Bologna

EPA WORK ASSIGNMENT NUMBER: 004-2L1E

EPA CONTRACT NUMBER: 68-W8-0110
EBASCO SERVICES INCORPORATED

ARCS II PROGRAM

FINAL

REMEDIAL INVESTIGATION/ FEASIBILITY STUDY WORK PLAN CIRCUITRON CORPORATION SITE SUFFOLK COUNTY, NEW YORK

FEBRUARY, 1989

revised 4/28/89

NOTICE

The information in this document has been funded by the United States Environmental Protection Agency (USEPA) under ARCS II Contract No. 68-W8-0110 to Ebasco Services, Inc. (Ebasco). This document is a draft and has not been formally released by either Ebasco or the USEPA. As a draft, this document should not be cited or quoted, and is being circulated for comment only.

8884b

4/28/89

REVISIONS TO BE INCLUDED IN THE FINAL WORKPLAN

1. Executive Summary, 1st page, last paragraph, 2nd line:
Delete:
"one shallow monitoring well"
and revise to read:
"seven well clusters".

2. Section 1.6.4, page 29, 6th, 7th and 8th line: Delete the sentence:
"Since the dicharges to the storm drains have ceased, the potential of an air release no longer exists.".

3. Section 2.1.1.3, page 37, 1st, 2nd and 3rd line: Delete the sentence:
"In its current condition, the Circuitron Corporation Site does not represent a hazard with regard to air transported contaminants.".

4. Section 2.1.1.3, page 38, 1st paragraph, 3rd line: Delete the word:
"not".

5. Section 3.3, page 55: Insert Attachment 1 at the end of section 3.3.

6. Table 3-1, page 56: Table 3-1 has been revised to include the groundwater samples to be collected from the newly proposed deep monitoring well MW-4D.

7. Section 3.3.4, page 58, 1st paragraph, 1st line: Delete:
"and ane shallow well"
and revise the begining of the sentence to read:
"Seven (7) monitoring well clusters will be installed...".

8. Section 3.3.4, page 58, 1st paragraph, 12th line: Delete:
"plus a shallow well"
and revise to read:
"and five clusters downgradient to...".

9. Section 3.3.4, page 58, last paragraph, 1st line: Revise the begining of the sentence to read:
"The seven well clusters will allow...".

10. Figure 3-1, page 59: Figure 3-1 has been revised to show the final locations of the proposed monitoring well clusters.

11. Section 3.3.4, page 60: Insert Attachment 2 after the end of the first paragraph of this page. Attachment 1 will be the second paragraph of page 60.

12. Section 3.3.5 1, page 60, 1st line: Delete:
"and one shallow well"
and revise to read:
"seven well clusters will be installed...".

13. Section 3.3.5.1, page 62, 3rd paragraph, 1st and 2nd line:
Revise to read:
"A total of 308 groundwater samples will be obtained during the two rounds of monitoring well sampling from the 14 proposed monitoring wells and ...".

14. Figure 3-4, page 66: Figure 3-4 has been revised to show the final locations of the monitoring wells and the piezometers needed for the optional pumping test.

15. Section 3.3.6, page 68, 4th, 5th and 6th line: Delete:
"the one (1) shallow monitoring well boring (MW-4S"
and revise the sentence to read:
"be obtained from the four (4) deep monitoring well borings (MW-1D, MW-2D, MW-3D abd MW-4D), the two (2) surface soil...".

16. Section 3.3.6.2, page 71, 2nd line: Delete:
"and from shallow well MW-4S"
and revise the end of the sentence to read:
"of the deep wells MW-1D, MW-2D, MW-3D and MW-4D.".

EBASCO SERVICES INCORPORATED

EBASCO

160 Chubb Avenue, Lyndhurst, NJ 07071-3586, (201) 460-1900

February 17, 1989
ARCS II-89- 59

Dr. A. Fayon
Remedial Project Manager
U S Environmental Protection Agency
Room 747
26 Federal Plaza
New York, New York 10278

SUBJECT: EPA CONTRACT NUMBER 68-W8-0110
WORK ASSIGNMENT NUMBER: 004-2LIE
CIRCUITRON CORPORATION SITE
EAST FARMINGDALE, NEW YORK
FINAL RI/FS WORK PLAN

Dear Dr. Fayon:

Ebasco Services Incorporated is pleased to submit ten (10) copies of the final Work Plan for the Circuitron Corporation Site Remedial Investigation and Feasibility Study(RI/FS). The Work Plan presents Ebasco's technical scope and schedule for conducting the RI/FS studies including field investigations, health risk assessment and RI/FS report preparation. This document incorporates comments on the draft Work Plan, as well as issues and suggestions from the USEPA that were a result of numerous meetings concerning this work effort. Also enclosed, is a copy of comment resolution sheets which identify all comments transmitted to Ebasco on the draft Work Plan, how the comments were resolved, and where in the final Work Plan the comment resolution has been included. We hope these sheets will assist you in your review of this document.

The final cost estimate to execute the scope of work identified in this final Work Plan will be sent under separate cover.

Please contact us if we can be of any assistance during your review of this document, and please complete and return the Acknowledgment of Receipt form attached to this letter at your convenience. If you have any questions or comments regarding the work plan, please do not hesitate to call me at (201) 460-6434 or Mr Richard Zarandona at (201) 460-6232.

