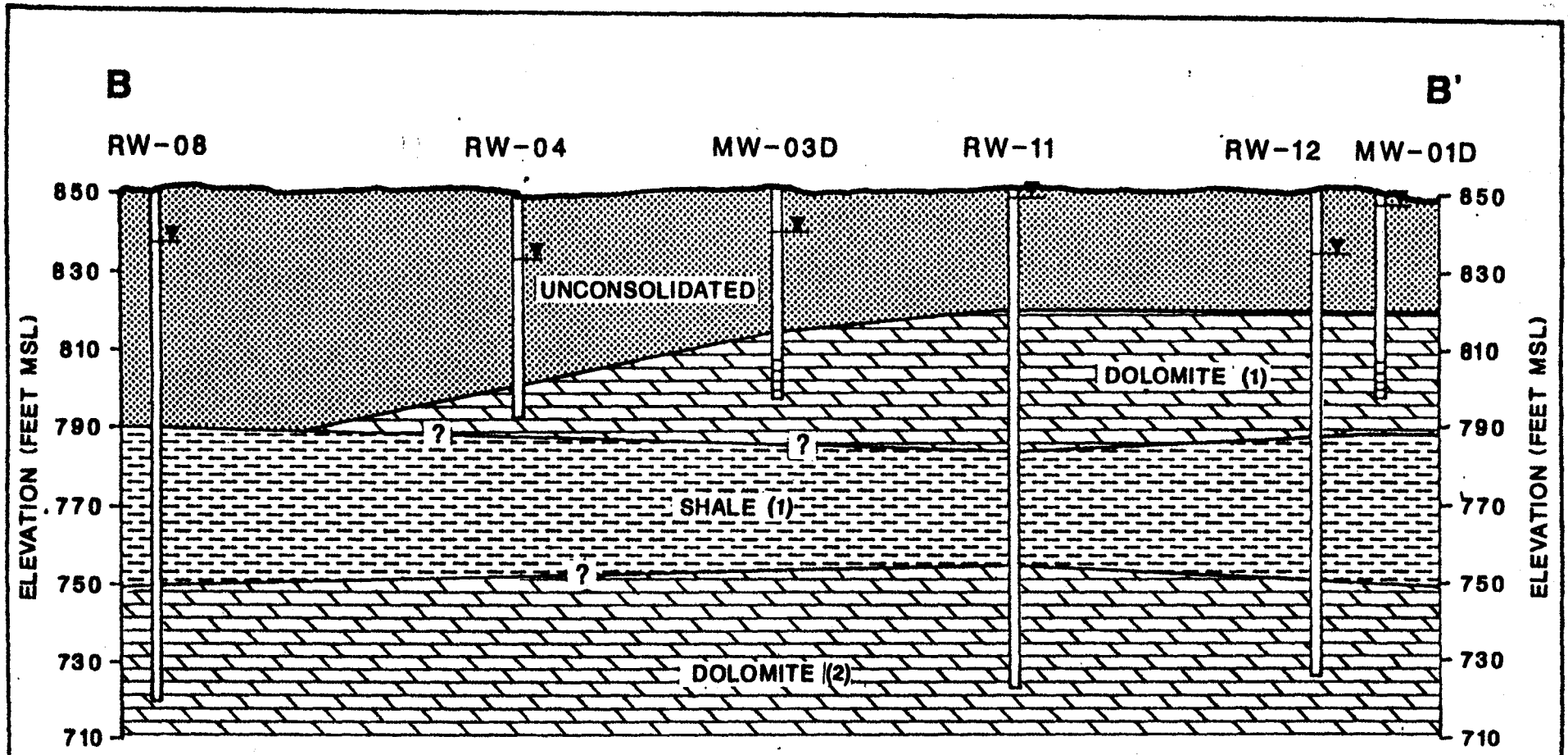
Analytical results for organics in the groundwater samples collected from the monitoring wells indicated the presence of six volatile organic contaminants, 1,1-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethene (total), 1,2-dichloroethane,



ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 3-3 Monitoring and Residential Well Locations
EBASCO SERVICES INCORPORATED



ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 3-4 GENERALIZED GEOLOGIC CROSS SECTION A-A'
EBASCO SERVICES INCORPORATED



(1) Maquoketa

(2) Galena-Platteville Dolomite

NOTE: RW Groundwater Levels are Based on Measurements Taken After Well Construction.

ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 3-5

GENERALIZED GEOLOGIC CROSS SECTION B-B'

EBASCO SERVICES INCORPORATED

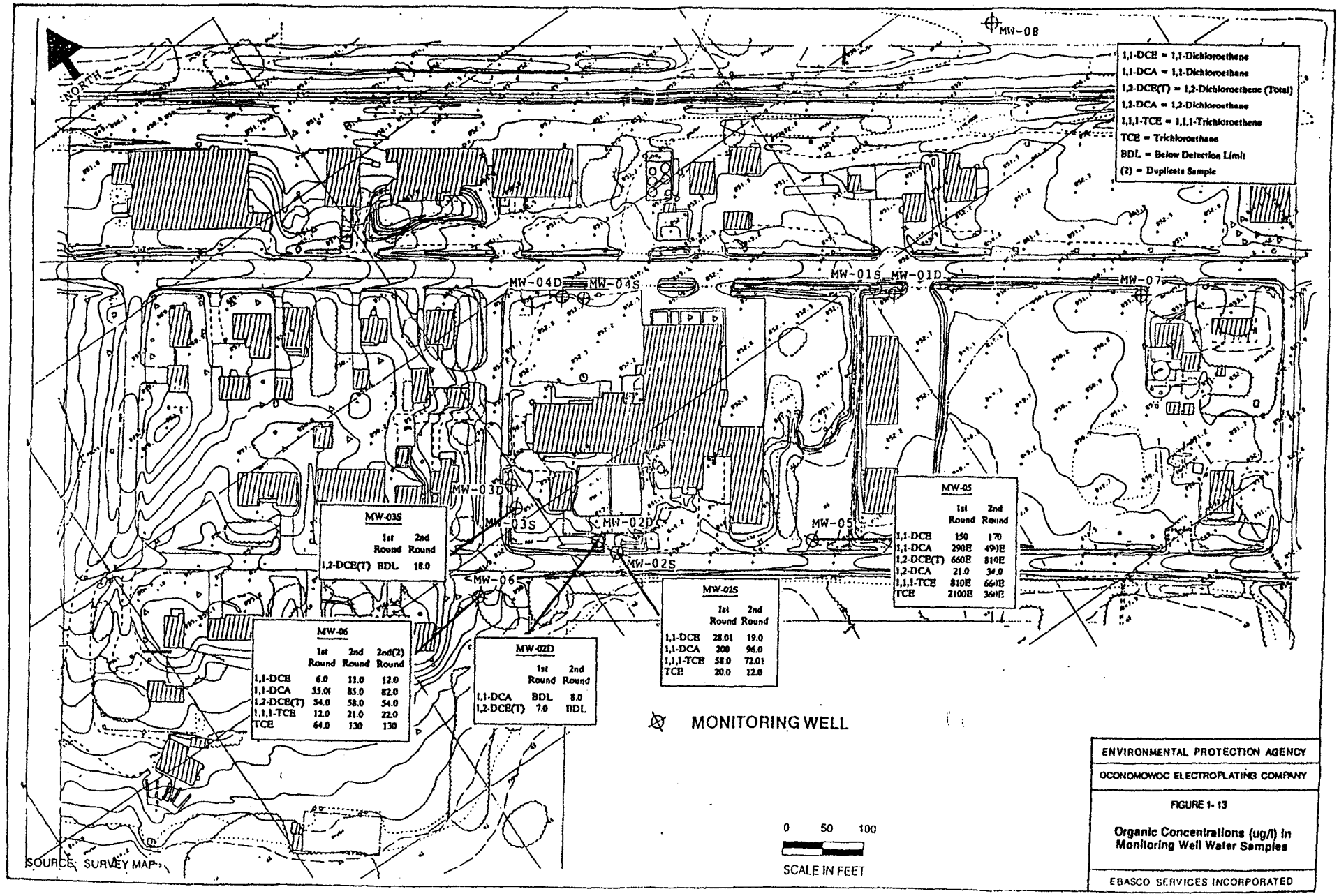
1,1,1-trichloroethane, and trichloroethene. These organic compounds were detected in both rounds of sampling. The concentration distribution of the organic contaminants in groundwater are shown in Figure 1-13. All detected volatile organic compounds exceeded the Maximum Contaminant Levels (MCLs) and the Wisconsin Groundwater Quality Standards. Most of the groundwater contamination with volatile organics was found to be restricted to three shallow monitoring wells (MW-02S, MW-05, and MW-06) located in the downgradient direction. The highest concentrations of volatiles was reported in monitoring well MW-05 located in the southern corner of the lowlands area.

Groundwater contaminated with cadmium, nickel, and cyanide was found in shallow monitoring well MW-02S located downgradient in the drainage ditch southwest of the wastewater treatment in both rounds of sampling. These concentrations were above Wisconsin Enforcement Standards (ES) concentrations for cadmium and cyanide. Cadmium was also detected in shallow monitoring well MW-06, and cyanide was detected in shallow wells MW-03S, MW-04S, MW-05, and MW-06. These concentrations were below MCLs but were above Wisconsin Preventive Action Limits (PALs) for cadmium in monitoring well MW-06 and cyanide in monitoring wells MW03S and MW-05. In monitoring wells MW-02D, MW-025 MW-03D, MW-04S, MW-05, and MW-06, nickel was also detected, (no federal or state standards exist for nickel). The concentration distributions of cadmium, nickel, and cyanide in groundwater are shown in Figure 1-14.

B.2 Residential Wells

Analytical results of the first round of groundwater samples collected from the residential wells indicated the presence of only acetone at low concentration. In the second round of groundwater sampling, all volatile organic compounds were reported below detection limits.

Groundwater contaminated with nickel was detected in several residential wells at concentrations above background levels. The concentration distribution of nickel in residential well samples is shown in figure 1-15. The highest concentrations of nickel were reported in residential wells RW-06 (87.5 ppb) and RW-07 (75.8 ppb) located west of the OEC facility in a downgradient direction. The Federal lifetime health advisory for nickel is 100 ppb. RW-07 also had elevated concentrations of cadmium, lead and zinc. It is not known whether the completion zone of these residential wells is in the upper dolomite or the lower dolomite. No federal MCLs/non-zero MCLGs were exceeded in the residential wells, although the State's PALs for chromium was exceeded in RW-07 (19.4ppb) and lead (20.5ppb).



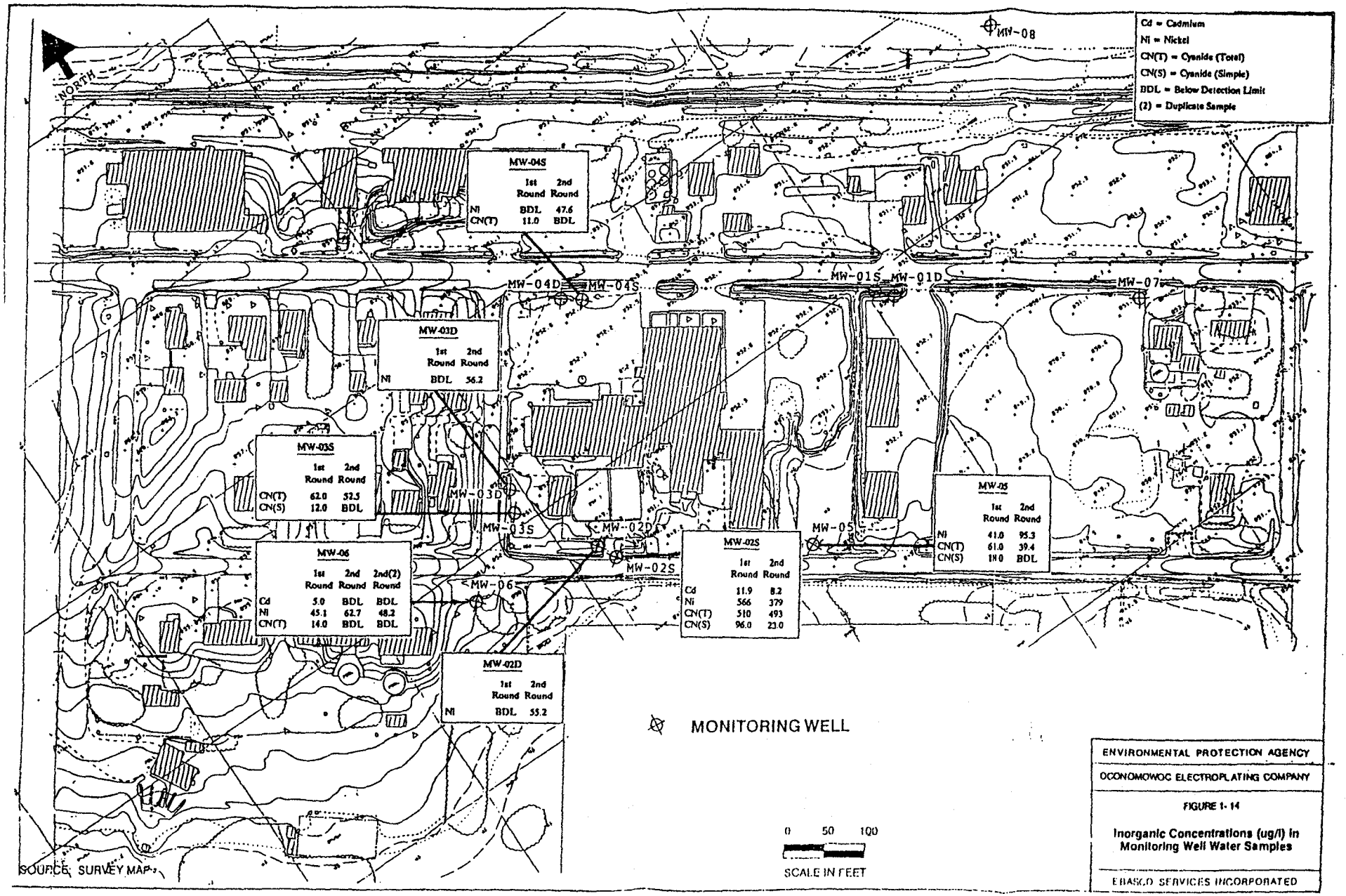
ENVIRONMENTAL PROTECTION AGENCY

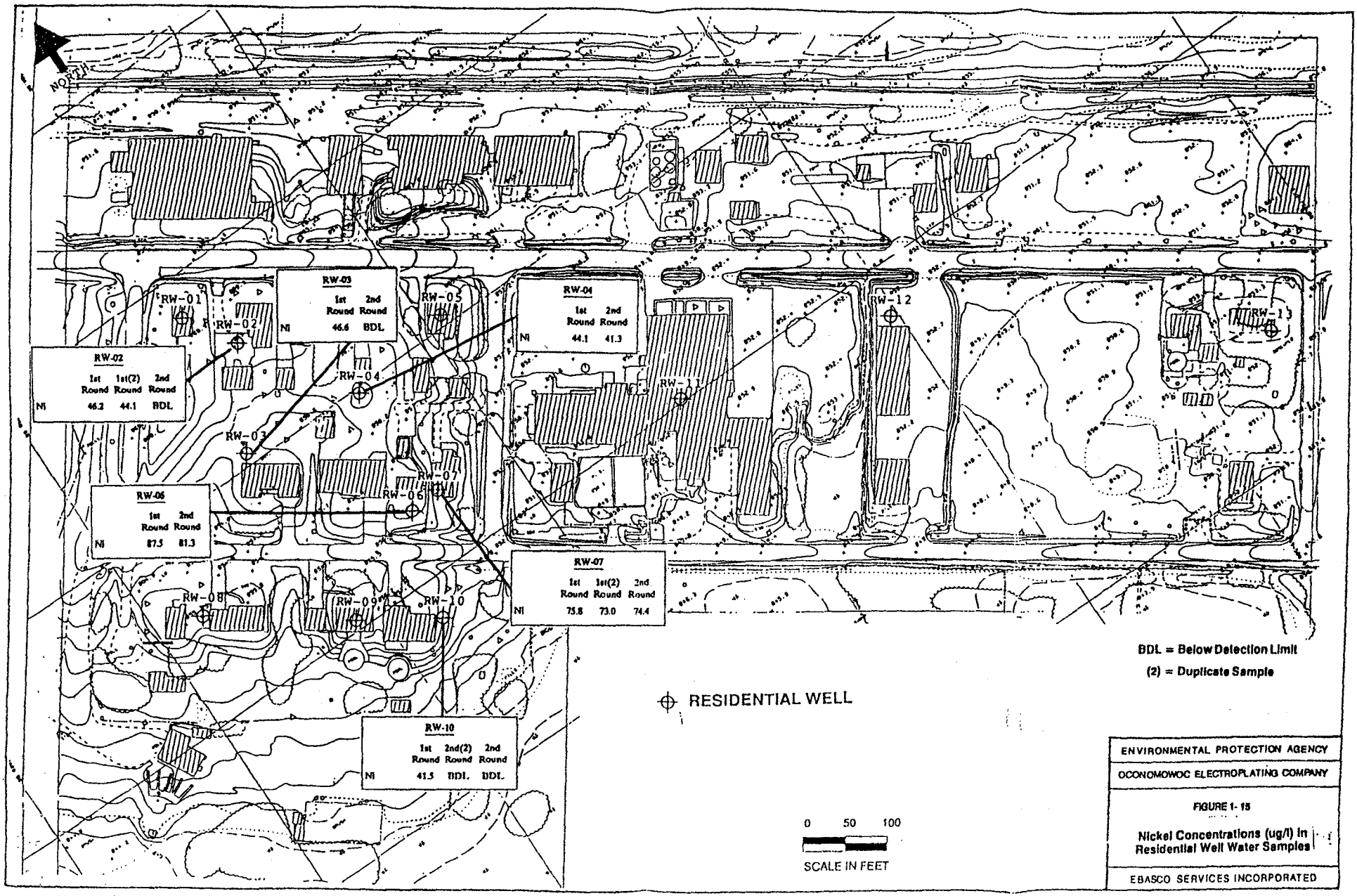
OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-13

Organic Concentrations (ug/l) in Monitoring Well Water Samples

EBASCO SERVICES INCORPORATED


NORTH
MW-08
Cd = Cadmium
Ni = Nickel
CN(T) = Cyanide (Total)
CN(S) = Cyanide (Simple)
BDL = Below Detection Limit
(2) = Duplicate Sample
MW-04S
1st Round 2nd Round
Ni BDL 47.6
CN(T) 11.0 BDL
MW-04D
MW-04S
MW-01S
MW-01D
MW-07
MW-03D
1st Round 2nd Round
Ni BDL 56.2
MW-03S
1st Round 2nd Round
CN(T) 62.0 52.5
CN(S) 12.0 BDL
MW-03D
MW-03S
MW-02D
MW-02S
MW-05
MW-05
1st Round 2nd Round
Ni 41.0 95.3
CN(T) 61.0 39.4
CN(S) 11.0 BDL
MW-06
1st Round 2nd Round 2nd(2) Round
Cd 5.0 BDL BDL
Ni 45.1 62.7 48.2
CN(T) 14.0 BDL BDL
MW-06
MW-02S
1st Round 2nd Round
Cd 11.9 8.2
Ni 566 379
CN(T) 510 493
CN(S) 96.0 23.0
MW-02D
1st Round 2nd Round
Ni BDL 55.2
MONITORING WELL
0 50 100
SCALE IN FEET
SOURCE: SURVEY MAP
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-14
Inorganic Concentrations (ug/l) in Monitoring Well Water Samples
EBASCO SERVICES INCORPORATED


NORTH
RW-01
RW-02
RW-03
RW-04
RW-05
RW-06
RW-07
RW-08
RW-09
RW-10
RW-11
RW-12
RW-13
RW-02
1st Round 1st(2) Round 2nd Round
Ni 46.2 44.1 BDL
RW-03
1st Round 2nd Round
Ni 46.6 BDL
RW-04
1st Round 2nd Round
Ni 44.1 41.3
RW-06
1st Round 2nd Round
Ni 87.5 81.3
RW-07
1st Round 1st(2) Round 2nd Round
Ni 75.8 73.0 74.4
RW-10
1st Round 2nd(2) Round 2nd Round
Ni 41.5 BDL BDL
BDL = Below Detection Limit
(2) = Duplicate Sample
RESIDENTIAL WELL
0 50 100
SCALE IN FEET
ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 1-15
Nickel Concentrations (ug/l) in Residential Well Water Samples
EBASCO SERVICES INCORPORATED

C. Lagoon Contamination

Sludge and liquid samples were collected from the two RCRA-regulated wastewater treatment lagoons. A total of 9 sludge samples (including 1 duplicate), and 3 liquid samples (including 1 duplicate) were collected from the lagoons. The sampling locations are shown in Figure 1-16. The samples were analyzed for volatile organics and full TAL inorganics. In addition, one composite sludge sample was collected from the lagoons and analyzed for RCRA hazardous waste characterization.