Very truly yours,

Dev R. Sachdev

Dev R Sachdev, PhD
Regional Manager-Reg. II

February 17, 1989
ARCS II-89-59

Dr. A. Fayon
Remedial Project Manager
U S Environmental Protection Agency
Room 747
26 Federal Plaza
New York, New York 10278

SUBJECT: EPA CONTRACT NUMBER 68-W8-0110
WORK ASSIGNMENT NUMBER: 004-2LIE
CIRCUITRON CORPORATION SITE
EAST FARMINGDALE, NEW YORK
FINAL RI/FS WORK PLAN

cc: J McGahren (EPA)
M S Alvi (EPA)
M Kuo
R Zarandona
C Papaioannou
J Mummaw
R Rienzo
ARCS II Files

ACKNOWLEDGMENT OF RECEIPT

PLEASE ACKNOWLEDGE RECEIPT OF THIS WORK PLAN BY SIGNING AND RETURNING THE DUPLICATE COPY OF THIS LETTER TO EBASCO AT THE ABOVE ADDRESS.

USEPA Signature

Date of Receipt

EPA WORK ASSIGNMENT NUMBER: 004-2L1E
EPA CONTRACT NUMBER: 68-W8-0110
EBASCO SERVICES INCORPORATED

ARCS II PROGRAM

FINAL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN
CIRCUITRON CORPORATION SITE
EAST FARMINGDALE, SUFFOLK COUNTY, NEW YORK

FEBRUARY, 1989

Prepared by:

Richard Zarandona
Site Manager

Approved by:

Dev R Sachdev, PhD., PE
Program Manager, Region II

Approved by:

Dr. Abram Fayon
EPA-RPM

Approved by:

Mr. M. Shaheer Alvi
Program Officer

8884b

FINAL
RI/FS WORK PLAN
CIRCUITRON CORPORATION SITE

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EXECUTIVE SUMMARY

This Remedial Investigation (RI) and Feasibility Study (FS) Work Plan for the Circuitron Corporation Site in East Farmingdale, Suffolk County, New York, has been prepared in response to USEPA Work Assignment Number 004-2L1E under the USEPA ARCS II Contract.

The Circuitron Corporation Site is a former electronic circuit-board manufacturing facility that operated from 1961 through 1986 at which time the facility was abandoned. The site is approximately one acre in size and has an abandoned building covering most of the surface. Most of the remaining site surface is covered by asphalt and was used as a parking area for employees. Over the 25 year operating period of the facility, the Suffolk County Department of Health Services (SCDHS) and the New York State Department of Environmental Conservation issued numerous violations with regard to the facility's discharge permit (SPDES) for an industrial wastewater groundwater discharge system.

Investigations of the site, performed over the last few years by the SCDHS and the USEPA, have documented the contamination of the facility's septic system, SPDES leach pool system and area storm water drainage system with volatile organics and heavy metals.

The Long Island-New York area is highly dependent upon groundwater as the major source of potable water supply for residents and industry. Contamination of the aquifer in the area of the Circuitron Corporation Site has been documented by the SCDHS in shallow groundwater samples obtained from on-site wells and as evidenced by the shutdown of a public supply well within one mile of the Circuitron Corporation Site because of organic contamination.

The focus of this RI/FS is to perform a detailed study of the potential sources of groundwater contamination at the Circuitron Corporation Site; to study the extent of soil and groundwater contamination; to evaluate the risks to public health; and, to formulate cost effective and reliable remedial alternatives that could be implemented to help prevent or reduce public health risks and the further spread of contamination.

To study the site and groundwater matrices, this work plan includes the installation of ~~one shallow monitoring well and six~~ seven well clusters, each consisting of a shallow and a deep monitoring well. Each well cluster is strategically located upgradient, on, or downgradient of the site. These wells will provide a means to sample the upper and lower strata of the Upper Glacial groundwater regime. In addition, during installation of the on-site wells, soil samples will be obtained for the evaluation of soil contamination.

Soil samples will also be obtained from six soil borings (one in front of the building, four inside the building and one at the rear of the building). These samples will be obtained at varying depths and analyzed for organic and metal contamination. Prior to the sampling activities, the ground penetrating radar (GPR) method will be applied for the determination of the exact location and the approximate configuration of the underground structures that are reported to exist at or very close to the proposed locations of the monitoring wells and the soil borings outside the building. This will enable more careful final selection of sampling locations near or in the underground structures (leaching pools, piping and drains). In addition, surface soil samples will be collected from the unpaved areas of the site. Cement samples will be collected from the building floor during the soil boring installation. Futher, sediment and aqueous (if any) samples will be obtained from the SPDES authorized leaching pool, the old distribution pool, the cesspools and the storm drains. Most samples will be analyzed for the Target Compound List (TCL) chemicals and metals.

All the above ground and below ground tanks, the wastewater treatment basin, the unauthorized leaching pool in the middle of the plating room, drums, and the spills on the floor and walls of the building will be sampled by the EPA under a separate work assignment contract.

The results of the sampling program will be used to produce a picture of the vertical and horizontal extent of contamination in the soil and groundwater in the vicinity of the site. An aquifer pumping test is not likely to be performed, unless it is not possible to obtain reliable background information of the characteristics and geotechnical parameters of the Upper Glacial aquifer. This information could be obtained from recent pumping tests performed on the wells of the immediate vicinity screened in the aquifer of concern. These data will be used in the execution of the groundwater computer model, which will provide a clearer picture of the vertical and horizontal extent of the contamination plume. The results of all RI work will be summarized in the Remedial Investigation Report.

The Feasibility Study Report will present the technologies and detailed remedial alternatives that may be used to reduce public health risks, reduce the potential for off-site migration of contaminants, and/or remove contaminants from soil and groundwater matrices. The FS will carefully examine the cost, implementability, feasibility, institutional aspects and environmental improvements of each remedial alternative so that the USEPA can make a sound choice of the alternative, most desirable for the Circuitron Corporation Site.

The RI/FS will require approximately 12 months to complete including all on-site activities and completion of the RI/FS reports. This aggressive schedule is based on a quick turn-around of deliverables by the USEPA and other reviewing agencies as well as concurrent preparation of the RI and FS reports. RI/FS activities on-site will not begin until the USEPA has completed its emergency response activities.

The RI/FS will be culminated by a Record of Decision for the Circuitron Corporation Site that will be issued by the USEPA upon completion of the work.

1.0 SITE BACKGROUND INFORMATION AND CHARACTERIZATION

1.1 INTRODUCTION

Ebasco Services Incorporated (EBASCO) is submitting this Work Plan to the U.S. Environmental Protection Agency (USEPA) in response to the Work Assignment Number 004-2L1E under ARCS II Contract Number 68-W8-0110.

This Work Plan presents EBASCO's technical scope of work for the Remedial Investigation/Feasibility Study (RI/FS) and a detailed schedule for the performance of the work. A description of the responsibilities of the professionals expected to play a significant role in this work assignment is also included.

This Work Plan has been prepared in accordance with current USEPA guidance. The following are several of the documents specifically applicable to the preparation of an RI/FS, which were considered in preparing this Work Plan:

- Draft Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988)
- Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities (USEPA, 1986)
- Interim Guidance of Superfund Selection of Remedy (USEPA, 1987)
- Superfund Public Health Evaluation Manual (USEPA, 1986)
- Superfund Exposure Assessment Manual (USEPA, 1986)

This Work Plan consists of four sections. Section 1 presents the background information and the historical chemical characterization of the Circuitron Corporation Site. Section 2 contains information that scopes the RI/FS including a preliminary identification of the applicable regulations, a preliminary risk assessment and an assessment of the data gaps and data quality objectives. Section 3 presents the twelve (12) major work tasks for the preparation of the RI and the FS. Finally, Section 4 presents the management approach for the project including the key staff and project personnel involved, the schedule of the work, and the project budget.

1.2 SITE LOCATION, DESCRIPTION AND HISTORY

1.2.1 Site Location and Description

The Circuitron Corporation Site is located at 82 Milbar Boulevard, East Farmingdale, Suffolk County, New York. The site is situated on the Nassau County - Suffolk County border in central Long Island. The site encompasses approximately 1 acre in an industrial/commercial area just east of Route 110 and the State University of New York, Agricultural and Technical College campus in Farmingdale. The site is generally flat and appears to have a slight slope down to the southeast. The site elevation is approximately 85 to 90 feet above mean sea level (MSL). Figures 1-1 and 1-2 present regional and detailed location maps for the site.

Figure 1-3 illustrates the site plan and approximate location of the above and below grade structures.

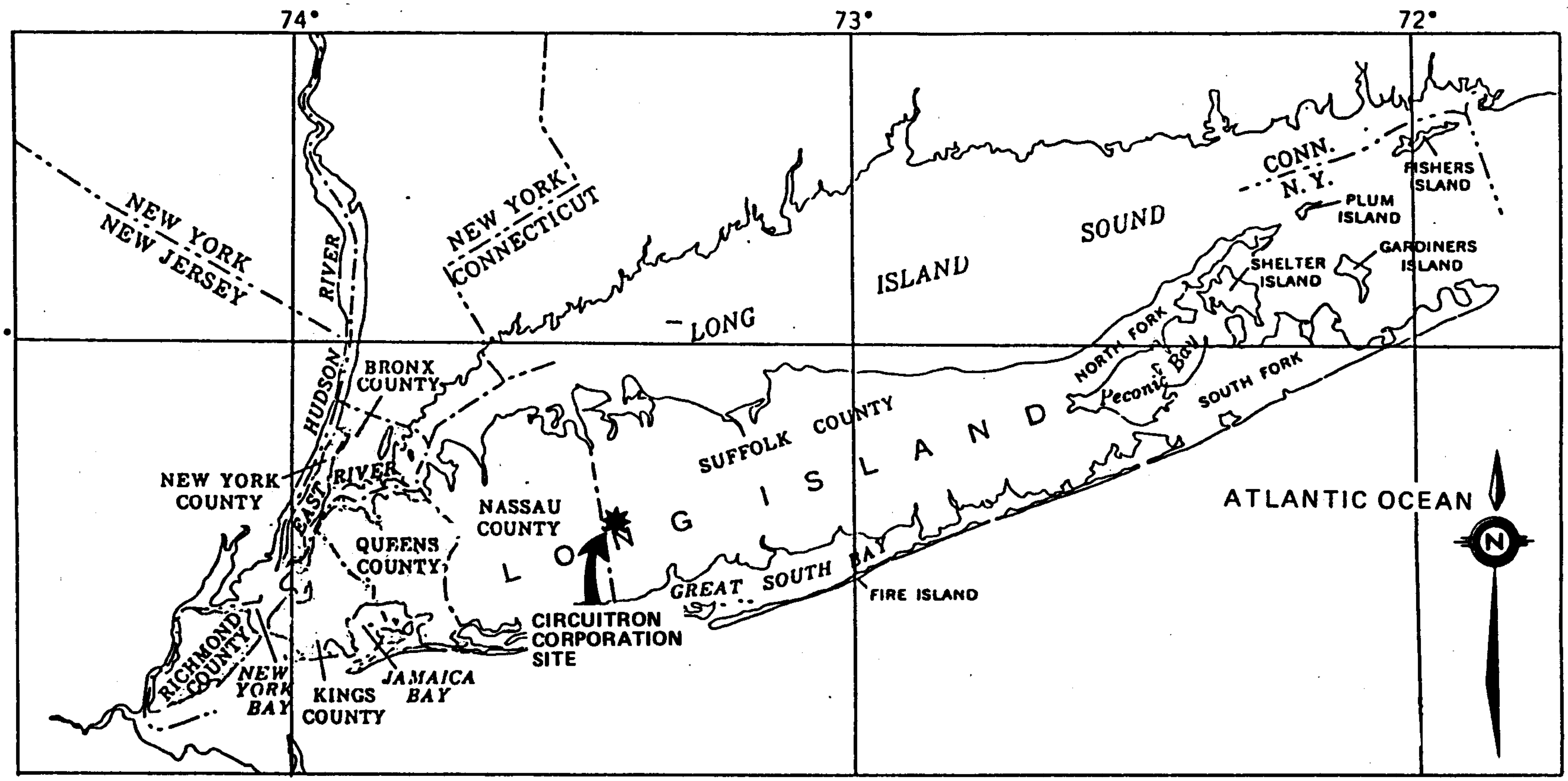
The Circuitron Corporation Site includes a building, that is divided into the following four main areas: a) the drilling and silkscreening area, b) the plating room, c) the scrubber room and d) the storage area. Aside from the building, the site is primarily asphalt paved, with the exception of the rear of the building which comprises a small percentage of the site area. The paved area in front of the building was used in the past as a parking lot for the employees of Circuitron Corporation and is presently used as a parking lot by employees of nearby companies.