C.1 Sludge

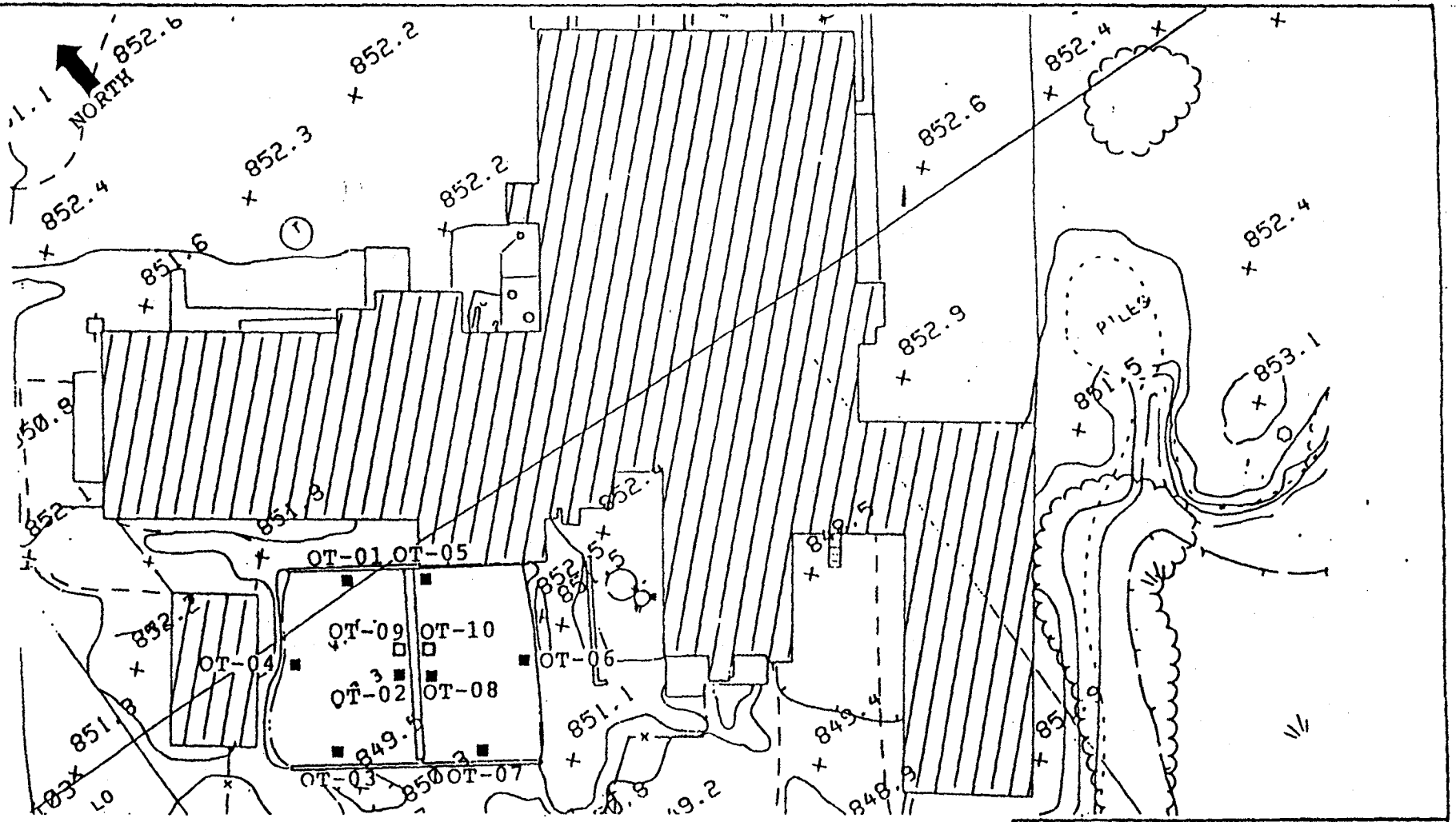
Analytical results of the RCRA lagoon sludge samples indicated the presence of nine volatile contaminants which include acetone, methylene chloride, 1,1-dichloroethane, 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, toluene, ethylbenzene, and xylene. Acetone in particular was detected at elevated concentrations in eight of the nine samples. Most of the volatile compounds were reported in sludge samples located adjacent to the central dividing wall running lengthwise between the two wastewater treatment lagoons. This may indicate a tendency on the part of the contaminated sludge to settle out adjacent to the dividing wall. The degreasing operations are the likely source of these contaminants.

Sludge contaminated with arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide was found in most of the samples collected from the wastewater treatment lagoons. These inorganics were reported with very high concentrations, where the maximum concentrations were detected in the west lagoon except for arsenic. Arsenic was detected with the maximum concentration was in the east lagoon. The presence of these inorganics is likely from the treatment of wastewater from the OEC electroplating process. In addition, the lagoon sludge was determined to be a characteristic hazardous waste based on its EP toxicity (cadmium) and reactivity (cyanide). The lagoon sludge is a listed RCRA hazardous waste (F006).

C.2 Liquid

Analytical results of the lagoon liquid samples indicated the presence of methylene chloride and acetone. These contaminants were detected in both wastewater treatment lagoons. Methylene chloride and acetone were also detected in the lagoon sludge at elevated concentrations. The occurrence of these organics may be attributed to the discharge of spent solvents and bottom sludges from the degreasing operations into the lagoons.

No inorganic contamination was detected in the lagoon liquid.



■ LAGOON SLUDGE SAMPLE
□ LAGOON LIQUID SAMPLE
(All locations are approximate)

0 50

SCALE IN FEET

ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-16

LAGOON SAMPLING LOCATIONS

EBASCO SERVICES INCORPORATED

D. Wetlands Contamination

Several studies of the contamination in the wetlands have been conducted. In 1987, Weston collected sediment and surface water samples from a 300 acre wetlands area south of the OEC facility along Davy Creek. A total of 184 sediment.samples and 7 surface water samples were collected. The wetlands area under investigation was subdivided into three areas: the grid area, the Davy Creek up-stream area, and the Davy Creek down-stream. The grid area consisted of 94 sediment samples obtained from 30 locations in a 250,000 square foot area south of the OEC facility. The Davy Creek up-stream area occupied the east side of the grid along Davy Creek. Forty-five sediment samples from 14 locations were collected along this 3/4 mile stretch along Davy Creek. The Davy Creek down-stream area was defined as the area between the grid and the confluence point of Davy Creek with the Rock River. Forty-five sediment samples were collected from 16 locations west (down-stream) of the grid area. The 7 surface water samples were collected from different locations within the wetlands study area.

Selected sediment samples were analyzed for total Hazardous Substance List (HSL) metals, full-scan HSL organics, hexavalent chromium, total and reactive cyanide, EP toxicity (metals), and total organic carbon. A maximum of four intervals (0 to 1, 1 to 2, 2 to 3, and 3 to 5 feet) were sampled at any given location. Surface water samples were analyzed for total HSL metals, full-scan HSL organics, hexavalent chromium, and total cyanide.

D.1 Wetlands Grid Sediment

Analytical results indicated three volatile organic compounds present in the sediment. These were acetone, methylene chloride, and toluene. The highest concentrations reported were 4,000 g/kg acetone, 250 g/kg methylene chloride (also detected in laboratory blank), and 1,100 g/kg toluene.

The grid, which is located adjacent to OEC's discharge ditch, was suspected to be a potential sink for contaminants. Sediment samples collected from the central and upper-central sections of the grid contained the highest concentrations of metals and cyanide. The contaminants of primary concern in the grid sediment were cadmium, chromium, copper, nickel, zinc, tin, and cyanide. The 0 to 1 foot sampling interval yielded concentrations of up to 3,600 mg/kg cadmium, 8,840 mg/kg chromium, 3,550 mg/kg copper, 16,500 mg/kg nickel, 1,120 mg/kg tin, 10,800 mg/kg zinc, and 1.120 total cyanide. These contaminant concentrations exceeded those of the background sample and the range of typical metal concentrations in natural soils. Results also indicated that the concentrations of metals and cyanide are at elevated levels at depths greater than three feet. Isopleths of concentrations for cadmium, chromium, nickel,

zinc, and cyanide for 0 to 1, 1 to 2 and 2 to 3 foot depth intervals are illustrated in Figures 1-17 through 1-31 in the FS. Isopleths for the above metals for the 0 to 1 foot interval are attached. See Figures 1-17, 1-20, 1-23, 1-26, and 1-29.

Results of the 1987 Extent of contamination Study showed no EP toxicity levels over the RCRA levels for metals. However the April 1988 test results showed a large area within the wetland exceeding RCRA EP toxicity levels for metals. Inorganic and organic concentrations are shown in Tables 1-1 through 1-3 and Table 5.

D.2 UpStream Area Sediments

Samples were collected through the first two feet of sediment in the Davy Creek upstream area (Figure 1-32). The sediment did not appear to be contaminated with metals or cyanide. The concentration ranges shown in Tables 1-4 and 1-5 , can be considered the background samples.

D.3 Down-Stream Area Sediments

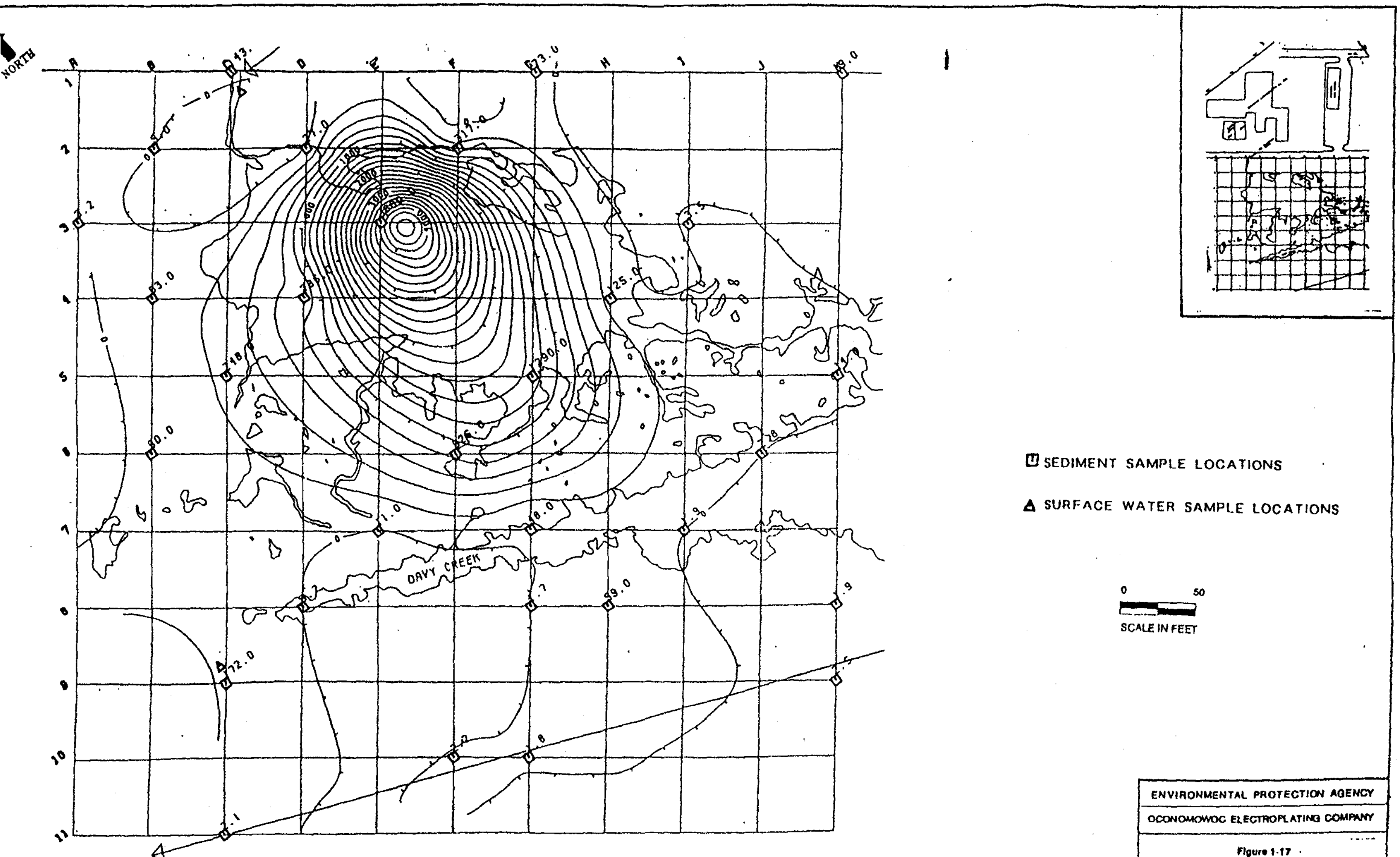
The sediment samples collected immediately down-stream of the sewage treatment plant's discharge area (Figure 1-32) had elevated concentrations of metals and Cyanide. Cadmium (272 mg/kg), chromium (1,370 mg/kg), copper (714 mg/kg), and nickel (987 mg/kg) were detected in the 1 to 2 foot sampling interval. Also, 11.1 mg/kg of cyanide was reported. The remaining downstream Davy Creek sediment samples also had elevated levels of metals contaminants.

D.4 Surface Water

The organic analytical results indicated that surface water in the wetlands does not appear to contain any significant concentrations of contaminants.

Surface water samples in the wetlands did not contain metal contaminants, with the exception of zinc, associated with OEC processes. Zinc concentrations ranged from 11 to 478 ppb, the latter concentration being from a sample collected at the OEC discharge point. The field blank also detected zinc (13 ppb) which may indicate that the sample bottles or the preservative was slightly contaminated with zinc. Cyanide concentrations in all the water samples were below detection limits.

Chemicals of concern identified in the wetlands which may contribute to chronic and or acute toxicity to aquatic organisms living in the wetlands and Davy Creek include cadmium, chromium, nickel, copper, lead, zinc and cyanide. In addition, cadmium and copper may bioaccumulate to varying degrees in organisms within in the wetlands and Davy Creek ecosystems.



ENVIRONMENTAL PROTECTION AGENCY

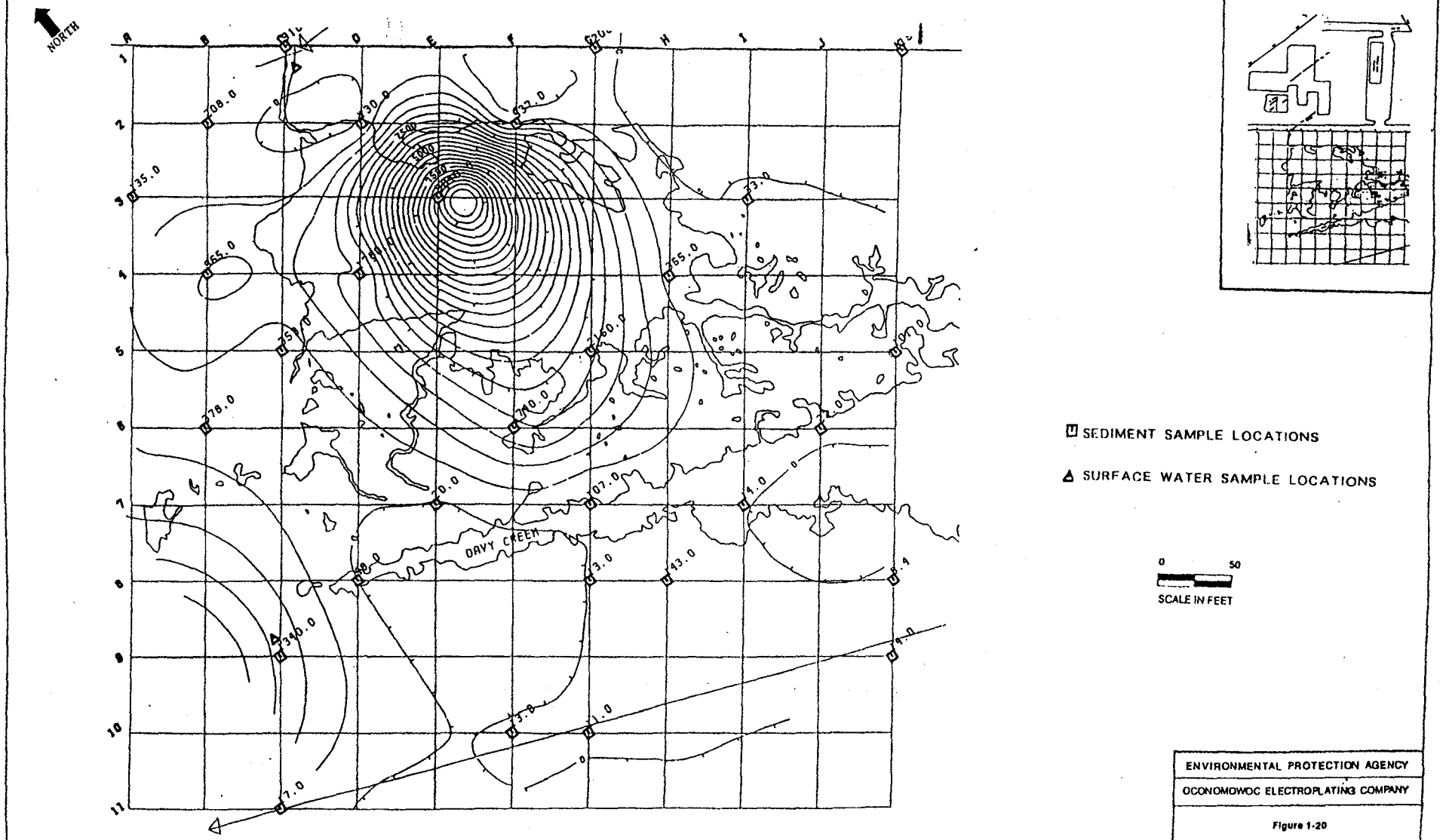
OCONOMOWOC ELECTROPLATING COMPANY

Figure 1-17

Cadmium Concentration Isopleths (mg/kg) for Grid Area Sediment 0-1 ft Depth Interval

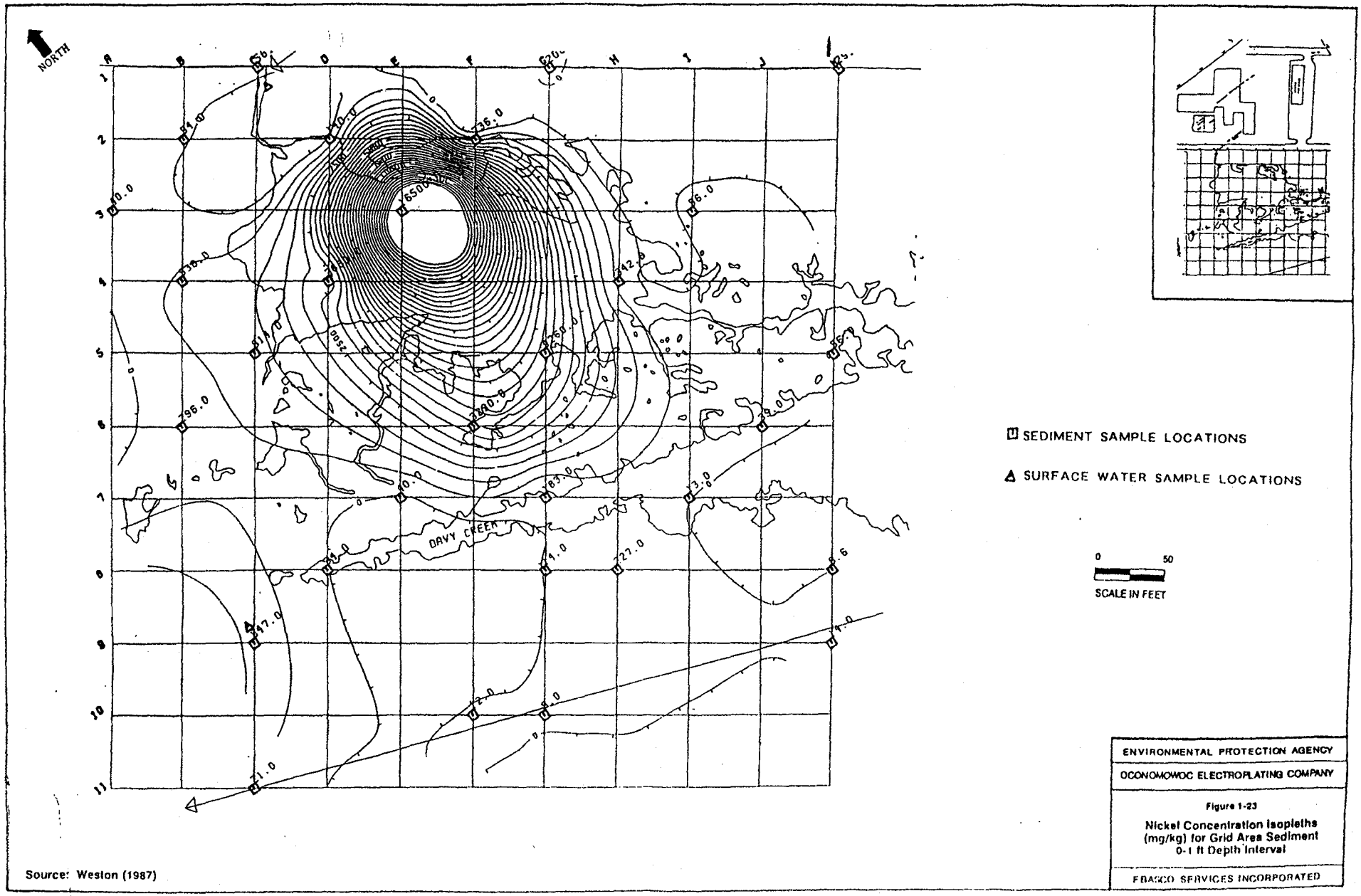
EBASCO SERVICES INCORPORATED

ce: Weston (1987)



Source: Weston (1987)

ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
Figure 1-20 Chromium Concentration Isopleths (mg/kg) for Grid Area Sediment 0-1 ft Depth Interval
ERASCO SERVICES INCORPORATED



Source: Weston (1987)