The rear of the building and the western side of the site are fenced with a sound chain link fence.

A series of leaching pools underlies the parking lot in front of the building. These authorized leaching pools include an authorized wastewater discharge pool (authorized via a State Pollution Discharge Elimination System (SPDES) permit) below a manhole located on the north side of the property in front of the laboratory (see Figure 1-3), and the old abandoned leaching pools located in the northeast corner of the site.

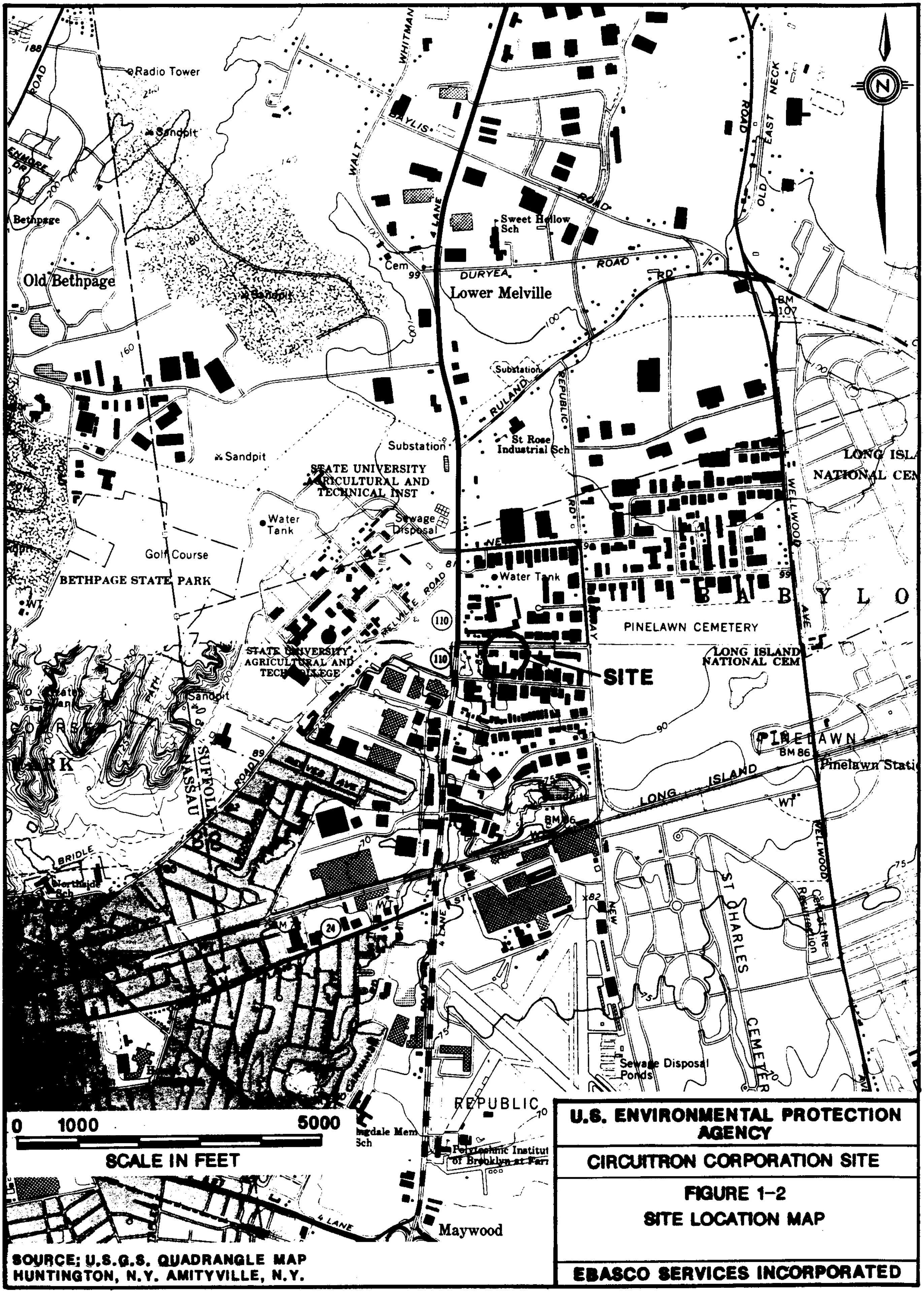
Both pools were opened during the May 14, 1987 site reconnaissance and were found to be dry. Both were monitored with an OVA, an HNu, and an explosimeter. No organic vapors were detected using these instruments. The main SPDES receiving pool measures approximately 15 feet deep, and the distribution pool measured 5 feet deep. The distribution pool is a concrete ring approximately 4 feet in diameter with a pipe from the building entering at the top, and three pipes at the bottom discharging to at least three separate leaching pools. Figure 1-4 provides a diagram of the distribution pool. The bottom of the distribution pool appears to be sand.