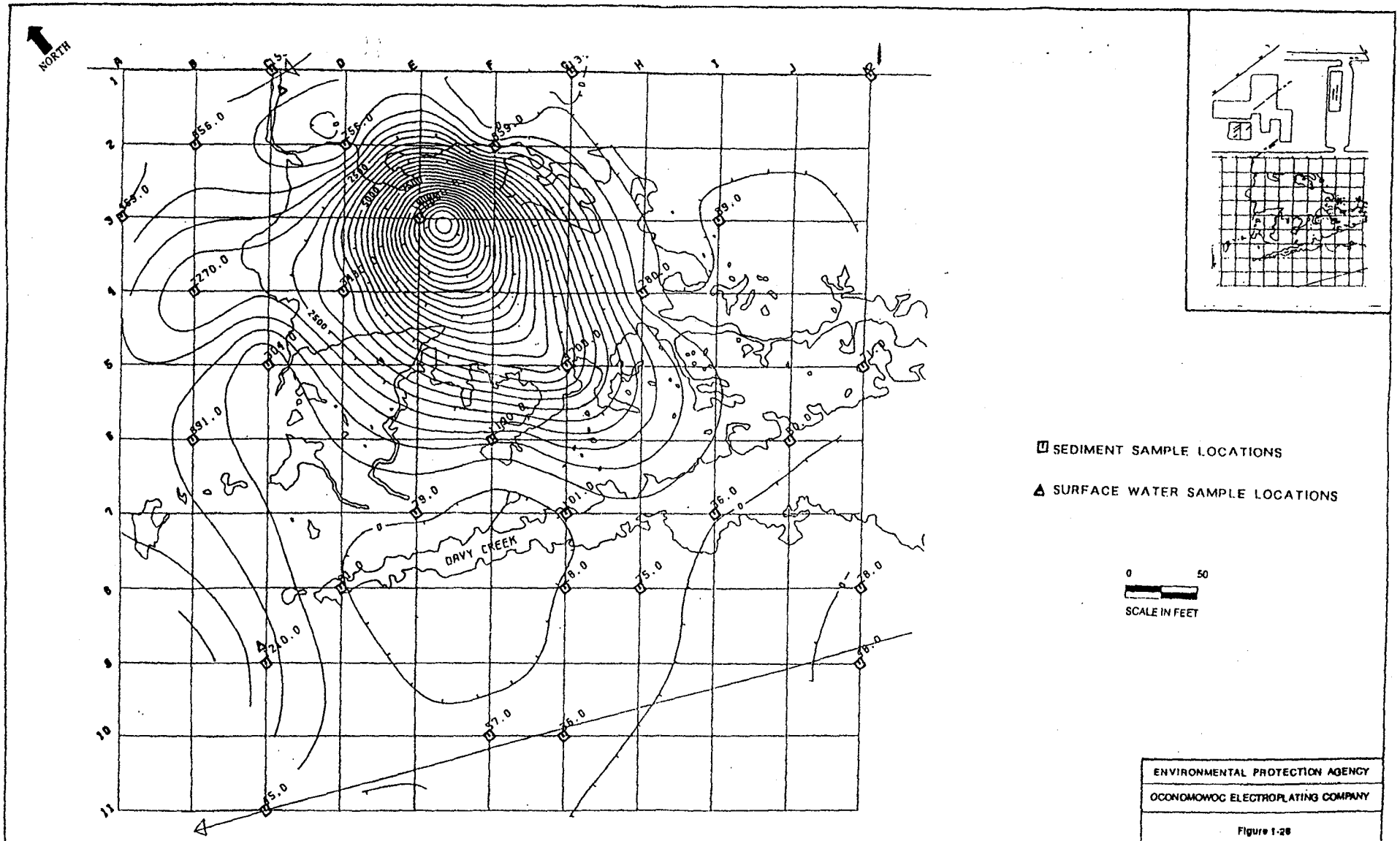
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

Figure 1-23

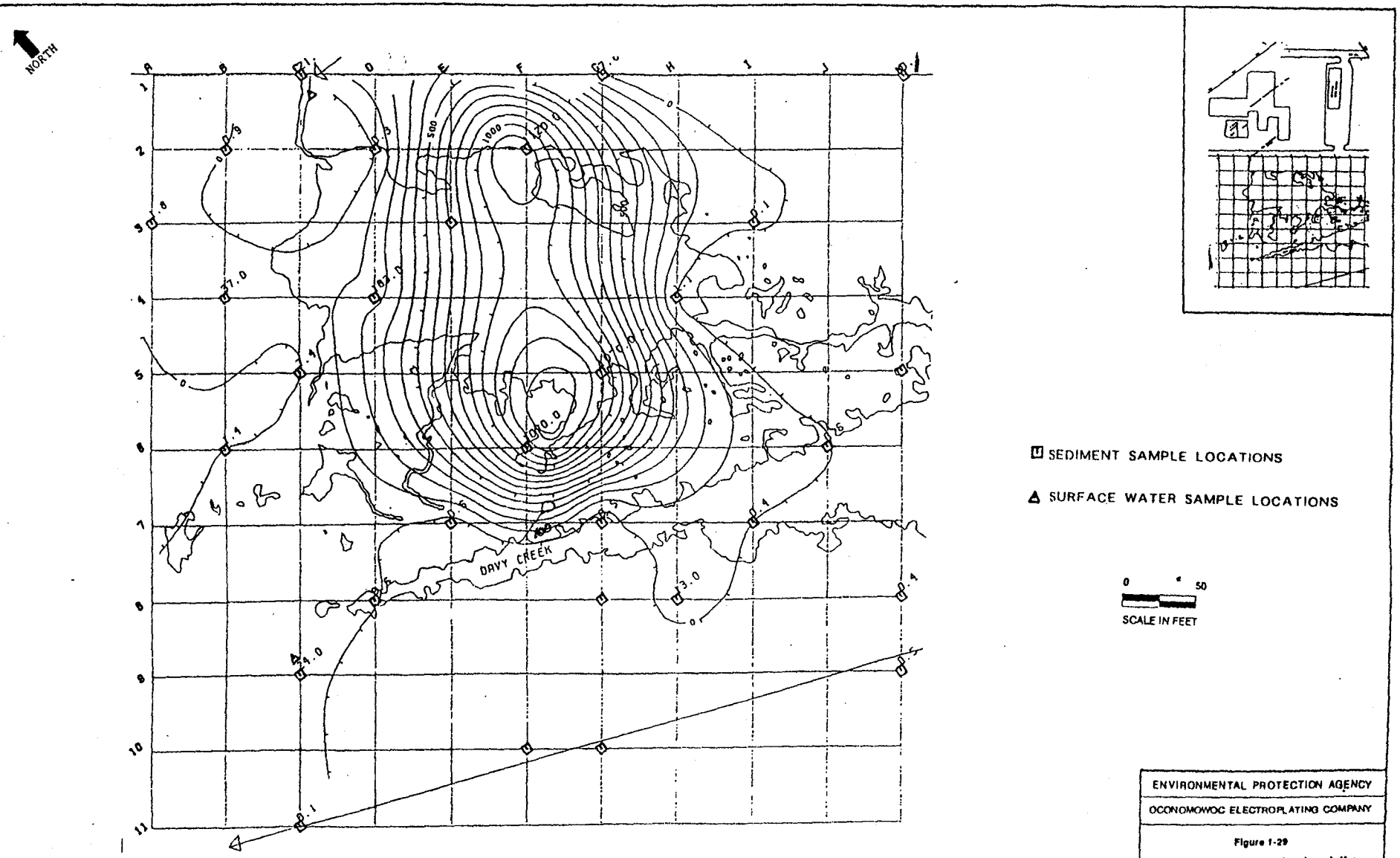
Nickel Concentration Isopleths (mg/kg) for Grid Area Sediment 0-1 ft Depth Interval

EBASCO SERVICES INCORPORATED



Source: Weston (1987)

ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
Figure 1-26 Zinc Concentration Isopleths (mg/kg) for Grid Area Sediment 0-1 ft Depth Interval
EBASCO SERVICES INCORPORATED



Source: Weston (1987)

ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

Figure 1-29

Cyanide Concentration Isopleths (mg/kg) for Grid Area Sediment 0-1 ft Depth Interval

EBASCO SERVICES INCORPORATED

Table 1-1: Inorganic Concentrations (mg/kg) in Davy Creek Sediment Downstream of OEC Facility -- 0 to 1 Foot Depth Interval

Analyte	Sample S3A(1)	S2A(1)	S1A(1)	7+50D(2)	10+00D(2)	12+50D(2)	Background
Cadmium	383	13.7	10.4	149	22	20	<2.7
Chromium (Total)	4,720	130	37.6	545	94	48	14
Chromium (Cr^{+6})	NA	NA	NA	4.6	<2	NA	NA
Copper	2,760	26.8	58	249	90	97	18
Lead	284	6.4	6.0	8.8	17	<4.1	9.6
Nickel	2,760	69.2	40.1	591	98	35	12
Tin	NA	NA	NA	<14	<26	<16	64
Zinc	4,230	75.6	89.5	318	139	91	47
Cyanide (Total)	39.0	6.1	--	3.6	<1.3	NA	<0.2
Cyanide (Reactive)	NA	NA	NA	<0.2	NA	NA	NA

(1) Results of FIT Collected Sediment Samples (Ecology & Environment, 1988)
(2) Results of TAT Collected Sediment Samples (Weston, 1987)
(3) Background Sample Collected Approximately 3700 Feet Upstream of Site
NA = No Analysis Performed

Table 1-2: Inorganic Concentrations (mg/kg) in Davy Creek Sediment Downstream of OEC Facility -- 1-2 Feet Depth Interval

Analyte	Sample S3A(1)	S2A(1)	S1A(1)	7+50D(2)	10+00D(2)	12+50D(2)	Background
Cadmium	11.1	121	9.3	272	21	<3.6	<2.7
Chromium (Total)	72.4	379	22	1,370	97	<3.6	14
Chromium (Cr^{+6})	NA	NA	NA	NA	NA	<2	NA
Copper	40.7	171	17.1	714	65	90	18
Lead	13.4	25	10.2	29	11	<3.6	9.6
Nickel	48.2	518	23.5	987	78	4.3	12
Tin	NA	NA	NA	86	<26	<14	64
Zinc	90.4	320	79.9	1,190	82	7.3	47
Cyanide	1.7	90.4	--	11.05	NA	<0.71	<0.2
Cyanide (Total)	NA	NA	NA	<0.2	NA	NA	NA

(1) Results of FIT Collected Sediment Samples (Ecology & Environment, 1988)
(2) Results of TAT Collected Sediment Samples (Weston, 1987)
(3) Background Sample Collected Approximately 3,700 Feet Upstream of Site
NA = No Analysis Performed

Table 1-3: Organic Concentration (μg/kg) in Davy Creek Sediment Samples Downstream From OEC Facility

Compound	Sample* S1A	S1B	S2A	S2B	S3A	S3B
Acetone	--	--	--	--	--	--
1,1-Dichloroethene	--	--	--	--	--	--
1,1-Dichloroethane	--	--	--	--	--	--
1,2-Dichloroethene (Total)	--	--	--	--	--	--
2-Butanone (MEK)	8	11	18	14	110	--
1,1,1-Trichloroethane	--	--	--	--	--	--
Trichloroethene	--	--	--	--	--	--
4-methyl-2-pentanone	--	--	--	--	20	--
Toluene	--	--	7	4	17	--
Chlorobenzene	--	--	--	--	--	--

A = 0-1 Foot Depth
B = 1-2 Foot Depth

* FIT Collected Sediment Samples (Ecology & Environment, 1988)

Table 1-4: Inorganic Concentrations (mg/kg) in Davy Creek Sediment Upstream of OEC Facility -- 0 to 1 Foot Depth Interval

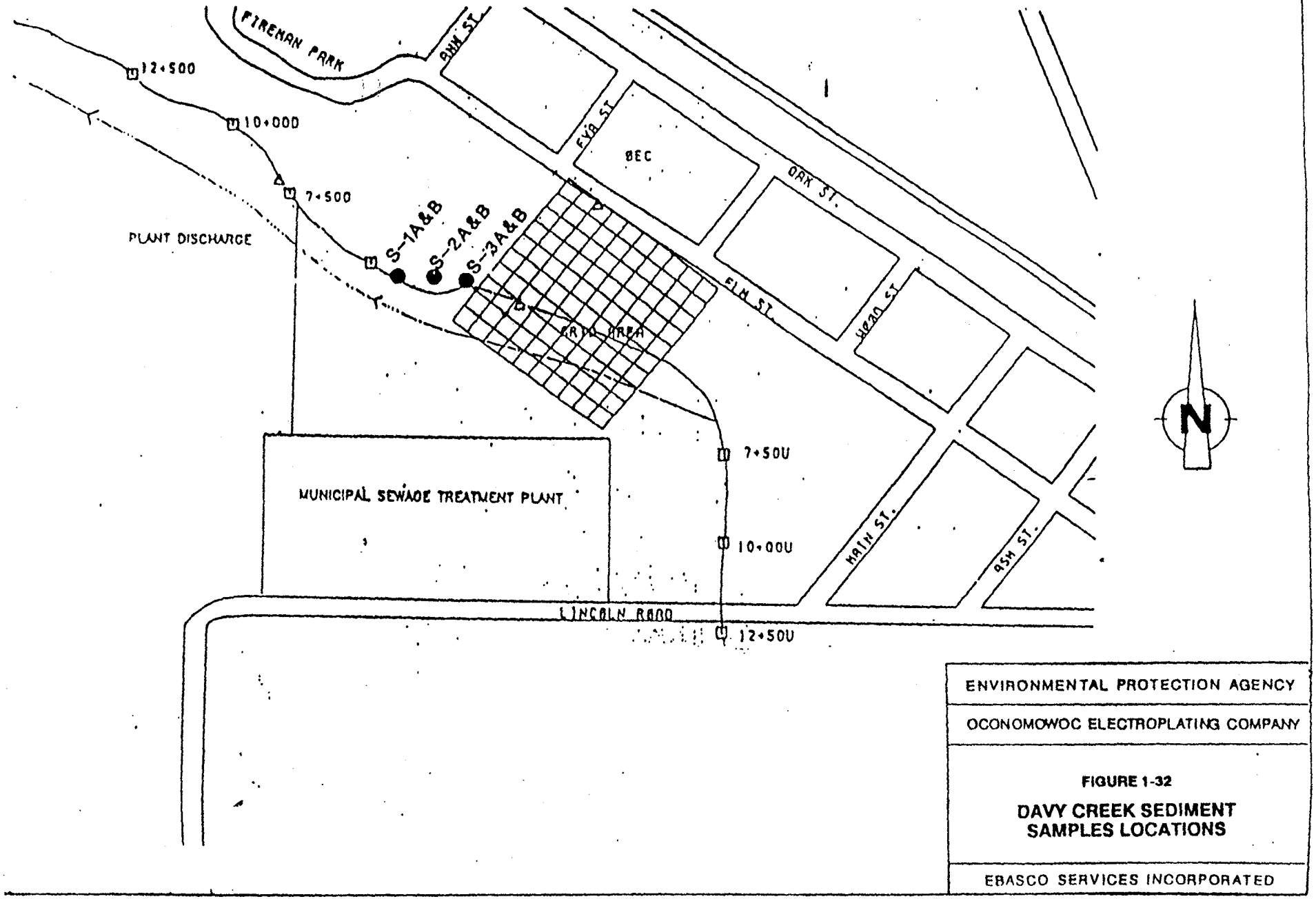
Analyte	Sample[1] 7+50M	10+00M	12+50M	Background(2)
Cadmium	9.5	10	5.9	<2.7
Chromium (Total)	29	125	26	14
Chromium (Cr^{+6})	<2	NA	<2	NA
Copper	47	39	26	18
Lead	<6.3	7.5	14	9.6
Nickel	78	69	49	12
Tin	<25	<17	<21	64
Zinc	91	74	40	47
Cyanide (Total)	<1.2	NA	<1.1	<0.2
Cyanide (Reactive)	NA	NA	NA	NA

NA = No Analysis Performed
(1) TAT Collected Sediment Samples (Weston, 1987)
(2) Background Sample Collected Approximately 3,700 Feet Upstream of Site.

Table 1-5: Inorganic Concentrations (mg/kg) in Davy Creek Sediment Upstream of OEC Facility -- 1-2 Foot Depth Interval

Analyte	Sample[1] 7+50M	10+00M	12+50M	Background(2)
Cadmium	3.9	<3.2	<4.6	<2.7
Chromium (Total)	11	6.9	15	14
Chromium (Cr^{+6})	NA	<2	NA	NA
Copper	12	15	21	18
Lead	4	4.3	16	9.6
Nickel	12	14	17	12
Tin	<13	<13	<19	64
Zinc	28	29	65	47
Cyanide (Total)	NA	NA	NA	<0.2
Cyanide (Reactive)	NA	NA	NA	NA

NA = No Analysis Performed
(1) TAT Collected Sediment Samples (Weston, 1987)
(2) Background Sample Collected Approximately 3,700 Feet Upstream of Site



ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 1-32

DAVY CREEK SEDIMENT SAMPLES LOCATIONS

EBASCO SERVICES INCORPORATED

The contamination of the wetlands to the south of the OEC Facility is a hazard to the environment.

The toxicity tests revealed a few samples to be acutely toxic to fathead minnows. In addition, one sample was chronically toxic to the algae. The chemical or precise combination of chemicals which are causing the toxicity are unknown. Each chemical or metal in our analysis can be toxic when presented in appropriate concentrations. They can also act as synergists or antagonists when presented with other metals. In this case the levels or combination of chemicals and metals has exceeded the minimum which is toxic to the two species tested.

The toxicity data collected on fathead minnows and algae showed conclusively that the contamination in the wetland is toxic.

E. Contaminant Fate and Transport

The fate and transport of chemical contaminants is of major importance in the evaluation and quantification of the risks resulting from site contamination. The relevant environmental fate data for the chemical contaminants associated with the OEC site are presented. These chemicals were grouped into two generalized classes sharing similar characteristics, volatile organics and inorganics.

E.1. Volatile Organics

The volatile organic compounds that were detected or exceeded the MCLs or PALs were grouped into chlorinated and non-chlorinated type compounds.

E.1.a Chlorinated Compounds

The chlorinated compounds considered to be indicator chemicals at the OEC site are methylene chloride, 1,1-dichloroethene, 1,1-dichloroethane, 1,2-dichloroethene (total), 1,2-dichloroethane, 1,1,1-trichloroethane, trichloroethene, and tetrachloroethene. Due to the high water solubility of these compounds, groundwater transport of chlorinated volatile organic compounds will be a principal environmental fate/transport mechanism at the OEC site. Volatilization will also be a major environmental fate/transport mechanism at the air-soil-water interface matrices for chlorinated compounds at the site. Photolysis, oxidation, hydrolysis, sorption, bioaccumulation, biodegradation/biotransformation, and persistence are not significant environmental fate processes.

E.1.b Non-chlorinated Compounds

The non-chlorinated indicator chemicals at the OEC site are acetone, toluene, ethylbenzene, and xylene. Water solubility and volatilization are the principal environmental fate/transport mechanisms at the OEC site. For non-ketone volatile organic compounds (i.e., toluene, ethylbenzene, and xylene), adsorption will be a principal fate/transport mechanism. But for ketone volatile compounds (i.e., acetone) adsorption will not be a principle fate/transport mechanism. Photolysis, oxidation, bioaccumulation, biodegradation/biotransformation, and persistence are not significant environmental fate processes.

E.2 Inorganics

The inorganic indicator chemicals at the OEC site are arsenic, cadmium, chromium, copper, lead, nickel, zinc, and cyanide. The principal environmental fate/transport mechanisms for these inorganic contaminants are sorption, complexation, and precipitation/coprecipitation.

Arsenic, cadmium, copper, lead, nickel, and zinc are all adsorbed by a variety of constituents present in the environment. These include hydrous iron, calcium oxides, metal oxides, aluminum, clays, and organic matter. Two elements which are not significantly affected by the sorption mechanisms are chromium and cyanide.

All the inorganic analytes of concern form organic and inorganic complexes in the environment. These complexes, along with sorption, can aid in the precipitation/coprecipitation of the contaminants and therefore contribute to the persistence of these inorganics. Arsenic is the only element of concern which is not significantly affected by the precipitation/coprecipitation mechanism.

Bioaccumulation is not significant for arsenic, chromium, lead, zinc, or cyanide. However, cadmium and copper are bioaccumulated to varying degrees in the environment. Volatilization and photolysis are also not important fate/transport mechanisms for the majority of the inorganic contaminants of concern at the OEC site. Cyanide, however, is a highly volatile element and could potentially enter the environment as vapor. Copper and lead have been shown to be susceptible to sunlight.

In summary all of the inorganic contaminants except cyanide are persistent in the environment. Cyanide is very mobile and easily biodegraded, therefore, it is not very persistent.

/I. Summary of Site Risks

The exposures and risks to nearby residents or workers, and to the environment were evaluated. This assessment is site specific and provides baseline evaluation of the site under the assumption of no remedial actions and that future development of the site could occur. The baseline risk assessment followed the guidance in the Superfund Public Health Evaluation Manual (1986). At this time, no final exposure levels have been calculated for the wetlands south of the OEC facility. However, a preliminary toxicity investigation in the wetlands was conducted by the USEPA to determine if the contaminated sediments from the wetlands are toxic to aquatic organisms. The results of all investigations relating to the wetlands are included in the Administrative Record file.

A. Human Health Risk

The public health evaluation for the OEC site was organized around several areas of the site which are sources of potential human exposure to contamination. See tables 6-1 and 6-2 for the media of concern and the chemicals of concern for the following areas:

1. Parking Lot Area - the unfenced northern corner of the site, plus the paved area and driveway on the eastern side of the site;

2. Decontamination Area - the fenced portion of the northern corner of the site;

3. Fill Area - the unfenced area southeast of the OEC facility;

4. Lowlands Area - the unfenced swampy area south of the fill area;

5. Lagoon Area - the fenced area surrounding the lagoons and wastewater treatment buildings, and adjacent to the western walls of the OEC facility; and

6. Lagoons - the area of the wastewater treatment lagoons themselves.

Nine possible human exposure scenarios associated with these sources of site contamination were identified and evaluated. The first five were evaluated for current use and the last four were evaluated for future use. These are:

1. Dermal contact, ingestion, and inhalation of soil by children playing in the ballpark/playground area southeast of the site.

TABLE 6-28 (Cont'd.)
TOXICITY PARAMETERS USED IN THE RISK ASSESSMENT

NOTE:

a. Chronic (AIC): Acceptable Chronic Intake

b.

RfD = Verified Agency-wide Value
HEA = Health Effects Assessment Document
IRIS = USEPA Integrated Risk Information System
CAG = USEPA Carcinogen Assessment Group

c. Alphanumerics represent EPA Weight of Evidence classifications, which are defined as follows:

Group A – Human Carcinogen. Sufficient evidence from epidemiologic studies to support a casual association between exposure and cancer.
Group B1 – Probably Human Carcinogen. Limited evidence of carcinogenicity in humans from epidemiologic studies.
Group B2 – Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals; inadequate evidence of carcinogenicity in humans.
Group C – Possible Human Carcinogen. Limited evidence of carcinogenicity in laboratory animals.

d. Converted from standard of 1.3 mg/l by assuming a 70kg adult drinking 2 liters/day of water.

** – For those compounds where inhalation criteria are not available, the oral criteria will be used as the cancer potency factor and/or AIC (RfD) in evaluating potential risks posed by these compounds.

ND: Not Determined
NA: Not Applicable or Not Available

TABLE 6-28
TOXICITY PARAMETERS USED IN THE RISK ASSESSMENT

Chemical	Acceptable Intake(a) (mg/kg/day) Oral	Inhalation	Source(b)	Cancer Potency Factor (mg/kg/day)(-1) Oral	Inhalation	Source	EPA Weight of Evidence(c)
Acetone	1.00E-01	ND	HEA	--	--	--	--
Ammonia	9.70E-01	0.36 mg/m3	RfD	NA	NA	--	--
Arsenic	1.0E-03	ND	--	1.8E+00	5.0E+01	HEA	A
Cadmium	1.03E-03 (food) 5.0E-04 (water)	ND	RfD	ND	6.1E+00	HEA	B1
Chromium							
Hexavalent (VI)	5.0E-3	ND	RfD	NA	4.1E+01	--	--
Trivalent (III)	1.0E+0	ND	RfD	NA	NA	--	--
Copper	3.7E-02(d)	ND	HEA	NA	NA	--	--
Cyanide	2.0E-02	ND	RfD	NA	NA	--	--
1,1-Dichloroethane	1.0E-01	1.0E-01	RfD	9.1E-02	ND	HEA	B2
1,1-Dichloroethene	9.0E-03	ND	RfD	6.0E-01	1.2E+00	HEA	C
1,2-Dichloroethane	NA	NA	--	9.1E-02	9.1E-02	HEA	B2
Ethylbenzene	1.0E-01	ND	RfD	NA	NA	--	--
Lead	1.4E-03	ND	MCL	ND	ND	--	--
Methylene Chloride	6.0E-02	NA	RfD	7.5E-03	1.4E-02	HEA	B2
Nickel	2.0E-02	ND	RfD	ND	8.4E-01	HEA	A
Toluene	3.0E-01	1.0E+00	RfD	NA	NA	--	--
1,1,1-Trichloroethane	9.0E-02	3.0E-01	RfD	NA	NA	--	--
Trichloroethene	NA	NA	--	1.1E-02	1.3E-02	HEA	B2
Total Xylenes	2.0E+00	4.0E-01	RfD	NA	NA	--	--
Zinc	2.0E-01	NA	RfD	NA	NA	--	--

2. Dermal contact, ingestion and inhalation of soil, and inhalation of volatiles emanating from soil, by children accessing the on-site fill and lowlands areas.

3. Inhalation of resuspended contaminated soil by workers and children accessing the parking lot area.

4. Inhalation of resuspended lagoon area soil by a worker who frequents the lagoon area (i.e., the wastewater treatment engineer).

5. Inhalation of resuspended lagoon sludge, and volatiles emanating from lagoon sludge during dry periods by the wastewater treatment engineer.

6. Inhalation of resuspended lagoon sludge during dry periods by residents adjacent to the site.

7. Ingestion of garden vegetables grown in windblown soil from the site.

8. Dermal contact, ingestion, and inhalation of on-site fill area soil by workers during future excavation/construction.

9. Future ingestion of shallow on-site groundwater migrating to residential wells in the Upper Dolomite aquifer.

Models and parameter assumptions were developed and used to calculate chronic daily intakes of indicator chemicals from the exposure pathways associated with these scenarios. Two exposure cases were evaluated for each pathway, one representing the best-estimate (geometric mean) of exposures to indicator chemicals, and one representing a set of conditions which would result in a reasonable maximum exposure level.

A.1 Toxicity Assessment Summary

Cancer potency factors (CPFs) have been developed by U.S. EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal

bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. See Table 6-28.

Reference doses (RfDs) have been developed by U.S. EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media(e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors assure that the RfDs will not underestimate the potential for adverse non carcinogenic effects to occur.

Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific conditions at a site.

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

Excess cancer risk estimates were calculated for exposures to carcinogenic indicator chemicals by summing the product of the chronic daily intakes (CDI) and cancer potency factor for all carcinogenic indicator chemicals and intake routes for a given human receptor. Hazard indices were calculated for exposures to non-carcinogenic indicator chemicals by summing the ratios of CDIs to acceptable daily intakes (reference doses) for all chemicals and intake routes for a given human receptor.

B. Risk Summary

The risk assessment results show that risk estimates for both carcinogens and non-carcinogens are within EPA's target risk ranges (10^{-4} to 10^{-6} excess cancer risk and hazard index <1.0) for all best-estimate exposure scenarios. With the exception of

1

TABLE 6–1
SUMMARY OF ORGANIC CONTAMINANTS SELECTED AS INDICATOR CHEMICALS BY MEDIUM

Contaminant	Soil	Lagoon Sludge	Groundwater	Lagoon Liquid
Acetone	O	X	O	X
Methylene Chloride	O	X	O	X
1,1–Dichloroethene	—	—	v	—
1,1–Dichloroethane	X	X	X	—
1,2–Dichloroethene (total)	O	—	O	—
1,2–Dichloroethane	—	—	X	—
1,1,1–Trichloroethane	X	X	X	—
Trichloroethene	X	X	X	—
Tetrachloroethene	O	X	—	—
Toluene	X	X	—	—
Ethylbenzene	—	X	—	—
Xylene	O	X	—	—
Vinyl Chloride	—	—	O	—

X Contaminant is selected as indicator chemical.
O Contaminant is present in the medium but not selected as indicator chemical.
— Contaminant is not present in the medium.

TABLE 6–2
SUMMARY OF INORGANIC CONTAMINANTS SELECTED AS INDICATOR CHEMICALS BY MEDIUM

Contaminant	Soil	Lagoon Sludge	Groundwater	Lagoon Liquid
Arsenic	X	X	—	—
Cadmium	X	X	X	—
Chromium	X	X	—	—
Copper	X	X	—	—
Lead	X	X	—	O
Nickel	X	X	X	—
Zinc	X	X	—	O
Cyanide	X	X	X	—

X Contaminant is selected as indicator chemical.
O Contaminant is present in the medium but not selected as indicator chemical.
— Contaminant is not present in the medium.

the future groundwater ingestion limiting case (contaminated groundwater migrating from the site to the residential wells), excess cancer risk estimates are within target risk ranges for all other reasonable maximum exposure scenarios. The results indicate an excess of target risk ranges for these potential exposure scenarios at the OEC site:

1. A non-carcinogen hazard index of 1.81 was calculated for the plausible maximum exposure to contaminated soil by a child continuously accessing the fill and lowlands areas on the southeast side of the site. Over 75 percent of this risk is attributable to exposures to lead and cadmium through direct contact and incidental ingestion pathways.

2. A non-carcinogen hazard index of 3.66 was calculated for the plausible maximum exposure to contaminated soil by a worker involved in possible future development of the fill area. Over 75 percent of this risk is attributable to exposures to lead and cadmium through incidental ingestion pathways.

3. An excess cancer risk of 3.53E-03 and a non-carcinogen hazard index of 3.2 were calculated for the possible future groundwater ingestion pathway. This exposure scenario was evaluated for a limiting case, where it was assumed that for 50 years an individual drinks 2 liters per day of groundwater having indicator chemical concentrations equal to the maximum concentrations detected in the shallow on-site monitoring wells.

One or more residential wells downgradient from OEC showed elevated levels of zinc, cadmium, lead and nickel. No federal MCLs were exceed in these analyses. The Wisconsin PAL for cadmium was exceeded at one well. The levels of risk estimated for the two fill/lowlands area exposure scenarios are a result of high lead and cadmium concentrations in fill and laboratory area soil. The exposure pathways of concern are dermal contact and incidental ingestion. Volatile organic contaminants in the soil are not a risk to human health.

C. Ecological Risk Assessment

The major areas of environmental concern associated with the OEC site are Davy Creek and the adjacent wetlands ares. Several studies conducted over the years by WDNR and EPA have demonstrated that the Davy Creek area and wetlands have been impacted by the electroplating wastes from the OEC site. In particular, the investigations have shown that the wetlands are contaminated with elevated levels of cadmium, chromium, nickel, copper, lead nickel, tin, zinc, and cyanide. The contamination of these environmentally-sensitive areas is largely a result of

the direct channelling of highly contaminated, untreated wastewater in the wetlands area by the OEC facility. There is also evidence that surface run-off from the site during heavy precipitation events or snow melts may have led to contamination being transported to these areas.

During the Remedial Investigation, a number of samples were taken from the wetlands and Davy Creek area. Sediment and surface water samples were taken in areas upstream, down-stream and adjacent to the treatment plant's discharge area. The results of that sampling are presented Table 0-1 through 1-5. It should be noted however, that final exposure levels have not been calculated for these areas at this time. During remedial design and action phases, additional environmental studies will be conducted to further define the extent of contamination in Davy Creek and the wetlands and the extent of a toxicity due to the contamination. A product of those studies will be the development of final exposure levels for the contaminated sediment in the wetlands and Davy Creek. The EPA and WDNR believe that the RI information presented is sufficient to support the EPA's and WDNR's decisions to take the interim action of removing the more highly contaminated sediments in order to prevent further degradation of the wetland and to achieve significant risk reduction. It is unknown in the wetland area whether endangered species inhabit the contaminated area.

C.1 Environmental Risks

The contamination of the wetlands to the south of the OEC Facility has been proven to be a significant hazard to the environment. The sediments from several points exceed what is accepted as highly toxic.

Wetland sediments have a large capacity for binding heavy metals and not allowing these metals to become available to the environment and its biota. In the present case, the high levels of metal contamination have been partially bound to the sediments but the high levels of contamination have overwhelmed the capacity of the wetlands and toxic metals are available.

The toxicity tests revealed a few samples to be acutely toxic to fathead minnows. In addition, one sample was chronically toxic to the algae. The chemical or precise combination of chemicals which are causing the toxicity are unknown. Each chemical or metal in our analysis can be toxic when presented in appropriate concentrations. They can also act as synergists or antagonists when presented with other metals. In this case the levels or combination of chemicals and metals has exceeded the minimum which is toxic to the two species tested.

The toxicity data collected on fathead minnows and algae showed conclusively that the contamination in the wetland is toxic. The

use of two species one fish and one plant has demonstrated that the contamination of chemicals and metals on site is toxic to both species.

C. Assessment of Human Health and Environmental Risks Presented by the Site

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

VII. Description of Alternatives

The goals of the OEC remedial actions are: to protect human health from any current and future risk; control the sources of groundwater contamination to protect human health; and to protect the environment by removing contamination currently causing environmental harm. The following is the list of alternatives by operable units followed by a detailed description of the alternatives.

A. No Action

B. Minimal Action

C. Operable Unit 1: Lagoons/Final Action

L1 - Contaminated Water - Pumping/Ion Exchange/Carbon Adsorption Sludges/Excavation/Off-Site Treatment and Disposal

D. Operable Unit 2: Contaminated Soil/Final Action

S1 - Excavation/Off-Site Treatment and Disposal

S2 - Capping(RCRA)

E. Operable Unit 3: Groundwater/Final Action

GW1 - Subsurface Drains/Ion Exchange/Air Stripping/Carbon Adsorption/Chemical Oxidation (If Necessary)

GW2 - Groundwater Pumping/Ion Exchange/Air Stripping/Carbon Adsorption/Chemical Oxidation (If Necessary)

F. Operable Unit 4: Davy Creek and Wetlands/Interim Action

DW1 - Excavation/Off-site Treatment and Disposal

DW2 - Excavation/On-site Stabilization/Off-site Disposal

G. Manufacturing Building and Subsurface Soils

Data is insufficient at this time to recommend alternatives for the building and subsurface soils. Additional investigations will be conducted in this area.

A. No Action Alternative

CERCLA requires that the "no action" alternative be considered at every site. Under this alternative, EPA would take no further action to remedy the contamination. However, long-term monitoring of the site of all four operable units would be necessary to monitor contaminant migration. A ground water monitoring program would be performed for the first three operable units to observe possible changes in contaminant levels. The wetlands would also be monitored.

Because this alternative would result in contaminants remaining on-site above risk based levels, CERCLA requires that the site be reviewed every five years. If justified by the review, remedial actions would be implemented at the time to remove or treat the wastes.

The present worth cost of this alternative is $322,992.

B. Minimal Action

The Minimal Action alternative would also be used for all four operable units and would include fencing and sign posting in addition to long-term monitoring of the groundwater, surface water and sediments.

A chain link security fence would be installed around the perimeter of the site to prevent access. Presently, a fence exists around the lagoons and wastewater treatment facility. However, additional fencing is required around the remainder of the site. The length of proposed fencing is approximately 1200 linear feet including two 20 foot wide double swinging gates to provide access to the OEC facility. In addition to the security fence, warning signs would be posted along the fence and at the entrance gates. Long-term monitoring of the site would consist of checking the condition of the fence; and sampling and analysis of surface water, groundwater and sediment in order to monitor contaminant migration. The monitoring program would be the same as the one proposed in the No Action alternative. This alternative would only be chosen in the event that the active

remedial alternatives were found to be impracticable by the agencies.

The present worth cost for this alternative is $348,192.

C. Alternative L1 - RCRA-regulated Lagoons

The RCRA lagoons contain approximately 72,000 gallons of organic contaminated water. Under this remedial alternative, the water would be pumped from the two lagoons to an equalization tank. From this tank the surface water would be transferred to the groundwater treatment system. This treatment system will include an ion exchange unit or metal precipitation unit for metal removal; and an air stripper, vapor phase carbon adsorption unit or a liquid phase carbon adsorption unit for organic contaminant removal. The treated water would then be discharged directly to the Davy Creek/Wetlands area, in compliance with the WPDES discharge requirements.

After removing the contaminated lagoon water, the metal hydroxide sludge (which contains F006 hazardous waste) at the bottom of the lagoons (~400 yd^3) would be removed using a backhoe.

The contaminated soil surrounding the lagoons (~250 yd^3) would also be excavated with the backhoe. The soil, which contains F006 waste, would be excavated to background levels in compliance with the WDNR clean closure requirements. Both the sludge and soil would then be loaded into trucks and transported off-site to a RCRA permitted treatment and disposal facility, where they will be stabilized in accordance with RCRA LDR requirements. All excavated areas will be backfilled using clean fill material and the area would be graded and revegetated.

The total present worth cost for this alternative is $490,302.

C. Operable Unit 2 - Contaminated Soil

C.1 Alternative S1

Contaminated soils not associated with the wastewater treatment lagoons (~1,000 yd^3), also considered to be a hazardous waste containing a F006 waste, would be excavated to established cleanup levels (based on results of the risk assessment, See Table 2-1), loaded onto trucks and transported to a RCRA permitted treatment and disposal (TSD) facility . At the TSD facility the wastes will be stabilized in accordance with RCRA LDR requirements prior to land disposal. All excavations would be backfilled with clean fill material, graded, and vegetated. See Figure 4-1.

The present worth cost for this alternative is $258,667.

TABLE 2-1

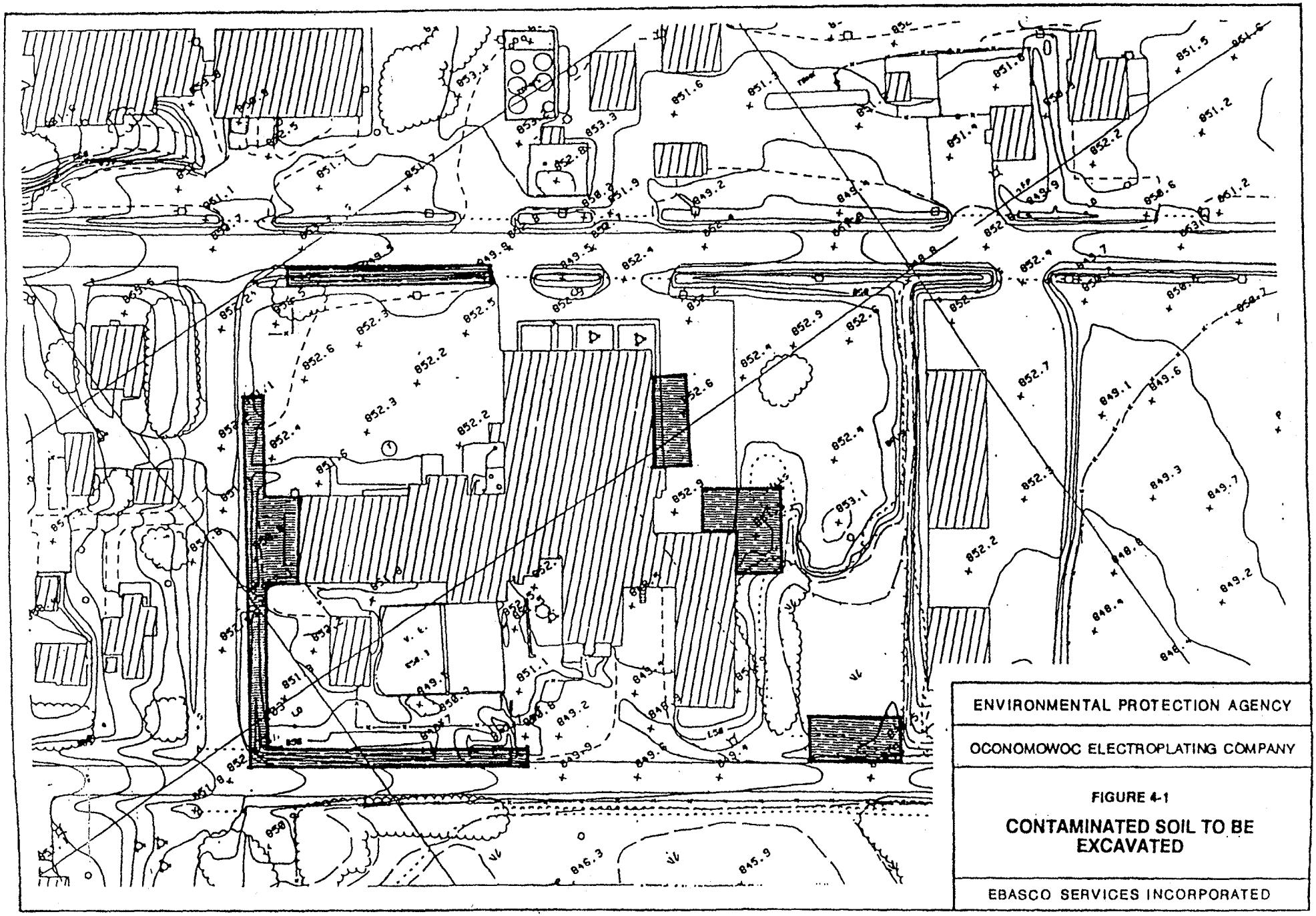
SOIL CLEANUP LEVELS FOR THE
OCONOMOWOC ELECTROPLATING SITE

CARCINOGENS:

CARCINOGENIC PARAMETER	FILL SOIL C (MAX) MG/KG
ARSENIC	47.0
1,1-DICHLOROETHANE	0.070
TRICHLOROETHENE	0.800

NONCARCINOGENS:

NONCARCINOGENIC PARAMETER	FILL SOIL C (MAX) MG/KG
ARSENIC	47.0
LEAD	300.0
CADMIUM	500.0
NICKEL	2500.0
COPPER	1500.0
CHROMIUM	1200.0
ZINC	4500.0
CYANIDE	90.0
1,1-DICHLOROETHANE	0.070
TOLUENE	0.075
1,1,1-TRICHLOROETHANE	0.210



ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-1

CONTAMINATED SOIL TO BE EXCAVATED

EBASCO SERVICES INCORPORATED

D.2 S2 - Capping (RCRA)

This remedial alternative would consist of capping the contaminated areas. A multi-layered cap which complies with RCRA closure requirements would be placed over the site. See Figure 4-2 and 4-3. The area to be capped would include the fill/lowlands and those areas determined to be contaminated east of the facility. This area would be approximately 1.5 acres and would be constructed as follows (from bottom to top):

- o 2-foot clay layer (permeability, 10^{-7} cm/sec)
- o 40 mil synthetic membrane (High Density Polyethylene)
- o 1-foot sand layer -- act as drainage layer
- o Geotextile -- polypropylene cloth to allow filtration of leachate into sand layer
- o 2-foot soil layer -- for vegetation
- o Vegetation -- to prevent erosion

Post-closure use of the property would also be restricted, as necessary, to prevent damage of the cap. Post-closure care and ground water monitoring, in accordance with RCRA and WDNR hazardous waste regulations, would also be implemented.