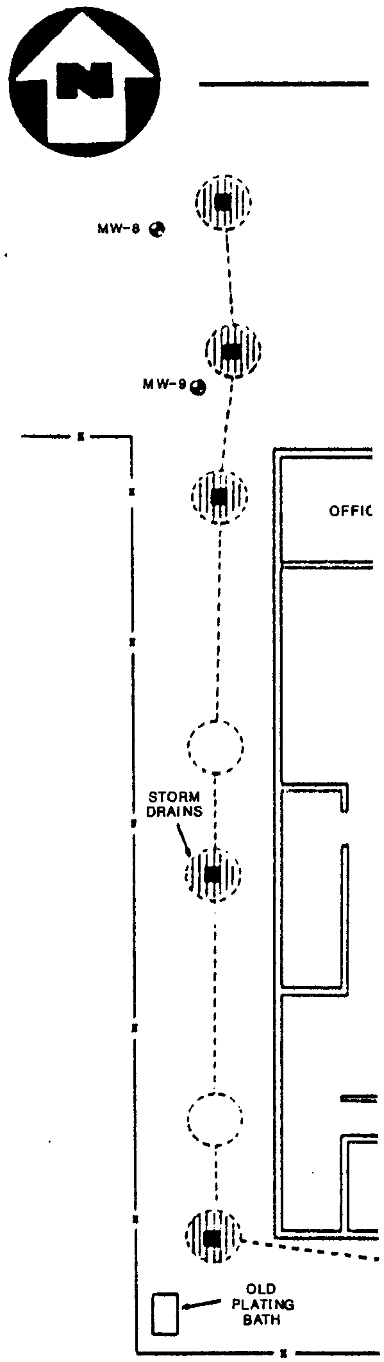
At least two sanitary cesspools have been documented to exist below the parking lot in front of the northwest corner of the building (see Figure 1-3). The sanitary cesspools were authorized to accept sanitary wastes only. However, Suffolk County Department of Health Services (SCDHS) analyses indicate that the cesspools have received hazardous materials. The manhole covers to both of these pools were removed during the



SOURCE: MC CLYMONDS AND FRANKE

U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 1-1 REGIONAL LOCATION MAP
EBASCO SERVICES INCORPORATED


Radio Tower
Sandpit
Bethpage
Old Bethpage
WALT WHITMAN
BAYLIS ROAD
4 LANE
Sweet Hollow Sch
Cem
DURYEA ROAD RD
Lower Melville
BM 107
Substation
RULAND
REPUBLIC RD
St Rose Industrial Sch
Substation
STATE UNIVERSITY AGRICULTURAL AND TECHNICAL INST
Water Tank
Sewage Disposal
Golf Course
BETHPAGE STATE PARK
Water Tank
MELVILLE ROAD
110
LONG ISL
NATIONAL CEM
WELLWOOD AVE
OLD EAST NECK ROAD
B A B Y L O
PINELAWN CEMETERY
LONG ISLAND NATIONAL CEM
SITE
STATE UNIVERSITY AGRICULTURAL AND TECH COLLEGE
Sandpit
SUFFOLK
NASSAU
PINELAWN
BM 86
Pinelawn Stati
LONG ISLAND
BRIDLE
Northside Sch
24
4 LANE ST
NEW
ST CHARLES
CEMETERY
WELLWOOD
Sewage Disposal Ponds
REPUBLIC
Polytechnic Institut of Brooklyn at Farr
Maywood
0 1000 5000
SCALE IN FEET
SOURCE: U.S.G.S. QUADRANGLE MAP
HUNTINGTON, N.Y. AMITYVILLE, N.Y.
U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 1-2
SITE LOCATION MAP
EBASCO SERVICES INCORPORATED



CIRCUITRON CORP.
EAST FARMINGDALE, N.Y.

LEGEND:

- UNDERGROUND CEMENT-LINED TANKS
- EXISTING MONITORING WELL
- SPILLS
- STORM DRAIN
- LEACHING POOL
- SANITARY CESSPOOL
- UNDERGROUND OIL STORAGE TANK