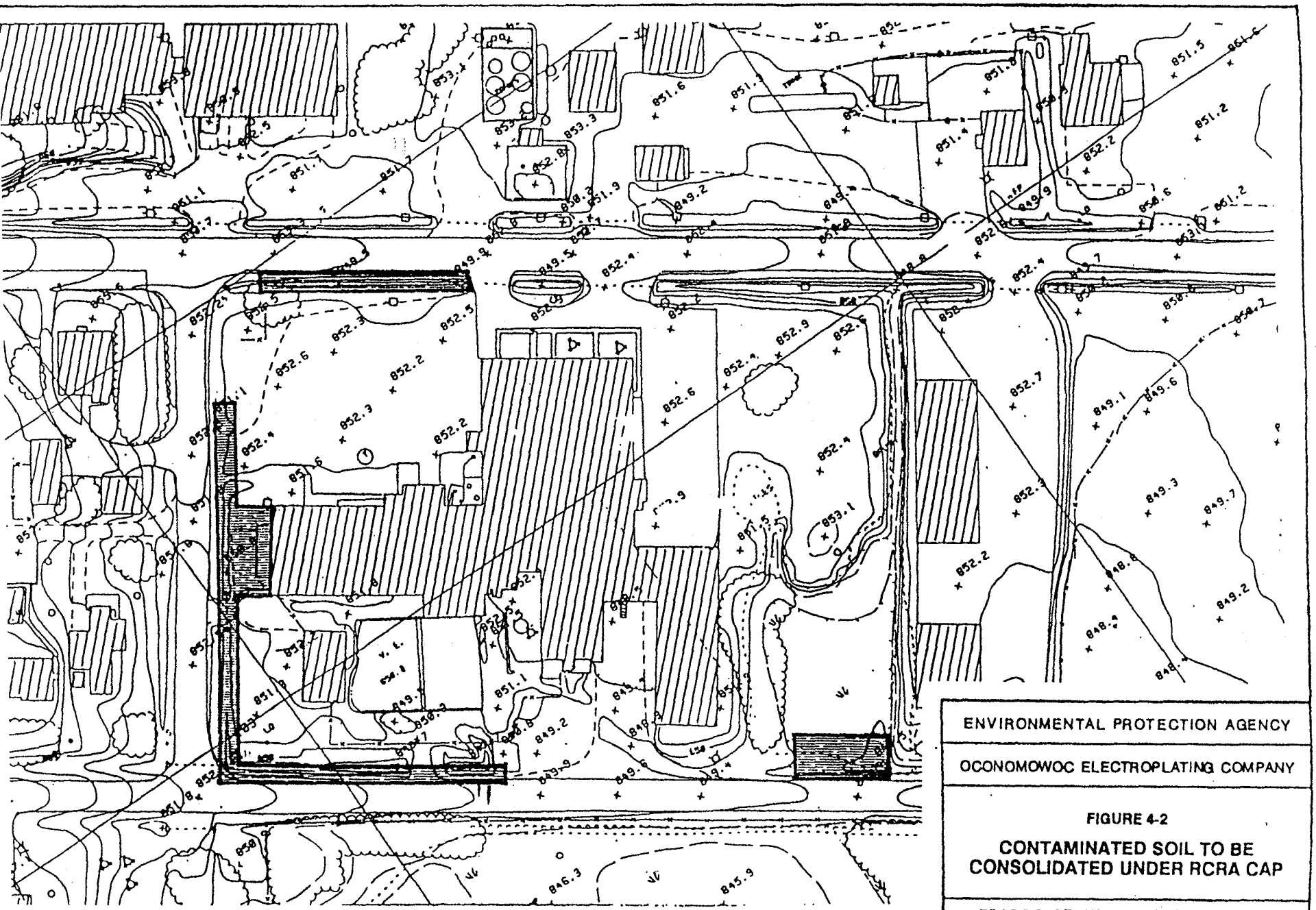
The present worth cost for this alternative is $1,108,793

E. Operable Unit 3 - Groundwater

E.1 Alternative GW-1

This remedial alternative involves intercepting the contaminated groundwater in a subsurface drainage system and treating it on-site to reduce the contaminant levels. See Figure 4-4.

An approximately 500 foot long subsurface drainage system would be installed south of the waste treatment lagoons and the lowlands area. The trench would be approximately 15 feet deep and approximately 4 feet wide. The captured groundwater would be pumped to an on-site treatment system which would include ion exchange for metal and possible cyanide removal; and air stripping and carbon adsorption for organic contaminant removal. A alkaline chlorination (chemical oxidation) system will be utilized for the treatment of cyanide if a treatability study indicates that ion exchange is ineffective in removing the contaminant from the groundwater. The groundwater would be treated to meet the WPDES discharge standards and then discharged



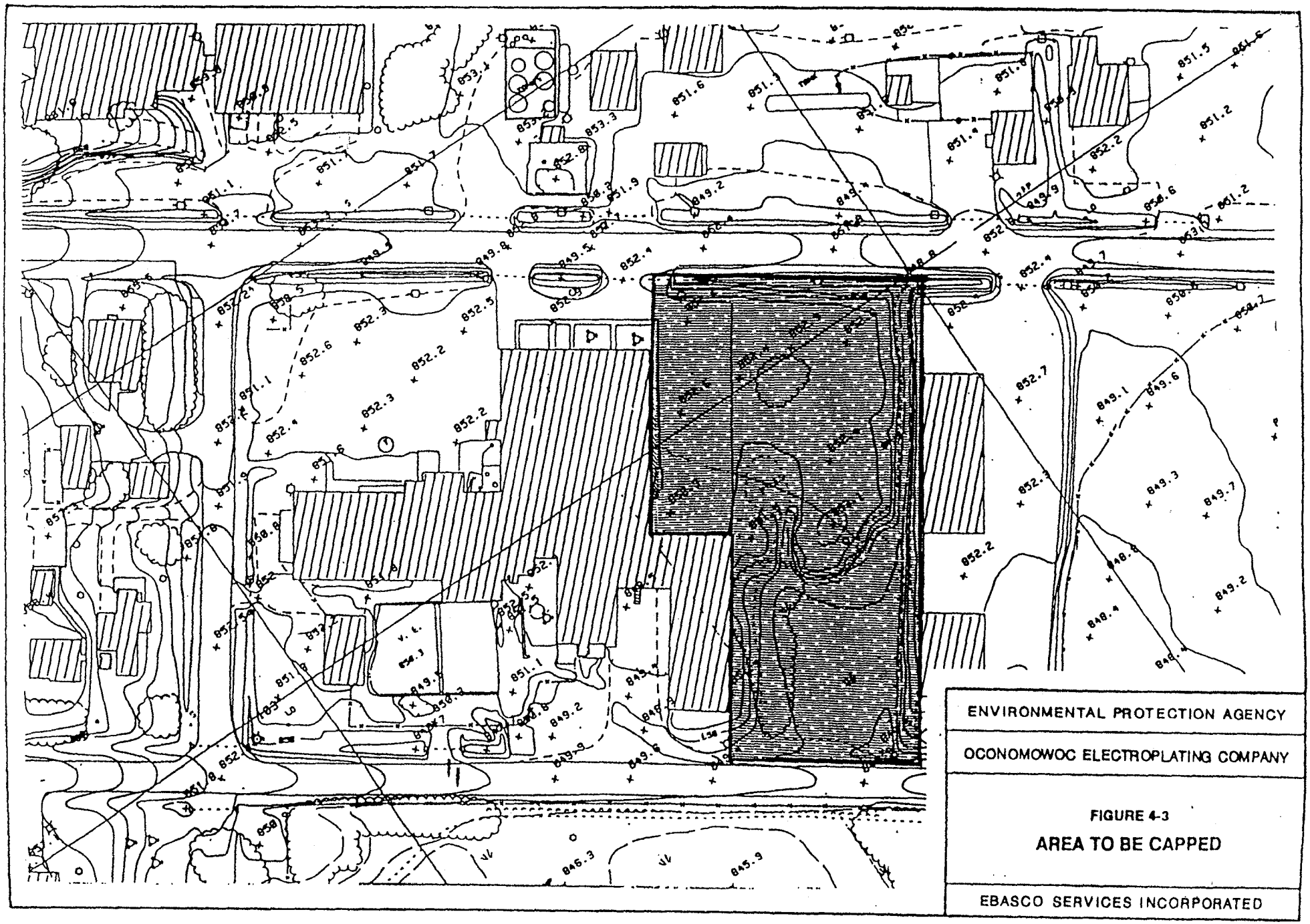
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-2

CONTAMINATED SOIL TO BE CONSOLIDATED UNDER RCRA CAP

EBASCO SERVICES INCORPORATED



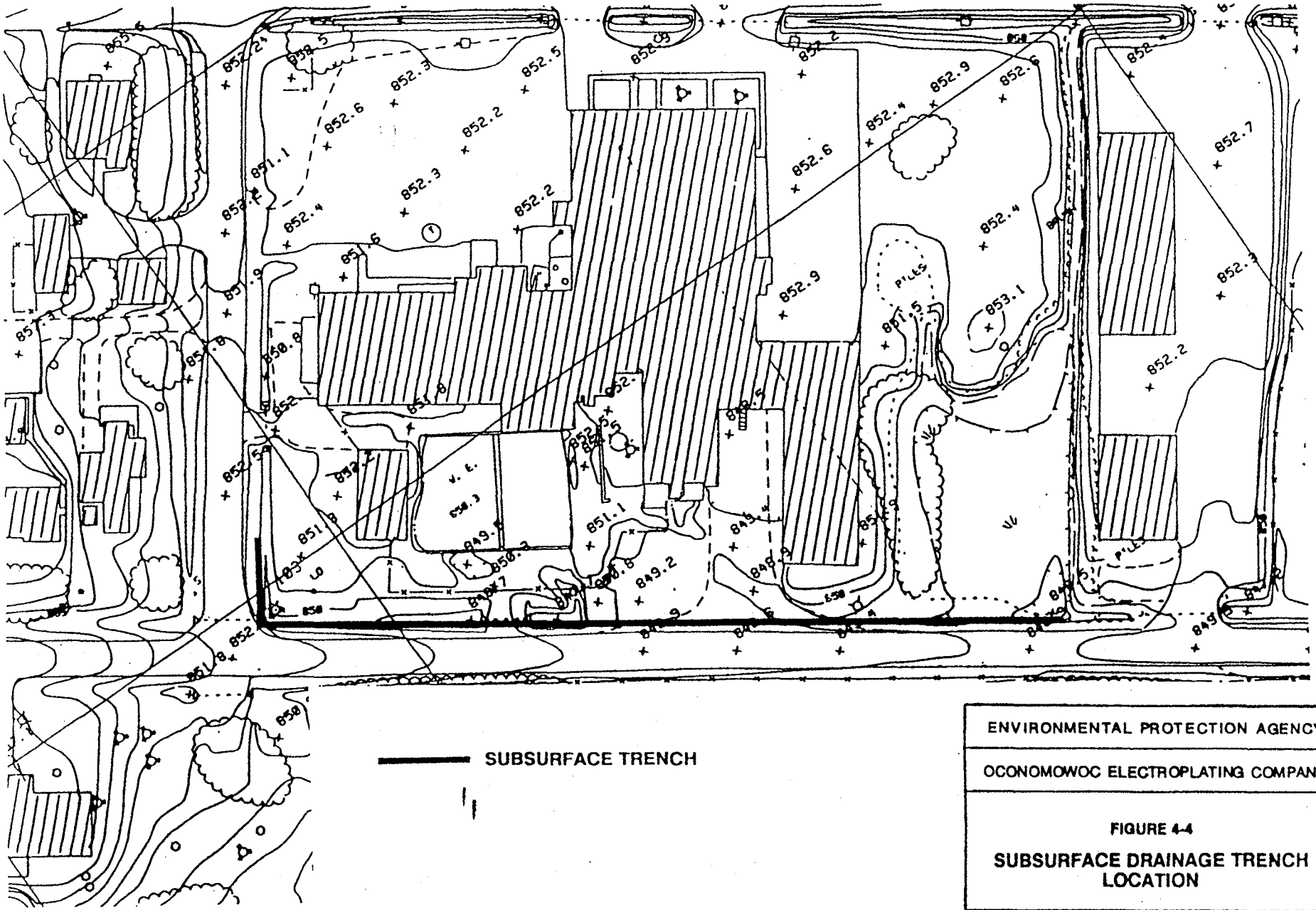
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-3

AREA TO BE CAPPED

EBASCO SERVICES INCORPORATED



ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-4

SUBSURFACE DRAINAGE TRENCH LOCATION

EBASCO SERVICES INCORPORATED

to the Davy Creek/Wetlands area. Air emissions from the air stripping tower would meet all WDNR requirements in NR 400 - 499, Wisconsin Administrative Code. The resultant ion exchange resin from this treatment process would be properly disposed off-site at a RCRA permitted landfill because it will contain an F006 waste. It will be determined whether or not the spent carbon requires disposal in a RCRA permitted landfill.

Figures 4-5 and 4-6 show block diagrams of the proposed treatment process utilizing ion exchange and chemical oxidation, respectively.

Action-specific ARARs which are applicable for the site pertain to the construction of the subsurface drainage system and treatment process, the treatment and subsequent disposal of the treated groundwater, and the management of treatment residuals. The groundwater would be treated to surface water quality standards for organic and inorganic contaminants before being discharged to the Davy Creek/wetlands area. The discharges from the air stripper will meet the requirements of state code NR 400-499.

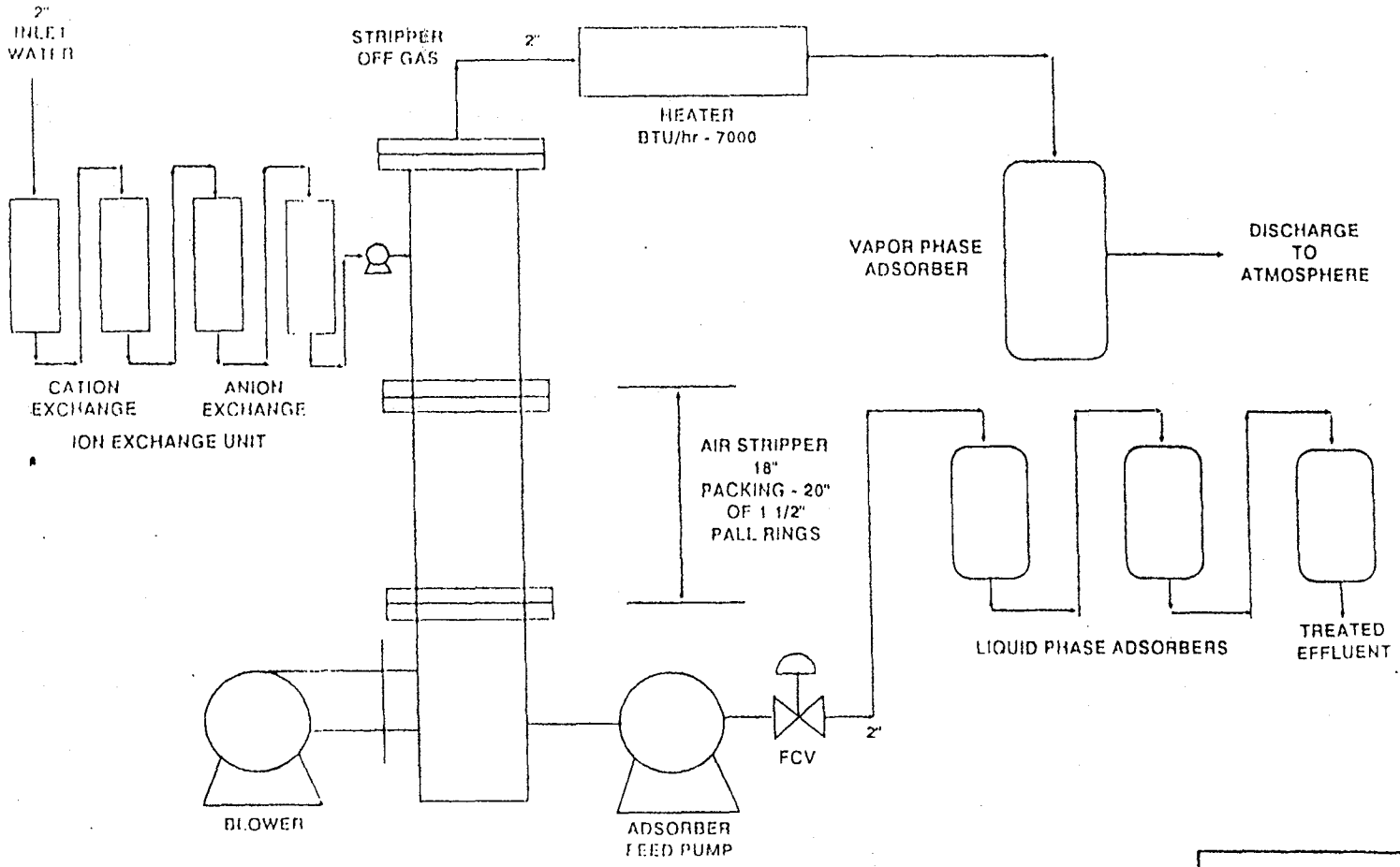
Alternative GW1 would consist of developing a groundwater extraction system, analysis, design and implementation of an air stripping, carbon adsorption and ion exchange. For costing purposes the required time for complete remediation of the unconsolidated unit aquifer is estimated to be 30 years. However, the actual remediation time will likely be less than 30 years and groundwater monitoring will be performed for the duration of the treatment process to determine the effectiveness of the system. This remedial alternative would also include semi-monthly sampling of influent and effluent to confirm the effectiveness of the treatment process. Process parameters are monitored as required using instrumentation installed in the system.

The capital costs and O&M costs for this alternative with and without chemical oxidation are $1,048,220, $1,223,660 and $131,158, $143,765 respectively. The present worth cost for this alternative with and without chemical oxidation is $3,081,130 and $3,450,370 respectively.

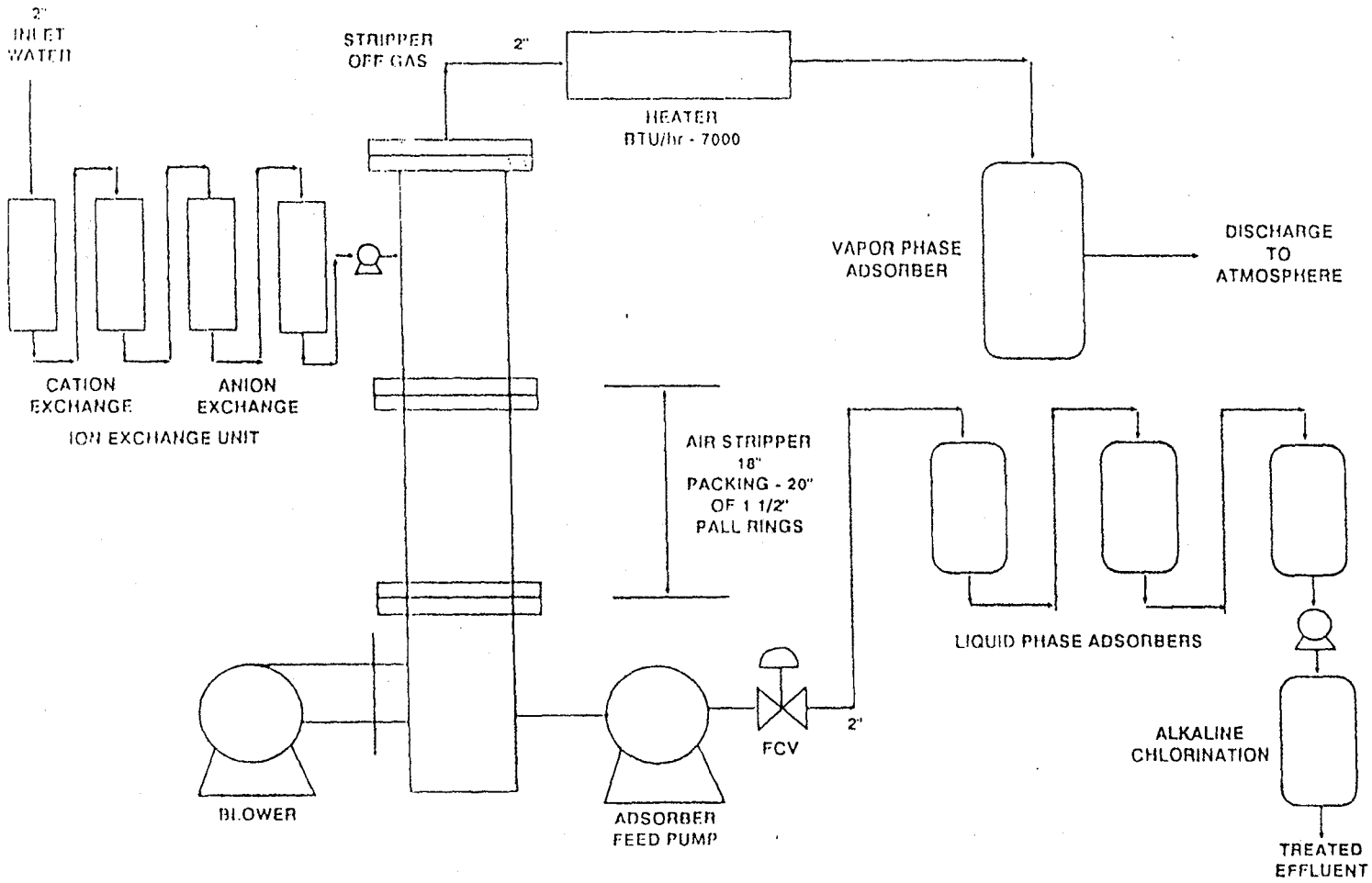
E.2 Alternative GW2

This remedial alternative includes using extraction wells to remove contaminated groundwater and treating it to reduce the contaminant levels. See Figure 4-7.

Five groundwater recovery wells would be installed and equipped with pumps south of the lagoons and fill/lowlands area. Recovered groundwater would be pumped to an on-site treatment plant through a header pipe system. Treatment would include filtration, ion exchange, air stripping and carbon absorption. An



ENVIRONMENTAL PROTECTION AGENCY
OCONOMOWOC ELECTROPLATING COMPANY
FIGURE 4-5 **SCHEMATIC OF TREATMENT SYSTEM FOR ALTERNATIVE GW1 AND GW2 USING ION EXCHANGE**
EBASCO SERVICES INCORPORATED



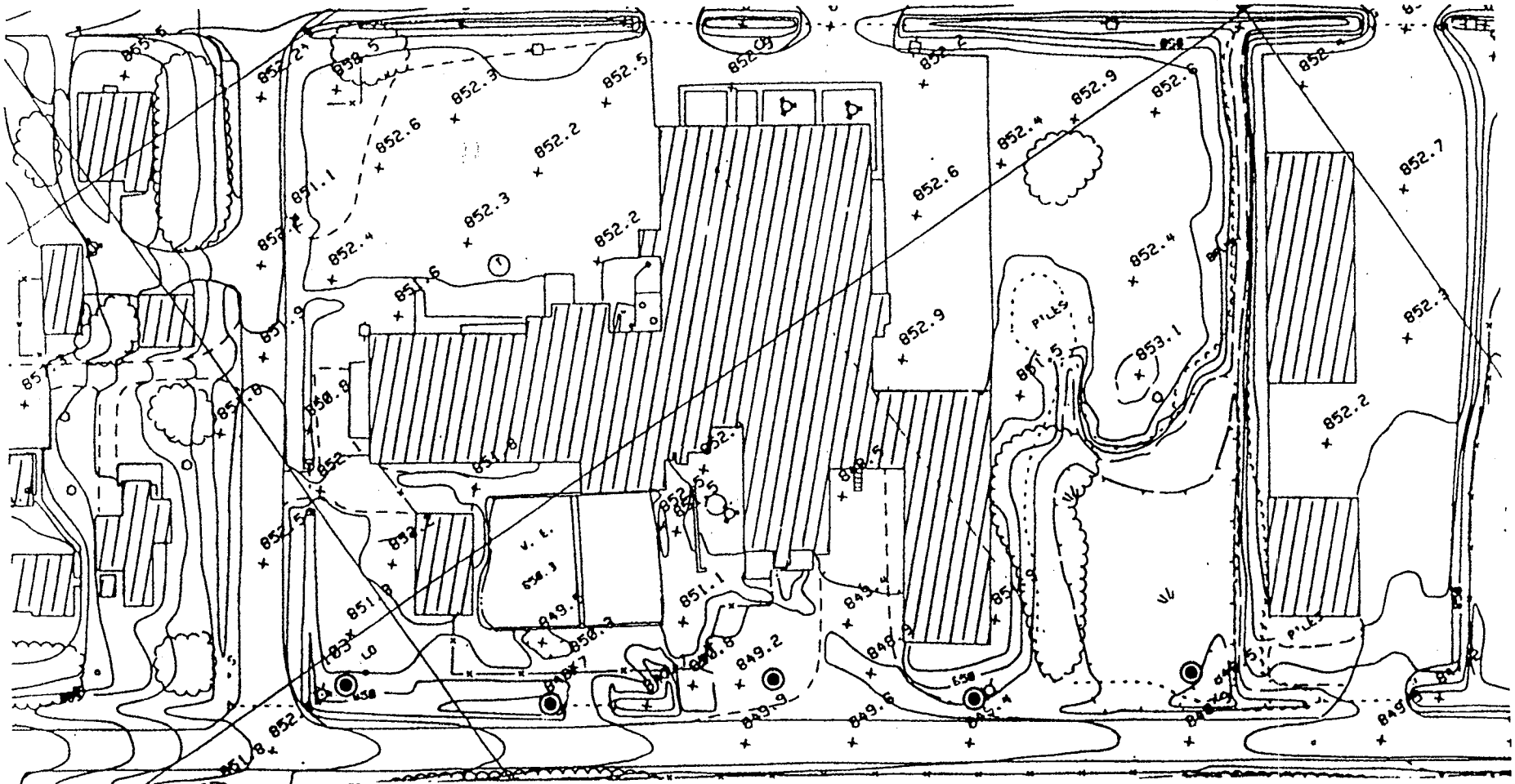
ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-6

SCHEMATIC OF TREATMENT SYSTEM FOR ALTERNATIVES GW1 AND GW2 USING CHEMICAL OXIDATION

EBASCO SERVICES INCORPORATED



PUMPING WELL

ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-7

PUMPING WELL LOCATIONS

EBASCO SERVICES INCORPORATED

alkaline chlorination (chemical oxidation) system will be utilized for treatment of cyanide if a treatability study determines that ion exchange will be ineffective in removing cyanide from the groundwater. This treatment train is explained in detail in Alternative GW1. Treated groundwater would be discharged to the wetlands. Actual discharge limits will be determined by WPDES requirements and considerations. The resultant ion exchange resin from this treatment process would be properly disposed off-site at a RCRA permitted landfill because it will contain an F006 waste. It will be determined whether or not the spent carbon requires disposal in a RCRA permitted landfill. All air emissions will comply with WDNR requirements in NR400 - 499, WAC.

Figures 4-5 and 4-6 show block diagrams of the proposed treatment processes utilizing ion exchange and chemical oxidation, respectively.

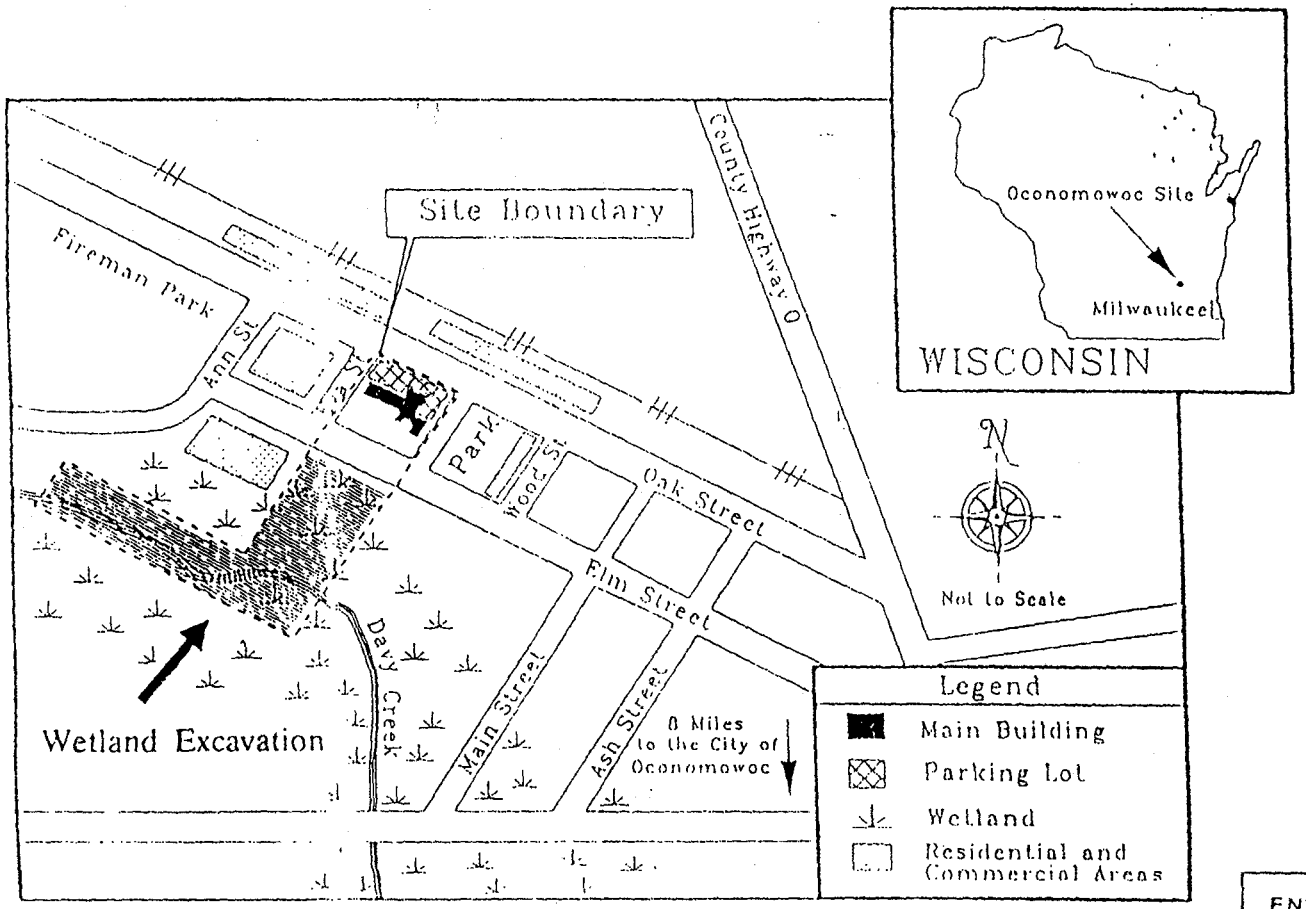
The capital and O&M costs with and without chemical oxidation are $402,310, $432,908 and $91,905, $90,569 respectively. The total present worth for this alternative with and without chemical oxidation is $1,831,805 and $1,841,865 respectively.

F. Operable Unit 4 - Davy Creek and the Wetlands

F.1 Alternative DW1

The objective of this alternative is to minimize potential risks to public health and the environment associated with the contaminated sediments by removing the contaminated sediments from the wetlands area and portions of Davy Creek. This interim action will be followed by a final action once the planned sediment study is completed.

A berm would be constructed around the contaminated wetlands area to prevent surface water infiltration. The area would then be dewatered with pumps and the sediment (~ 5,200 yd^3) excavated to a depth of 2 feet. Sediment from Davy Creek (750 yd^3) would also be excavated to a depth of 2 feet. See Figure 4-8. The length of creek to be remediated extends from the OEC discharge point south to slightly past the discharge point of the municipal water treatment plant. The sediment would be dewatered in a sedimentation basin/lagoon, loaded on to trucks and transported to a RCRA subtitle C permitted treatment and disposal facility. The treatment of these wastes would be in accordance with the RCRA LDR requirements. Water decanted from the sedimentation basin/lagoon would be filtered and discharged directly to Davy Creek according to WPDES discharge standards. The filter technology to be utilized will be determined during the remedial design based on the discharge limits provided by the State. The excavated area would not be backfilled in order to prevent the potential for additional wetlands disturbance and/or destruction



ENVIRONMENTAL PROTECTION AGENCY

OCONOMOWOC ELECTROPLATING COMPANY

FIGURE 4-8

AREA OF PROPOSE WETLAND EXCAVATION

EBASCO SERVICES INCORPORATED

or introducing nonnative vegetation. Once the sediments have been excavated and disposed off-site the berm structure would be removed. If the berm material is not contaminated it would be used as fill material for the closure of the sedimentation basin. Clean fill and top soil would also be used to fill the sedimentation basin. After filling the basin it would be revegetated. This interim action will remove most of the highly contaminated sediments, but is not anticipated to be the final action for this media.

With regard to location-specific ARARs, Federal and state regulatory programs which are applicable to this remedial alternative include those pertaining to the protection and management of wetlands and floodplains. This interim action is in compliance with these ARARS to the extent practicable. Destruction or disturbance of portions of the wetlands is unavoidable if the contaminated sediments are removed. WDNR and the U.S Fish and Wildlife recognize that this destruction or disturbance will occur. The action is necessary to remove the significant contamination from the site. Remedial actions would have to be continually monitored to minimize and assess damage to the wetlands area.

Chemical-specific ARARs which are applicable to the site include Wisconsin's ambient water quality criteria and effluent limitations derived from NR 105 and NR 106 to protect the present and prospective use classification of Davy Creek and the wetlands. These water quality standards are legally applicable or relevant and appropriate to the site. Any discharges or release of contaminants to the wetlands area must meet the established effluent limitations/water quality criteria to protect and maintain the Full Fish and Aquatic Life classification of the water body.

The present worth cost for this alternative is $4,995,422.

F.2 Alternative DW2

This alternative is identical to Alternative DW1 with the exception that the sediments will be stabilized on-site. ARAR compliance for this alternative is the same as the previous alternative. See Figure 4-8.

The present worth cost for this Alternative is 5,000,584.

VIII. Comparative Analysis of Alternatives

A detailed analysis was performed on all alternatives for the four operable units using the nine evaluation criteria in order to select a site remedy. The following is a summary of the comparison of each alternative's strength and weakness with

respect to the nine evaluation criteria. The nine criteria are: 1) overall protection of human health and the environment, 2) compliance with applicable or relevant and appropriate requirements, 3) long-term effectiveness and permanence, 4) reduction of toxicity, mobility, and volume, 5)short-term effectiveness, 6) implementability, 7) cost, 8) state acceptance, and 9) community acceptance.

A. Overall Protection of Human Health and the Environment

All of the remedial alternatives considered for the OEC site are protective of human health and the environment by eliminating, reducing, or controlling risks at the OEC site with the exception of the no action, and minimal action alternative. As the no action and the minimal action alternatives do not provide protection of human health and the environment, they are not eligible for selection and shall not be discussed further in this document.

The lagoon alternative (L1) and soil alternative (S1) will remove all contaminated materials from the site. This will eliminate any unacceptable risks associated with these areas.

Soil alternative S2 will keep contaminated materials beneath a low permeability cap. This would remove risks posed by dermal contact, ingestion, and inhalation associated with the contaminated soil. Capping would also reduce infiltration through the contaminated material and therefore reduce contaminant leaching to groundwater.

Both groundwater alternatives GW1 and GW2 will gradually remove contaminants thereby reducing the risks from ingestion and off-site migration.

Both alternatives for Davy Creek and the wetlands will remove the more highly contaminated sediment from the site which will result in significant risk reduction quickly

B. ARARS Compliance

Each alternative is evaluated for compliance with ARARS, including chemical specific, action specific, and location specific ARARS. All of the alternatives for the first three operable units meet their respective ARARS. The alternatives for the interim action will comply with those standards that are applicable within the limited scope of this action.

With regard to location-specific ARARs, Federal and state regulatory programs which are applicable to this remedial alternative include those pertaining to the protection and management of wetlands and floodplains. This interim action is in compliance with these ARARS to the extent practicable.

Destruction or disturbance of portions of the wetlands is unavoidable if the contaminated sediments are removed. WDNR and the U.S Fish and Wildlife recognize that this destruction or disturbance will occur. The action is necessary to remove the significant contamination from the site. Remedial actions would have to be continually monitored to minimize and assess damage to the wetlands area.

The sediment of the wetlands area were contaminated as a result of improper discharges of F006 wastes from the OEC facility. Therefore, the contaminated sediments must be managed as a hazardous waste if picked up, according to RCRA's "contained-in" interpretation.

C. Long- Term Effectiveness and Permanence

This evaluation focuses on the results of a remedial action in terms of the risks remaining at the site after response objectives have been met. The following factors are addressed for each alternative: magnitude of remaining risk, adequacy and reliability of controls.

Alternatives L1 and S1 comply with this criteria by removal of the contaminated material associated with the respective operable units and would reduce the contaminants on-site permanently. Treatment and Off-site disposal in a RCRA landfill would further control the contaminated materials. All risks associated with the lagoons and soil would be reduced to protective levels.

Alternative S2 would contain the contaminated soil, thus preventing direct contact and ground water migration risks posed by the contamination remaining on-site. Periodic maintenance of the cap would be required to insure that it maintains its low permeability. Groundwater monitoring would also be required to determine whether contaminant leaching and migration is adversely affecting groundwater quality.

Both groundwater alternatives would slowly remove the contaminated groundwater onsite. Removing a bulk of the contamination will prevent migration towards the residential wells. It is projected that the ground-water extraction and treatment systems (Alternatives GW1 and GW2) may attain the Ground-Water Cleanup Standards within 30 years or less. However, ground-water quality will be evaluated to determine if the remedial action objectives have been met. If, after the ground-water operable unit has been operating, it becomes apparent that it is not technically or economically feasible to achieve a preventive action limit (PAL), then an alternate concentration limit (ACL) may be established, not to exceed the Enforcement Standards (ES).

If, during the implementation of the remedy, it becomes apparent that it is technically impracticable to achieve federal and State Ground-Water Cleanup Standards, including any NR 140 ACL established as discussed above, then the U.S. EPA in consultation with the WDNR, may then consider the use of alternative methods of controlling the ground-water contaminant plume or source to achieve the standards. If those alternate methods are found not to attain Ground-Water Cleanup Standards (including any ACL established), then a CERCLA waiver may be considered. Measures will be taken to ensure that this exposure pathway remains protective over a period of time.

Both alternatives for Davy Creek and the wetlands will remove the most highly contaminated sediments from the site. Off-site treatment and disposal in a RCRA permitted landfill will further control the contaminated materials.

D. Reduction of Toxicity, Mobility, or Volume Through Treatment

This alternative addresses the statutory preference for selecting remedial actions that employ treatment technologies which permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, irreversible reduction of contaminant mobility, or reduction of total volume of contaminated media.

For alternatives L1, S1, D1, and D2 removal and stabilization of the contaminated material at the source area assures the reduction of mobility of contaminants at the site through treatment (stabilization is considered treatment for F006 waste). For alternatives D1 and D2 some contamination will remain although its mobility will be monitored. Alternatives GW1 and GW2 by removing and treating the groundwater will reduce the toxicity and the mobility of the groundwater plume as well as the volume of the plume.

The toxicity and volume of the contaminated material will not be reduced for these alternatives but is considered.

E. Short-Term Effectiveness

This evaluation focuses on the effects to human health and the environment which may occur while the alternative is being implemented and until the remedial objectives are met. The following factors were used to evaluate the short term effectiveness of each alternative: protection of the community during remedial actions, protection of workers during remedial actions, environmental impacts from implementation of alternatives, and time until remedial objectives are met.

With regard to the community and onsite workers, all alternatives will pose potential risks from dust and air emissions generated during excavation activities because all alternatives require some excavation. Perimeter air monitoring would be needed during remedial activities to determine if steps are needed to protect the community from adverse air emissions. Workers will be required to wear the proper protective health and safety equipment to protect their safety.

With regard to the time until remedial objectives are met, all alternatives with the exception of GW1 and GW2 should take a few weeks to a few months to implement. Alternatives GW1 and GW2 could take up to 30 years to achieve the cleanup goals.

With regard to environmental impacts, alternatives GW1 and GW2 may result in a change in groundwater flow and will have to be monitored so that no adverse impacts result to the wetlands. Alternatives DW1 and DW2 will have environmental impacts to the wetlands and Davy Creek and a plan to mitigate these impacts (e.g. restricting vehicle traffic in the wetland) will be developed.

None of these alternatives will result in unacceptable short-term risks to worker, residents, or the environment.

F. Implementablity

This evaluation addresses the technical and administrative feasibility of implementing the alternatives and the availability of the various services and materials required during its implementation.

The alternatives L1, S1, D1 and D2, include excavation, stabilization and off-site disposal which are all demonstrated and commercially available. Conditions external to the site, such as equipment availability, materials and services present no problem at this time. The contaminated solids would be treated and disposed of in an off-site landfill. Stabilization has been determined to be the Best Developed Available Technology (BDAT) for wastes contaminated with F006 wastes. At this time, the specific location and capacity of the off-site landfill have not yet been determined but should not pose a problem. Alternative S2, capping, is well demonstrated and commercially available. Alternatives GW1 and GW2 are proven technologies and commercially available. A treatability study will be necessary to determine if ion exchange or chemical oxidation will be more practical in removing cyanide from the groundwater.

Administratively, none of the alternatives should have any problem with regard to implementation, although coordination at both the State and local level will be necessary for implementation.

G. Cost

This evaluation examines the estimated costs for implementing the remedial alternatives. Capital and O&M cost are used to calculate estimated present worth costs for each alternative. For the lagoons only one alternative was considered. Its capital cost is $485,601 with no O&M costs. Alternative S1 has a capital cost of $253,966 and no O&M costs. Alternative S2 has a capital cost of $887,035 and an O&M cost of $13,340. The cost for S2 is higher than S1, and S2 allows for contamination to remain onsite. Alternatives GW1 and GW2 (with ion exchange) are very similar with regard to meeting the remedial objectives, GW2 has a less costly present worth cost of $1,831,805 while GW1 has a present worth cost of $3,081,130. The capital and O&M costs for GW1 were $1,048,220 and $131,158 respectively. The capital and O&M costs for GW2 were $402,310 and $91,905 respectively. Alternatives DW1 and DW2 are also very similar in meeting the cleanup objectives with DW1 present worth cost at $4,995,422 and DW2 present worth cost at $5,000,584. Neither alternative has any O&M costs.