NOT TO SCALE

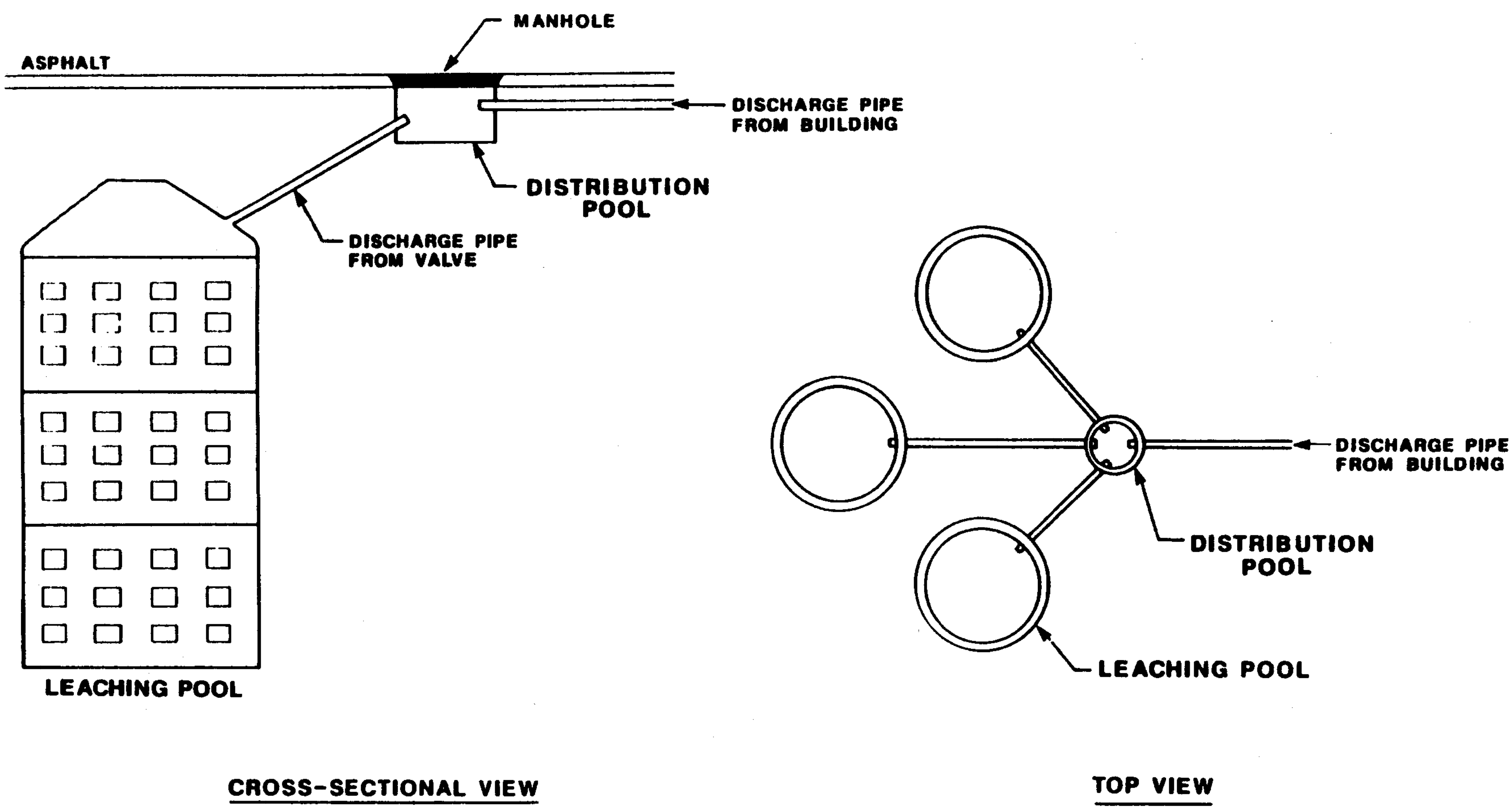
U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 1-3

SITE PLAN

EBASCO SERVICES INCORPORATED



U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 1-4

CROSS-SECTION AND TOP VIEWS OF THE DISTRIBUTION AND LEACHING POOLS

EBASCO SERVICES INCORPORATED

May 14, 1987, site reconnaissance and monitored utilizing the OVA, HNu, and explosimeter. No organic vapors were detected in the northernmost pool (nearest Milbar Boulevard), and it appeared to be dry. The depth from ground surface to the bottom of this cesspool was estimated to be 17 feet. The cesspool nearest to the building, which is the main receiving pool, produced a reading of 20 ppm on the OVA, but no vapors were detected neither on the HNu nor on the explosimeter. The pool appeared to have a liquid sludge material at the bottom, most likely sanitary waste. The depth from ground surface to the top of the liquid sludge material was estimated to be 13 feet.

A line of interconnected storm drains exists on the western portion of the site (see Figure 1-3). Each storm drain was monitored with an OVA, HNu, and explosimeter during the May 14, 1987, site reconnaissance. No vapors were detected by the instruments. Four of the five storm drains contained aqueous material, which was most likely storm water runoff. The storm drain depths ranged from 10 feet to approximately 18 feet deep. The depth of aqueous material in the storm drains ranged from approximately 1.5 feet to 4 feet. Two additional storm drains are located outside the building in an area between the plating room and the storage area in front of the garage door to the scrubber room.

Three large above ground tanks are located in the rear of the building, as shown on Figure 1-3. Reportedly, these tanks were used for the storage of methylene chloride and other solvents. An underground oil storage tank may also exist at the rear of the building as indicated by a vent and fill tube above ground. The structural integrity and contents of this tank are unknown.

The Circuitron building is approximately 100 feet wide and 75 feet long and has an internal clearance of 10 to 12 feet from floor to ceiling. It is abandoned and most of the contents have been removed. The drilling, silk screening and the scrubber room are empty except for general rubble and trash. The plating room is mostly empty except for six (6) drums of unknown content and four (4) five-gallon water bottles with unknown liquid contents.

At least two unauthorized leaching pools exist below the concrete floor in the plating room. One of these pools is located approximately in the middle of the plating room, and a second one at the southern end of the plating room. A circular sunken area, approximately 2-foot diameter, in the concrete floor towards the front of the plating room may indicate the presence of a third unauthorized pool. The pool in the southern portion of the room was reportedly cleaned and has been backfilled. All visible contamination was reportedly removed prior to backfilling. The leaching pool in the middle of the room was opened and sampled in December 1984. The floor was recemented after sampling so that Circuitron Corporation could continue operating. This pool was never cleaned out. The pool in the southern portion of the plating room is visible, because the pool opening was not resurfaced after backfilling.

A significant quantity of oil appears to have been spilled on the floor in the southeast corner of the scrubber room, as illustrated in Figure 1-3. There are no standing liquids on the building floor, but a significant amount of staining on floors and walls can be observed in almost every room. It is reported that at least six underground concrete holding tanks are located beneath the building floor (three at the north end of the plating room, two in the southwest corner of the scrubber room and one in a small room in the southeast corner of the building).

1.2.2 Site History

Circuitron Corporation was an electronic circuit board manufacturing facility. The facility began operations in 1961 under the ownership of the 82 Milbar Corporation, of which Mario Lombardo and Julius D'Amato were principal owners. In 1983, Mario Lombardo sold Circuitron Corporation to F.E.E. Industries, which in turn sold Circuitron Corporation to ADI Electronics. The 82 Milbar Corporation still retains ownership of the property, and ADI Electronics, located at 51 Trade Zone, Ronkonkoma, New York, is the current owner of the Circuitron Corporation. The current owners ceased operations and vacated the site some time between May and the end of June 1986.

The facility had an approved New York State Pollutant Discharge Elimination System (SPDES) permit, No. NY-007 5655, to discharge industrial wastewater to a series of leaching pools located below the parking lot in front of the building. This permit was deleted by NYSDEC on September 12, 1986 based on the July 1, 1986 inspection indicating that discharge had ceased.

Circuitron Corporation had received numerous warnings concerning SPDES permit violations and unauthorized discharges from both the Suffolk County Department of Health Services (SCDHS) and the New York State Department of Environmental Conservation (NYSDEC). An Order on Consent (Reference 26) and the Stipulated Agreement (Reference 27) issued by the SCDHS in 1984 and 1985, respectively, required that all leaching pools and storm drains be remediated; all toxic and hazardous materials be removed from the site including drums, tanks, and piping; and a groundwater quality study be performed. Although Circuitron Corporation installed 5 monitoring wells at the site (MW-8 thru MW-12 as shown in Figure 1-3), there are no engineering or well installation reports available. In addition, the analytical results from the Circuitron Corporation and the SCDHS groundwater sampling of these wells are conflicting. To date, only the authorized leaching pool in the southern part of the plating room has been cleaned out and backfilled. There are no records available regarding the amount of waste removed from the unauthorized leaching pool or the existence and the extent of contaminated soil in and around the leaching pool. Circuitron Corporation has received New York State's largest fine ($175,000) for environmental pollution, and the original owner, Mario Lombardo, has been fined and convicted of a felony in connection with unauthorized discharges.

Circuitron Corporation vacated the site without satisfactory compliance with terms in the Order on Consent and the Stipulated Agreement. Circuitron Corporation has since filed for bankruptcy. The property owner is attempting to block bankruptcy proceedings until the site is remediated. Litigation in this case is ongoing.

Table 1-1 presents a chronology of events at the Circuitron Corporation Site based on background information from the Suffolk County Department of Health Services, the New York State Department of Environmental Conservation, and the NUS Corporation Field Investigation Team (FIT 2).

1.2.3 Legal Actions

Circuitron Corporation has received numerous warnings and notices concerning SPDES permit violations and in regard to unauthorized discharges at the facility.

In response to the unauthorized discharge of hazardous materials to the storm drain in the southwest corner of the property, the SCDHS charged that Circuitron Corporation failed to comply with the following provisions of the Suffolk County Sanitary Code:

(1) Article 12, Section 1205: discharge of toxic or hazardous material on November 16, 1983 to and/or from their sanitary cesspool system.

(2) Article 12, Section 1217 (c): failure to clean out contaminated cesspool on April 3, 1985, after due notice of the need for such cleanout.

To satisfy the above violations, Circuitron Corporation agreed to a SCDHS Order on Consent, No. IW 84-46, on June 27, 1984 (Reference 26).

In response to additional violations of the Suffolk County Sanitary Code, Circuitron Corporation entered into a Stipulated Agreement, No. IW0885, with SCDHS on March 7, 1985 (Reference 27).

TABLE 1-1

CIRCUITRON CORPORATION SITE

CHRONOLOGY OF EVENTS AT THE CIRCUITRON CORPORATION SITE

1961	Circuitron Corporation begins operation at the site. The Corporation is owned by 82 Milbar Corporation, of which Julius D'Amato and Mario Lombardo are principal owners.
Approx. May 1981	An exchange of Circuitron Corporation stock takes place. Mario Lombardo gets 100 percent ownership of Circuitron Corporation, and Julius D'Amato gets 100 percent ownership of the property and 82 Milbar Corporation.
June 23, 1983	A fire at the facility destroys 95 percent of the east side of the building.
Unknown date 1983	Circuitron Corporation is purchased by F.E.E. Industries.
November 16, 1983	SCDHS samples the SPDES industrial leaching pool. Analytical results indicate that permit violations have occurred.
February 2, 1984	SCDHS orders Circuitron Corporation to clean out the SPDES leaching pool.
Unknown date 1984	ADI Electronics purchases Circuitron Corporation from F.E.E. Industries.
March 1984	The new owners discover that wastewater is being discharged to a storm drain in the southwest corner of the property and they notify the SCDHS.
June 4, 1984	SCDHS Commissioner issues a 10-point Order on Consent for cleanup of illegal discharge (IW 84-46) (Reference 26).
June 27, 1984	Joseph Mignone, President of Circuitron Corporation, agrees to Order on Consent.
July 20, 1984	Circuitron Corporation cleans out storm drain in southwest corner as per Order on Consent.