H. State Acceptance

The State of Wisconsin concurs with EPA's selection of alternatives for the four operable units at the OEC site. The State of Wisconsin predicates their concurrence on the interim nature of the response action planned in this ROD for Davy Creek and the wetlands areas. The State would not concur with this ROD if this was the final action for the wetlands and Davy Creek areas.

I. Community Acceptance

Community response to the alternatives is presented in the responsiveness summary which address comments received during the public comment period.

IX. The Selected Remedy

Based upon considerations of the requirements of CERCLA, the detailed analysis of alternatives, and public comments both U.S. EPA and WDNR have selected the following alternatives for the four operable units at OEC:

A. OU1; Alternative L1, lagoon closure, pump an estimated 72,000 gallons to the groundwater treatment system onsite and excavate an estimated 650 cubic yards of lagoon sludge and surrounding soil to be stabilized and disposed of at a

RCRA permitted landfill. Cleanup levels will be consistent with clean closure levels, in accordance with 40 CFR 264 and NR 181, WAC;

B. OU2; Alternative S1, onsite soil excavation of approximately 700 cubic yards of soil as shown on Figure 4-1 and off-site treatment and disposal. Cleanup levels will be risked-based pursuant to Wisconsin law and the EPA policy on implementing hybrid closures. Cumulative carcinogenic risk due to soil ingestion should not exceed 1×10^{-6} risk level, and the cumulative Hazard Index should not exceed 1.0;

C. OU3; Alternative GW2, installation of groundwater recovery wells, an onsite treatment system including ion exchange, air stripping and carbon absorption. A chemical oxidation system will be utilized for treatment of cyanide if a treatability study determines that ion exchange is ineffective in removing cyanide from the groundwater. The resultant ion exchange resin from this treatment process would be properly disposed off-site at a RCRA permitted landfill because it will contain an F006 waste. It will be determined whether or not the spent carbon requires disposal in a RCRA permitted landfill.

D. OU4; Alternative DW1 excavation of contaminated sediment in Davy Creek and the wetlands to a depth of two feet, and off-site stabilization and disposal of the contaminated sediment. Sediment to a depth of approximately two feet will be removed from the wetland and Davy Creek in order to remove the most contaminated sediments in these areas. Additional bioassay and risk assessment work will be performed to determine the final exposure levels.

X. Statutory Determinations

The selected remedy must satisfy the requirements of Section 121(a-e) of CERCLA to:

A. Protect human health and the environment;
B. Comply with ARARs;
C. Be cost-effective;
D. Utilize permanent solutions and alternate treatment technologies to the maximum extent practicable; and,
E. Satisfy a preference for treatment as a principle element of the remedy.

The implementation of Alternatives L1, S1, GW2, and DW1 at the OEC site satisfies the requirements of CERCLA as detailed below:

A. Protection of Human Health and the Environment

Implementation of the selected alternatives will reduce and control potential risks to human health posed by exposure to contaminated soil, sediment, and ground water. Lagoon cleanup will be to RCRA clean closure 40 CFR Part 264 Subpart G levels, or the appropriate State RCRA requirements. Extraction and treatment of contaminated ground water will be conducted to meet federal and state Ground-Water Cleanup Standards. Soil and debris at the site (i.e., the non-RCRA lagoon soils) will be excavated and backfilled so that the direct contact exposure risk will be reduced to 10^{-6} and migration of contaminants to ground water will be mitigated to standards, consistent with EPA's guidelines on hybrid clean closure. Cleanup levels in the wetlands and Davy Creek have not been established pending the results of the bioassay work. The selected remedy also protects the environment by reducing the potential risks posed by site chemicals discharging to surface water (Davy Creek) and the wetlands.

With regard to the community and onsite workers, all alternatives will pose potential risks from dust and air emissions generated during excavation activities. Perimeter air monitoring will be needed during remedial activities to determine if steps are needed to protect the community from adverse air emissions. Workers will be required to wear the proper protective health and safety equipment to protect their safety. None of these short-term risks will result in unacceptable exposures to human health or the environment.

B. Compliance With ARARS

The remedies selected for operable units 1, 2, and 3, will comply with the federal, and state standards where more stringent, of applicable or relevant and appropriate requirements (ARARs). The selected, interim remedy for Operable Unit 4 will comply with those ARARs that are pertinent, given the limited scope of this action. The ARARs for the four operable units are listed below.

B.1 Chemical-specific ARARS

Chemical-specific ARARs regulate the release to the environment of specific substances having certain chemical characteristics. Chemical-specific ARARs typically determine the extent of cleanup at a site.

B.1.a Soils

The soil clean-up standards for the OEC site will be based on the State's clean closure requirements (for the lagoons) and on EPA's hybrid closure guidelines for the contaminated soil and debris at the site.

B.1.b Sediments

The removal criteria for the sediments in the wetlands, and potentially Davy Creek, will be based on existing sediment studies, as well as any additional information collected during remedial design and action.

B.1.c Ground Water

i. Federal ARARs

Maximum Contaminant Levels (MCLs), and the non-zero Maximum Contaminant Level Goals (MCLGs), the Federal drinking water standards promulgated under the Safe Drinking Water Act (SDWA), are applicable to municipal water supplies servicing 25 or more people. At the OEC site, MCLs and MCLGs are not applicable, but are relevant and appropriate, since the sand and gravel aquifer is a Class IIA source which could potentially be used for drinking in the area of concern (the contaminant plume). MCLGs are relevant and appropriate when the standard is set at a level greater than zero (for non-carcinogens), otherwise, MCLs are relevant and appropriate. The point of compliance for ground water standards will be attained throughout the plume within a reasonable period of time, once all sources on site have been addressed.

ii. State ARARs

The State of Wisconsin is authorized to administer the implementation of the Federal SDWA. The State has also promulgated ground-water quality standards in Ch. NR 140, WAC. Chapter 160, Wis. Stats., directs the WDNR to take action to prevent the continuing release of contaminants at levels exceeding standards at the point of standards application. Ground-water quality standards established pursuant to Ch. NR 140, WAC, will be preventive action limits (PALs), where economically and technically feasible, or alternative concentration limits (ACLs) not to exceed the State's ES. Preventive action limits (PALs) and enforcement standards (ESs) contained in section NR 140.10, WAC, for the Chemicals of Concern are listed in Table 2-13. PALs (and ESs) are generally more stringent than corresponding Federal standards . The State's ground water law and code is a ARAR for this site, since those laws were created to address ground water quality in general.

The implementation of the selected remedy at the OEC site will be in compliance with Ch. NR 140, WAC, in that preventive action limits (PALs) will be the clean-up standard for ground water. The effectiveness of the ground water system in achieving that goal will be reviewed periodically to determine if achieving the PAL is technically and economically feasible, based on site-specific

TABLE 2-13

REMEDIATION GOALS FOR

CONTAMINANTS OF CONCERN IN GROUNDWATER

Contaminant(s) of Concern	Regulatory Standards		
	SDWA	Wisconsin	
	MCL	Enforc. STD	PAL
	(ppb)	(ppb)	(ppb)
Arsensic	---	50	5
Cadmium	5	10	1
Chromium	100	50	5
Copper	1300	1000	500
Cyanide	200	200	40
1,1-Dichloroethane	---	850	85
1,2-Dichloroethane	5	0.5	0.05
1,1-Dichloroethene	---	0.24	0.024
1,2-Dichloroethene	---	100	10
Lead	5	50	5
Manganese	---	50	25
Mercury	2	2	0.2
Tetrachloroethene	---	1	0.1
1,1,1-Trichloroethane	---	200	40
1,1,2-Trichloroethane	---	0.6	0.06
Trichloroethene	5	1.8	0.18
Vinyl Chloride	2	0.015	0.0015
Zinc	---	5000	2500

MCL - Maximum Contaminant Level

SDWA - Safe Drinking Water Act

Enforc.Std - Enforcement Standard

PAL - Preventive Action Limit

information collected during remedial action. The initial review of the ground water system shall occur within the first five years of implementing the ground water remediation system. Alternative concentration limits (ACLS), pursuant to the criteria in section NR 140.28, WAC, will be established if it is determined that attaining the PALs is infeasible, at any point in the remedial action process.

i. Federal ARARs

Surface water quality standards for human health and aquatic life protection were developed under the Clean Water Act (CWA) Section 304. The Federal Ambient Water Quality Criteria (AWQC) are non-enforceable guidelines that set pollutant concentration limits to protect surface waters that are applicable to point source discharges, such as from industrial or municipal wastewater streams. At a Superfund site, the Federal AQWC would not be applicable except for pretreatment requirements for discharge of treated water to a Publicly Operated Treatment Works (POTW). CERCLA (Section 121(d)(1)) requires the U.S. EPA to consider whether AWQC would be relevant and appropriate under the circumstances of a release or threatened release, depending on the designated or potential use of ground water or surface water, the environmental media affected by the releases or potential releases, and upon the latest information available. Since the aquifer is a current and potential source of drinking water, and treated water will be discharged to Davy Creek, AWQC adopted for drinking water and AWQC for protection of freshwater aquatic organisms are relevant and appropriate to the point source discharge of the treated water into Davy Creek.

ii. State ARARs

Section 303 of the CWA requires the State to promulgate state water quality standards for surface water bodies, based on the designated uses of the surface water bodies. CERCLA remedial actions involving surface water bodies must ensure that applicable or relevant and appropriate state water quality standards are met. The standards established pursuant to NR 105 and 106, WAC, would be ARARs for this site.

In addition Ch. NR 102, WAC establishes an antidegradation policy for all waters of the State and it establishes water quality standards for use qualifications. Chapter NR 102, WAC would be applicable to actions that involve discharges to Davy Creek in that discharges must meet water quality standards, as set forth in Section B.3.ii, below.

B.2 Location-specific ARARS

Location-specific ARARs are those requirements that relate to the geographical position of a site. These include:

i. Federal ARARs

Executive Order 11990 - Protection of Wetlands is an applicable requirement to protect against the loss or degradation of wetlands. As discussed above, Alternative GW2 should be designed not to have an adverse effect on the Davy Creek wetlands.

ii. State ARARs

Section 29.415, Wisconsin Statutes, and Chapter NR 27, WAC, are State Endangered and Threatened Species laws which prohibit the "taking" or harming of endangered or threatened wildlife resources in the area. Since it is possible that endangered species inhabit the wetlands, these statutes would be ARARs for the site in that the poisoning of endangered or threatened species by site contaminants could be considered by the WDNR to be a "taking."

B.3 Action-specific ARARs

Action-specific ARARs are requirements that define acceptable treatment and disposal procedures for hazardous substances.

i. Federal and State RCRA ARARs

Since the OEC was and is still operating a RCRA hazardous waste site, the State's RCRA Subtitle C requirements are applicable. The State's NR 181 requirements for clean closure of surface impoundments would be applicable to the OEC lagoons since these are regulated units pursuant to RCRA. The RCRA Subtitle C standards are not applicable to the site's contaminated soil and debris. However, since it is soil and debris contaminated with an F006 hazardous waste, the RCRA closure requirements would be relevant and appropriate. As established in the NCP, the EPA may utilize the EPA's hybrid closure guidelines for remediating the contaminated soil and debris, where RCRA is determined to be relevant and appropriate. The EPA and WDNR have agreed to use the hybrid closure guidelines when remediating the soil and debris at OEC.

The substantive requirements of RCRA waste generation and temporary storage regulations under 40 CFR Part 262 will be followed when managing the treatment residuals from the ground water system (e.g., ion exchange resins). Additional Federal action-specific ARARs are found in the FS.

ii. State ARARs

The State is authorized to implement the National Pollutant Discharge Elimination System (NPDES) program. The

substantive requirements of a Wisconsin Pollutant Discharge Elimination System (WPDES) permit, under Ch. NR 220, WAC, would be applied to the discharge of the treated water into Davy Creek. A permit is not required since the discharge point is considered to be on-site. Subject to the approval of the U.S. EPA, effluent limits for surface water discharge will be established by the WDNR. Ch. NR 220, WAC requires that the effluent limits be based on the application of best available treatment technology (BAT) prior to discharge.

Chapter 147, Wisconsin Statutes, is also applicable to treated water to be discharged to Davy Creek. These regulations state that no discharge shall contain quantities of listed pollutants greater than that would remain after subjecting the water to best available technology economically achievable (BATEA).

Chapter NR 445, WAC regulates air emissions from treatment technologies and is applicable to point source emissions from industrial facilities. Since air strippers may emit hazardous substances in the form of VOCs, section NR 445.04, WAC is relevant and appropriate for the remedy. The need for emission control technology shall be evaluated based on requirements of Ch. NR 445, WAC. If air stripper emissions are projected to exceed standards at the OEC property boundary, the point of compliance, then vapor control technology such as vapor phase activated carbon will be included in the treatment system to bring air emissions into compliance.

C. Cost-effectiveness

Cost-effectiveness compares the effectiveness of an alternative in proportion to its cost of providing its environmental benefits. Table ES-5 lists the costs associated with the implementation of the remedies.

1. Operable Unit 1 - RCRA Subtitle C Lagoon Closure

Clean closure of the surface impoundments affords the highest degree of effectiveness and reduction of MTV by removing contaminants so that the soils are excavated to background levels required by Wisconsin RCRA regulations. This alternative was determined to be cost-effective in that the costs incurred were reasonable in light of the long-term results achieved.

2. Operable Unit 2 - Soil and Debris

Alternative S1 was less costly than alternative S2, yet provides more long-term effectiveness, and a greater reduction of toxicity, and mobility of the contaminants.

J19

TABLE ES–5

COST ESTIMATE SUMMARY

Alternative	Capital Cost($)	Annual O&M Cost($)	5–Year Review($)	Total Present Worth($)
Alternative L1: Lagoon Closure	485,601	0	6,000	490,302
Alternative S1: Excavation and Disposal	253,966	0	6,000	258,667
Alternative GW2: Groundwater Pumping and Treatment (Ion Exchange)	402,310	91,905	6,000	1,831,805
Alternative GW2: Groundwater Pumping and Treatment (Chemical Oxidation)	432,908	90,569	6,000	1,841,865
Alternative DW1: Excavation and Removal	4,986,020	0	12,000	4,995,422

3. Operable Unit 3 - Groundwater

The two options for remediating the ground water provided comparable performances with respect to long-term effectiveness, short-term effectiveness and reduction of TMV. The only difference between the two remedies was that alternative GW2 was less costly.

4. Operable Unit 4 - Davy Creek and the Wetlands

Alternative DW1 was slightly less costly than Alternative DW2. The alternatives had comparable performance with respect to long-term effectiveness, short-term effectiveness, and reduction of TMV.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

U.S. EPA and the State of Wisconsin believe the selected remedies for the OEC Site represent the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the three final operable units and one interim action at the OEC site. The selected remedies utilize permanent solutions and alternative treatment technologies to the maximum extent practicable ("MEP"). This finding was made after evaluation of the protective and ARAR-compliant alternatives for the OEC site remedial actions and comparison of the "trade-offs" (advantages vs. disadvantages) among the remedial alternatives with respect to the five balancing criteria (see above).

Once the threshold criteria of protection of human health and the environment and ARARs-compliance were satisfied, the key criteria used in remedy selection for the OEC site were long-term effectiveness; reduction of toxicity, mobility, and volume ("TMV") through treatment; short-term effectiveness; and cost). The priority given to long-term effectiveness and to reduction of TMV at the site is consistent with U.S. EPA policy established in the NCP. This policy states that long-term effectiveness and reduction of TMV through treatment are generally the key decision factors to be considered at Superfund sites.

1. RCRA Lagoon Remedy

The selected remedy's long-term effectiveness and its ability to reduce the TMV of hazardous substances was weighed against its short-term effectiveness aspects in relation to the remaining alternatives. In general, the selected remedy does involve a small degree of risk to site workers and to the community in that

there would be movement and treatment of hazardous substances during implementation in order to minimize the long-term effects those substances would have on human health and the environment.

With respect to VOC-emissions during treatment of the lagoon water and ground water, and contaminated dust during excavation of soil, sludge and sediments, effective air monitoring would ensure that air standards established to protect human health and the environment are met. Emission controls may be utilized, if necessary, to meet those standards. Short-term risks due to the discharge of treated ground water to Davy Creek would be minimized by ensuring that the treated water meets discharge criteria, which are established to protect human health and the environment as well.

The lagoon alternative complies with State and Federal ARARS which require cleanup to clean closure standards. This provides maximum long-term effectiveness by removing the contaminated sludge and soil, treating it in accordance with the land disposal restrictions, and disposing of it in a RCRA Subtitle C land disposal unit, in compliance with the Superfund off-site policy. The major factor upon which this selection was based was the alternatives long-term effectiveness and its reduction of mobility, toxicity or volume.

2. Soil and Debris Remedy

Alternative S1 (excavation, treatment and disposal) has greater long-term effectiveness than alternative S2 (closure of waste in place) because S1 removes a continuing source of contamination and exposure from the site. The treatment of the soil and debris to the LDR requirements (BDAT) will reduce the mobility of the contaminants.

3. Ground-water Alternatives

Both ground-water alternatives provide for long term effectiveness. Ground-water extraction and treatment will utilize treatment to permanently address the principal threats posed by the ground-water contaminant plume.

4. Davy Creek and the Wetlands Alternatives

Both alternatives DW1 and DW2 are interim actions. Further monitoring of the wetlands will be necessary to determine the long term effectiveness of the selected remedy. Stabilization of the sediments will meet the LDR treatment standards.

D.1 Summary

The combination of treatment and engineering controls being implemented will minimize and eliminate threats remaining to

achieve protectiveness. Negative short-term impacts during implementation of the remedy will be minimized by health and safety measures. The State has concurred with the selected remedies for operable units one, two, three and four. Community acceptance is addressed in the responsiveness summary.

E. Preference for Treatment as a Principal Element

The principal threats at the OEC site are the ground-water contaminant plume, due to the potential use of the contaminated water as a drinking water source, and the contaminated soil, sediment and sludge due to direct exposure. The remedies selected in this ROD satisfy the statutory preference for treatment as a principal element of the remedy by treating the ground water and excavating and stabilizing the contaminated soils, and a portion of the contaminated sediments at the OEC site.

APPENDIX
RESPONSIVENESS SUMMARY
OCONOMOWOC ELECTROPLATING COMPANY INC. SITE
ASHIPPUN, WISCONSIN

I. Responsiveness Summary Overview

In accordance with CERCLA 117, the U.S. Environmental Protection Agency (U.S. EPA) held a public comment period from July 23, 1990 through August 22, 1990 for interested parties to comment on the Proposed Plan (PP) for the interim remedial action at the Oconomowoc Electroplating Company (OEC) Site in Ashippun, Wisconsin.

The PP, provides a summary of the background information leading up to the public comment period. Specifically, the PP includes information pertaining to the history of the OEC Site, the scope of the proposed cleanup action and its role in the overall Site cleanup, the risks presented by the Site, the descriptions of the remedial alternatives evaluated by EPA, the identification of EPA's preferred alternative, the rationale for EPA's preferred alternative, and the community's role in the remedy selection process.

EPA held a public meeting at 7:00 p.m. on July 25, 1990 at the Ashippun Town Headquarters in Ashippun, Wisconsin to outline the remedial alternatives for the four operable units described in the PP and to present EPA's proposed remedial alternative for controlling contamination at the OEC Site.

The responsiveness summary, required by the Superfund Law, provides a summary of citizens' comments and concerns identified and received during the public comment period, and EPA's responses to those comments and concerns. All comments received by EPA during the public comment period will be considered in EPA's final decision for selecting the remedial alternative for addressing contaminated at the OEC Site.

This responsiveness summary is organized into sections and appendices as described below:

I. RESPONSIVENESS SUMMARY OVERVIEW. This section outlines the purposes of the Public Comment period and the Responsiveness Summary. It also references the appended background information leading up to the Public Comment period.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. This section provides a brief history of community concerns and interests regarding the OEC Site.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE

COMMENTS. This section summarizes the oral comments received by U.S. EPA at the July 25, 1990 public meeting, and provides U. S. EPA's responses to these comments.

IV. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS. This section contains the letter received by EPA containing written comments, as well as EPA's written response to that letter.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Local awareness of the OEC site is very high, because startup of the Remedial Investigation (RI) was delayed in 1986 due to a lack of funds which in turn delayed the submission of the Dodge County Drainage Board's application to rechannel Davy Creek. This was a result of the decision of the U.S Army Corps of Engineers (U.S ACE) that the application to rechannel Davy Creek could not be submitted until the final RI was complete and the extent of contamination was known. Local residents have lost farmland to wetlands over the past twenty years and want to reclaim them, although the Department of Interior has taken the position that the wetlands are protected and attempts to drain them will not be allowed. The local residents are in the process of attempting to rechannel Davy Creek to mitigate flooding and stop the loss of existing farmland.

A local community group was formed called "People for the Cleanup of the Davy Creek Toxins". This group has been very active in generating community support for the quick remediation of the OEC site.

A health issues workshop was held on July 5, 1988, to inform the local residents of the potential risk associated with the site and a public meeting was held immediately afterward to inform the residents of the Superfund process and the work to be conducted under the RI. Major issues raised during the July 5, 1988, public meeting included the following:

- Why the start of the RI had been delayed;
- Why the wetlands could not be drained to return them to farmland;
- Why the government was allowing OECI to discharge after they had caused the site contamination.

An attempt was made by the RPM to satisfactorily respond to the issues, although as discussed above the issue of the wetlands has come up on every subsequent public meeting and is still very much an issue with the local residents.

On March 28, 1990, a RI/FS update meeting was held to inform the local residents of the results of the RI and give a schedule for the FS, ROD, and remedial design and construction. The major issue again concerned the wetlands and the rechannelization of Davy Creek.

As part of EPA's responsibility and commitment to the Superfund Program, the community has been kept informed of ongoing activities conducted at the OEC site. U.S. EPA has established a repository at the F&M Bank, in Ashippun, Wisconsin, where relevant site documents may be viewed. Documents stored at the repository include:

- The final RI and Feasibility Study for the site;
- The PP for the site;
- Fact sheets, summarizing the technical studies conducted at the site;
- Public Meeting Transcript.

U.S. EPA's selection of a remedy to cleanup the contamination at the OEC site will be presented in a document known as a Record of Decision (ROD). The ROD and the documents containing information that U.S. EPA used in making its decision (except for documents that are published and generally available) will also be placed in the information repository, as will this responsiveness summary.

III. Summary of Major Questions and Comments Received During the Public Comment Period and U.S. EPA Responses to These Comments

Oral comments raised during the public comment period for the OEC Site interim remediation have been summarized below together with U.S. EPA's response to these comments.

COMMENT: A resident inquired whether the 55 gallon drums left from the remedial investigation could be removed from the site within 30 days.

RESPONSE: The waste contained in the 55 gallon drums is considered a Resource Conservation and Recovery Act (RCRA) F006 hazardous waste. The drums are secured in a locked chain link fence and are scheduled for removal when the remedial action begins in 1992.

COMMENT: A resident asked why the wetland and Davy Creek would not be remediated to the same health based cleanup levels as the site soils.

RESPONSE: Excavation to a depth of two feet in Davy Creek and the wetlands is being done to remove the most significant contamination in these areas as an interim action. Additional

bioassay work is being performed to determine the level protective of the environment. Based on a determination of the level protective of the environment, it will be determined whether any further response is necessary in Davy Creek.

COMMENT: One resident stated that the contamination at the OEC Site was very serious and that she felt that U.S. EPA had come up with the best solution for the problem and that she supported the remedial alternatives.

RESPONSE: U.S. EPA acknowledges the comment.

COMMENT: Can another public meeting be held between all responsible parties involved with the Davy Creek rechannelization including U.S. ACE, Fish and Wildlife, Wisconsin Department of Natural Resources, and U.S. EPA.

RESPONSE: An attempt will be made in the near future to have all of the involved parties attend a public meeting as soon as they have had a chance to review and take a position on the proposed Davy Creek rechannelization.

IV. Written Comments Received During the Public Comment Period.

The written comments regarding the OEC site have been summarized below, together with U.S. EPA's responses to these comments.

COMMENT: The wetlands study and contamination from the manufacturing area should be more carefully studied before remediation begins. Also, the Site continues to operate and will the continued operation result in additional contamination after the remediation is complete.

RESPONSE: The wetlands are in the process of being very carefully studied to determine chronic toxicity levels. After the remediation is complete, the wetlands monitoring will continue to determine if the remedy is protective of human health and the environment. With regard to the manufacturing area, the remediation will be closely monitored so that contamination during the remediation does not runoff to the wetlands. Additional contamination from the OEC effluent is not anticipated because U.S. EPA has filed a civil suit against OEC for effluent violations, requiring that OEC comply with their NPDES permit.

COMMENT: I feel a need to protect the environment, although I do not feel that my rights as a landowner should be compromised for the sake of maintaining wetlands that developed after I bought my property.

RESPONSE: Whether or not the wetlands remain is not directly related to this remediation and will be addressed by the appropriate agencies after the rechannelization of Davy Creek is formerly submitted to the U.S. ACE.

COMMENT: "PEOPLE FOR THE CLEANUP OF THE DAVY CREEK TOXINS" are in favor of the PP to cleanup the OEC site so long as the remediation in the wetland and Davy Creek will be protective of human health and the environment.

RESPONSE: Excavation to a depth of two feet in Davy Creek and the wetlands is being done to remove the most significant contamination in these areas as an interim action. Additional bioassay work is being performed to determine the level protective of the environment. Based on a determination of the level protective of the environment along with human health, it will be determined whether any further response is necessary in Davy Creek.

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Carroll D. Besadny, Secretary
Box 7921
Madison, Wisconsin 53707
TELEFAX NO. 608-267-3579
TDD NO. 608-267-6897
SOLID WASTE TELEFAX NO. 608-267-2768

September 18, 1990

IN REPLY REFER TO: 4440

Mr. Valdas V. Adamkus, Regional Administrator
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, IL 60604

SUBJECT: Selected Superfund Remedy
Oconomowoc Electroplating Company, Inc. Site
Town of Ashippun, Dodge County, WI

Dear Mr. Adamkus:

The Department is providing you with this letter to document our position on the proposed remedy, which includes 4 operable units, for the Oconomowoc Electroplating Company, Inc. Site (OECI). The proposal, as identified in the draft Record of Decision, includes the following:

Clean closure of the RCRA subtitle C sludge lagoons.

Approximately 650 cubic yards of lagoon sludge and surrounding soils would be excavated, with off-site treatment and disposal at a RCRA Subtitle C facility. Contaminated lagoon water would be treated.

Alternate clean closure of contaminated soil areas.

Approximately 700 cubic yards of contaminated soil would be excavated, with off-site treatment and disposal at a RCRA Subtitle C disposal facility.

Extraction and treatment of contaminated groundwater.

Contaminated groundwater would be extracted and treated with an on-site treatment unit. The treated water would be discharged into Davy Creek in compliance with the substantive requirements of the Wisconsin Pollutant Discharge Elimination System.

Excavation of contaminated sediment from the Davy Creek wetlands.

Approximately 6000 cubic yards of contaminated sediment would be excavated from the wetlands, with subsequent treatment and disposal at an off-site RCRA Subtitle C disposal facility. This operable unit would be an interim action. Further investigation of the problem would occur. Potentially, another remedy would be necessary.

The total 30 year present net worth for the OECI Operable Units is estimated to be approximately $6,200,000, of which $4,776,000 is estimated to be capital cost and $92,000 per year is estimated to be annual operation and maintenance costs. The Department concurs with the preferred remedy, as described above and in the Record of Decision for these operable units.

We understand that if the potentially responsible parties (PRPs) do not agree to fund the remedy, the State of Wisconsin will contribute 10 percent of the remedial action costs associated with this remedy.

We also understand that our staff will continue to work in close consultation with your staff during any remaining investigative work associated with the OECI site, as well as during the design and construction of the operable unit remedies.

Thank you for your support and cooperation in addressing this contamination problem at the OECI site. If you have any questions regarding this matter, please contact Mr. Paul Didier, Director of the Bureau of solid and Hazardous Waste Management, at (608) 266-1327.

Sincerely,

C. D. Besadny
Secretary

CDB:cv

cc: Lyman Wible - AD/5
Linda Meyer - LC/5
Paul Didier - SW/3
Joe Brusca/Mike Schmoller - SOD
Wendy Carney/Tom Williams - EPA Region V (5HS/11)
Mark Giesfeldt/Sue Bangert/Celia VanDerLoop - SW/3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: OCT 02 1992

SUBJECT: Explanation of Significant Differences (ESD) for the Oconomowoc Electroplating Site, Ashippun, Wisconsin

TW

FROM: Tom Williams, RPM, MI/WI Section #4

TO: Addressees

Attached is a copy of the draft ESD for the remediation of Davy Creek and the wetlands at the Oconomowoc Electroplating Site. Please review the ESD and supply me with any comments you may have. Please provide comments by October 13, 1992.

Thank you for your cooperation and if you have any questions on this document please contact me at (312) 886-6157.

Addressees:

W. Carney, RRB
J. Mayka, RRB
R. Cvengros, WD
N. Bollo, ORC
J. Kleiman, RCRA
A. McLaughin, HQ
S. Pastor, OPA
S. Huff, DOI,
P. Kozol, WDNR

EXPLANATION OF SIGNIFICANT DIFFERENCES

OCONOMOWOC ELECTROPLATING COMPANY, INC. SITE
ASHIPPUN, WISCONSIN

I. Introduction

The 10.5 acre Oconomowoc Electroplating Company, Inc. site ("OECI") is comprised of the electroplating facility formerly located at 2572 Oak Street, Ashippun, Wisconsin and 6.5 acres of an adjacent wetlands area located to the southwest of the former facility. The 4 acre OECI facility consisted of a main building which housed the office and process lines; a wastewater treatment building (to the west); parking area (to the north and east); two formerly used wastewater treatment lagoons (to the south) which are still on site; various storage tank and container deposit areas; a fill area and a lowlands area between the main building and adjacent property. The electroplating facility was removed and demolished in May 1992. Davy Creek runs through the adjacent wetlands.

The U.S. Environmental Protection Agency (EPA) and the Wisconsin Department of Natural Resources (WDNR) are the lead and support agencies, respectively, for the conduct of the remedial action at OECI under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601, et seq. In September 1990, the EPA issued a Record of Decision (ROD) which outlined the remedy selection process and the selected cleanup actions for the OECI site. The State concurred with the selected remedy. This document provides a discussion of significant changes to the selected cleanup action in the Davy Creek/Wetland area.

II. Requirement to Address Significant Changes

The lead agency (in this case, EPA) may determine that a significant change to the selected remedy described in the ROD may be warranted after the ROD is signed. Section 117(c) of CERCLA, requires that:

> After adoption of a final remedial action plan [ROD]-
>
> (1) if any remedial action is taken,
> (2) if any enforcement action under section 106 is taken, or
> (3) if any settlement or consent decree under section 106 or section 122 is entered into,
>
> and if such action, settlement, or decree differs in any significant respects from the final plan, the [EPA] shall publish an explanation of the significant differences and the reasons such changes were made. (42 U.S.C. §9617(c)).

The EPA, in consultation with the WDNR, has determined that significant changes should be made to the remedial action plan. This document shall become part of the administrative record file which is available for viewing at the F&M Bank, Ashippun, Wisconsin and at the EPA regional offices in Chicago, Illinois, during normal business hours.

III. Background

A. Site History

The OECI facility operated from 1957 until its closing in February 1991. Electroplating and finishing processes performed at the facility utilized nickel, chromium, zinc, copper, brass, cadmium, and tin. The wastewaters formerly generated at OECI consisted of cyanide-bearing, chromium-bearing, and acid or alkaline solutions. Degreasing operations were also performed in conjunction with the electroplating process; as a result, a number of volatile organic compounds have contributed to the waste stream, including 1,1-dichloroethane, chloroform, 1,2-dichloroethane, and trichloroethene.

Prior to 1972, untreated wastewaters were discharged directly into the wetland area south of the OECI property. In 1972, OECI constructed two unlined settling lagoons to supplement a wastewater treatment system (discussed below). Each lagoon is 60 feet long by 40 feet wide with a sidewall depth of 5 feet. The walls are concrete on two sides and sloped gravel on the others. Over the years, both lagoons had accumulated large volumes of plating sludges. In the past, untreated plating sludges have overflowed the settling lagoons and accumulated in the wetlands between the OECI facility and Davy Creek.

Later, OECI utilized a wastewater treatment plant to treat effluent from its many electroplating processes. In November 1973, after installation of the wastewater treatment system, a Wisconsin Pollution Discharge Elimination System (WPDES) Permit was issued for discharging treated wastewater to Davy Creek. However, WDNR has documented numerous spills from the wastewater treatment unit. In August 1978, OECI was denied a WPDES Permit by the WDNR; however, since the facility had appealed the denial it was still operational and discharging wastewater to Davy Creek.

In 1980, OECI contracted to remove the lagoon sludge; approximately one million pounds of sludge were removed and disposed. The removal was not completed, however, and the lagoons currently are approximately one-third full of the electroplating sludge.

In 1983, in order to alleviate the local flooding problem, the Dodge County Drainage Board proposed to dredge and rechannel a 5,000 foot stretch of the Davy Creek near the OECI facility. However, the EPA and the U.S. Army Corps of Engineers disapproved the dredging proposal, believing that dredging would increase the migration of contaminated sediments from the wetlands into the Rock River.

During the summer of 1986, the Technical Assistance Team (TAT), a contractor to the EPA Emergency Response Section, conducted a limited

sediment sampling survey in the wetlands. The analytical results of these samples indicated high concentrations of metals and cyanide in the wetlands area immediately south of OECI. In March and April 1987, the TAT conducted an extensive sampling program which covered approximately 300 acres of wetlands along Davy Creek. This program also included sampling of the OECI sludge lagoons and soils at the ballpark located southeast of OECI. The analytical results indicated that approximately 75,000 square feet of the wetlands adjacent to OECI is contaminated with metals and cyanide associated with the facility's electroplating processes.

In December 1987, the U.S. Environmental Response Team (ERT) conducted a toxicity investigation in the wetlands south of the OECI site to determine if the contaminated sediments from the wetlands are toxic to aquatic organisms. The analytical results indicated severe metals and cyanide contamination of the sediments in the wetlands. As a result, the sediments from several locations were considered as being highly toxic. The toxicity data collected showed conclusively that the contamination in the wetlands was toxic to fathead minnows and algae.

EPA began a remedial investigation and feasibility study (RI/FS) in December 1987. The RI Report for three of the operable units, the lagoons, the contaminated soils adjacent to the manufacturing buildings and the ground water, was completed in March 1990. The FS was completed in July 1990.

B. Record of Decision

Due to the complexity of the site, the environmental problems were divided into four separate discrete actions or operable units (OUs). The building and underlying soil was described as in need of further investigation and became OU Five in the September 1991 Explanation of Significant Differences (ESD) which addressed them. The building removal and demolition was complete in May 1992 and the soil investigation was completed in July 1992. The specified operable units are:

OU One: Includes the surface water, metal hydroxide sludge and contaminated soils associated with the two RCRA Subtitle C lagoons located behind the OECI facility.

OU Two: Includes all other contaminated soil around the OECI facility not associated with the RCRA lagoons. This includes the fill area, the lowlands area, the drainage ditches, beneath the manufacturing building and the parking lot.

OU Three: Includes the contaminated groundwater associated with the site.

OU Four: Addresses the most highly contaminated sediments in the Davy Creek/Wetlands area.

OU Five: Manufacturing building.

In the September 1990 ROD, OU One, OU Two, and OU Three were considered classified as final actions, while OU Four was classified as an interim action.

IV. Significant Differences

The purpose of this document is to (1) show that significant differences have occurred and that OU Four should be considered a final action; (2) provide final estimates of sediment to be removed in Davy Creek and the wetland; and (3) to propose final cleanup levels for Davy Creek and the wetlands. EPA, in consultation with the WDNR, proposes to remove approximately 3,050 cubic yards (yd^3) of wetland sediment and 425 yd^3 of Davy Creek sediment to an off-site facility for treatment and disposal. Cleanup levels for the five metals of concern and cyanide are as follows:

Cyanide	45 mg/kg
Cadmium	210 mg/kg
Chromium	800 mg/kg
Copper	85.7 mg/kg
Nickel	54 mg/kg
Zinc	4,390 mg/kg

These numbers were derived from the September 1992 Sediment Risk Assessment for Chironomous sp. (midge larvae) and Odocoilus Virginiana (white tail deer) and the January 6, 1992 Final Ecotoxicological Report. Both of these documents are available at the F&M Bank, Ashippun, Wisconsin and at the EPA regional offices in Chicago, Illinois, during normal business hours.

The above cleanup numbers were derived by determining the lowest observed adverse effect level (LOAEL) the contaminants had on the midge larvae. Other organisms were tested as part of the risk assessment with varying results. The LOAEL for hyalella azteca (water flea) approached background concentration. Daphnia magna was not affected by the contaminated sediment. The LOAEL for midge larvae was used as cleanup numbers as opposed to the water flea because it is much more likely for the midge larvae to inhabit the wetland than the water flea.

OU Four was considered an interim action when the ROD was signed because it was unknown whether an ecological risk assessment could adequately determine numerical cleanup standards. The cleanup standards were to be based on bioassay work which was underway during development of the ROD and as discussed above are now complete. Because a numerical

cleanup standard was not available at the time the ROD was signed, volumes of sediment to be removed had to be roughly estimated. Now that the bioassay work is complete and final cleanup levels have been determined, OU Four should be considered a final action.

The remedy for OU Four in the ROD estimated the sediment to be removed in the wetland at 5,200 yd^3 and 750 yd^3 in Davy Creek, based on two feet of sediment and not back filling. Based on the April 1987, Extent of Contamination Survey, the majority of metal contamination is in the top foot of the sediment. Also, extensive removal of the wetland soil may affect the future viability of the wetland ecosystem. Therefore, EPA and WDNR believe only a foot of top soil should be removed and the excavated area back filled with at least 6 inches of highly organic soil. Concentrations of contaminants below the back fill may exceed the above cleanup numbers, but will not provide an exposure route to wetland species. Therefore the sediments below the back fill will not pose a risk. The remaining metals beneath the back fill should not pose a groundwater transport problem because metals are strongly bound in the soil matrix due to the low solubility product of metallic sulfides. Sulfur is a typical element found in wetland soil. Because contamination will remain on site above levels that allow for unlimited use and unrestricted exposure a five year review will be required.

Removal of a foot of sediment in Davy Creek should meet the above cleanup levels. Dredging of Davy Creek will stop at the former discharge of the Ashippun wastewater treatment plant. Contamination downstream of the discharge appears to be from the wastewater plant rather than the site. Sediment data clearly shows a drop off of contamination downstream of the site until the former wastewater discharge pipe is reached, where the contaminant levels significantly increase and then drop off again towards the Rock River. The areal extent of dredging the wetland and Davy Creek are shown on Figure 1.

Cost

The estimated cost to excavate contaminated sediment in the wetland and Davy Creek with stabilization and off-site disposal is $ 5.5 million. It was originally estimated at $5 million. The difference in cost is attributed to the cost of treating contaminated water as part of the remediation, which was not part of the original estimate and the offset of removing less sediment but back filling with 1,525 yd^3.

V. Affirmation of Statutory Determinations

Considering the new information that has been developed and the changes that have been made to the selected remedy, EPA and the WDNR believe that the remedy remains protective of human health and the environment, complies with federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost effective.

In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

VI. State Comment

The State concurs with the ESD.

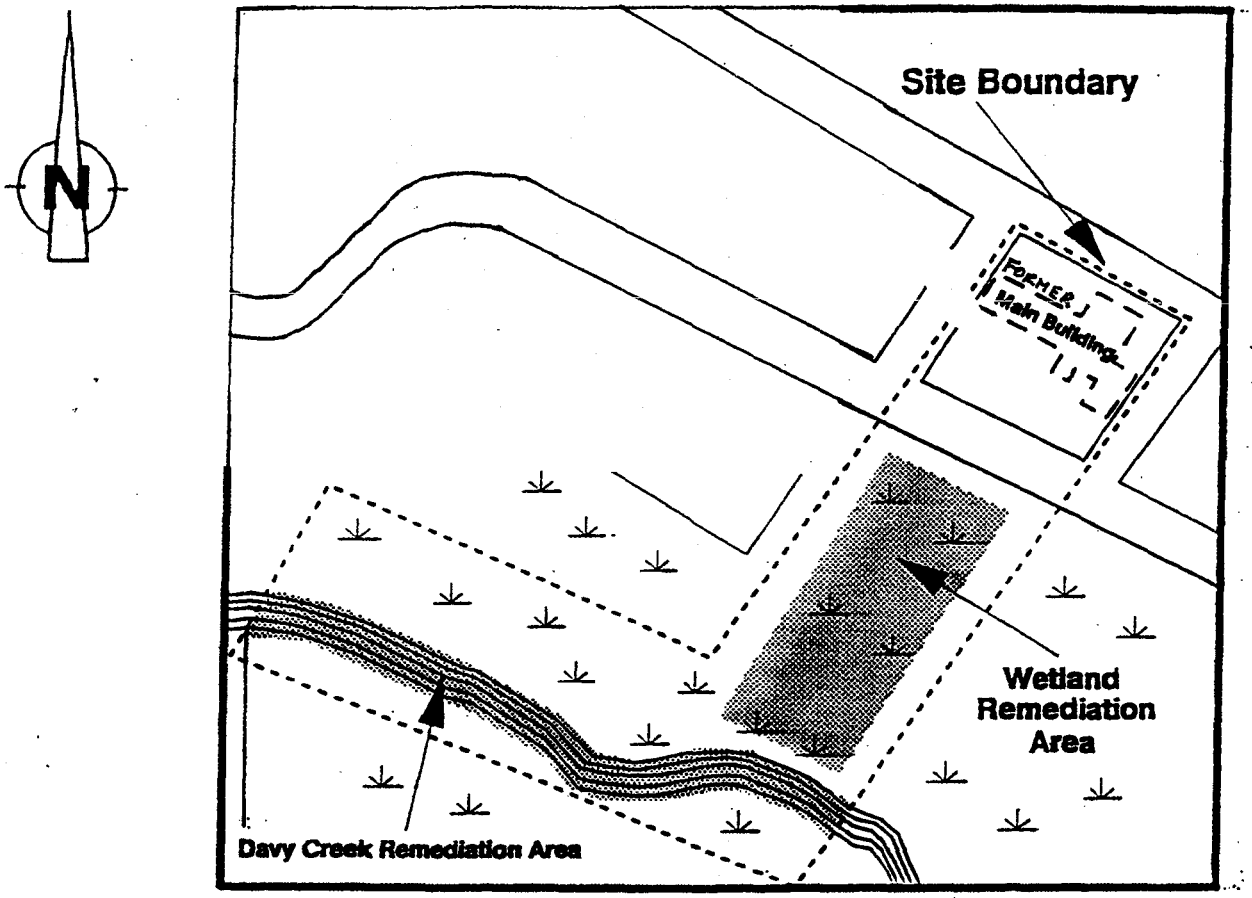


Figure 1: **Cleanup Plan**