TABLE 1-1 (Cont'd)

CIRCUITRON CORPORATION SITE

CHRONOLOGY OF EVENTS AT THE CIRCUITRON CORPORATION SITE

November 1984	Current owners discover unauthorized leaching pool below the floor of the plating room and inform SCDHS.
December 12, 1984	SCDHS inspectors sample the unauthorized leaching pool. One of their inspectors collapses from solvent fumes emanating from the pool.
December 14, 1984	EPA requests the Field Investigations Team (FIT 2) to perform a Site Inspection/ Preliminary Assessment on the site as a result of an article published in Newsday.
March 7, 1985	An Administrative Hearing is held, at which time Circuitron Corporation agrees to terms of a Stipulated Agreement.
March 14, 1985	SCDHS issues the Stipulated Agreement, DHS No. IW0885 (Reference 27).
March 25, 1985	NUS FIT 2 submits PA/Site Evaluation Report to EPA, recommending that a groundwater study be conducted.
March 26- April 5, 1985	SCDHS inspectors dye test the Circuitron Corporation's plumbing as per the Stipulated Agreement.
April 4, 1985	Samples collected indicate that unauthorized leaching pools were receiving discharges of toxic and hazardous materials.
April 1985	ADI Electronics informs SCDHS that Circuitron Corporation will vacate the premises and abandon operations at the site.
Approx. Mid-March- Mid-April 1985	Circuitron Corporation installs five ground-water monitoring wells. The wells were never approved by SCDHS. There are no engineering reports or well installation reports available on the monitoring wells.

TABLE 1-1 (Cont'd)

CIRCUITRON CORPORATION SITE

CHRONOLOGY OF EVENTS AT THE CIRCUITRON CORPORATION SITE

May 9, 1985	Former owner, Mario Lombardo, pleads guilty to charges of unauthorized disposal of hazardous waste, N.Y.S. Environmental Conservation Law, Section 27 09-14. He is fined $50,000 and sentenced to 700 hours of community service.
May 31, 1985	SCDHS notifies Circuitron Corporation that an environmental cleanup of all toxic and hazardous materials and a groundwater quality study would be required, prior to abandoning the facility.
September 1, 1985	Circuitron Corporation allows their SPDES permit to expire. They continue to discharge to the SPDES leaching pool through March 31, 1986.
September 10, 1985	SCDHS samples the five on-site monitoring wells. Analytical results indicate the presence of 1,1,1-trichloroethane in the three downgradient wells.
October 29, 1985	NYSDEC samples the SPDES industrial leaching pool. Analytical results indicate the presence of phenols, 1,1,1-trichloroethane, and 1,1-dichloroethane in excess of N.Y.S. ambient water quality standards.
January 17, 1986	SCDHS samples the SPDES leaching pool. Analytical results indicate the presence of methylene chloride.
Mid-May - End-June 1986	Circuitron Corporation vacates the facility at some time during this period. They remove all equipment of value and leave the facility in its present condition.
May 28, 1986	Over a 12-month period covering 4/85-3/86, NYSDEC noted 104 SPDES permit violations.

TABLE 1-1 (Cont'd)

CIRCUITRON CORPORATION SITE

CHRONOLOGY OF EVENTS AT THE CIRCUITRON CORPORATION SITE

July 1, 1986	NYSDEC inspects the Circuitron Corporation facility. They find the building vacated. Employees in neighboring buildings indicate that no one has been at the facility for at least a month. The SPDES industrial pool was dry, and eight 55-gallon drums with a strong solvent odor were left outside behind the building.
September 12, 1986	NYSDEC officially notifies Circuitron Corporation that it has deleted their SPDES permit based on the July 1, 1986, inspection indicating discharge has ceased.
April 15, 1987	EPA tasks NUS FIT 2 to conduct a Site Inspection at the Circuitron Corporation Site.
May 14, 1987	NUS FIT 2 conducts a site reconnaissance of the site for sampling to be conducted at a later date.
May 15, 1987	Based on conditions observed at the site, NUS FIT 2 recommends that EPA conduct an Emergency Response Action at the site.
May 16, 1987	U.S. EPA Emergency Response Team (ERT) and Technical Assistance Team (TAT) inspect the Circuitron facility.
May 18, 1987	ERT recommends a Removal Action at the site. The proposal for the Removal Action is currently being prepared.
May 19, 1987	NUS Corporation Region 2 FIT is tasked by EPA to conduct an Expanded Site Inspection (ESI) at the Circuitron Corporation Site. EPA requests FIT 2 to complete the Site Inspection Report and Hazard Ranking Model for the site, based on existing state and county data.

In 1984, the former owner of Circuitron Corporation, Mario Lombardo, was charged for discharging organic solvents to unauthorized "hidden" leaching pools between March 1, 1982 and March 22, 1984. He was indicted on 6 felony counts of unlawful dumping of hazardous wastes, under N.Y.S. Environmental Conservation Law (ECL) Section 27, Subsection 09-14; 19 felony counts of offering a false instrument for filing, under Suffolk County Penal Law Section 175, Subsection 135; and 20 misdemeanor counts of violating N.Y.S. ECL Section 17, Subsections 03-01 and 05-01. On May 9, 1985, Mario Lombardo pleaded guilty to unlawful dumping of hazardous wastes, NYS Section 27, Subsection 09-14. He was fined $50,000 and sentenced to 700 hours of community service.

When Circuitron Corporation informed SCDHS that they would be vacating the facility, SCDHS informed the owners that a cleanup of toxic and hazardous materials and a groundwater study would be required. SCDHS also required further off-site groundwater monitoring. Circuitron Corporation refused to adhere to the off-site groundwater monitoring requirement. In addition, the property owner, 82 Milbar Corp., has brought suit against the current facility owners, ADI Electronics, for cleanup of the site.

1.3 GEOLOGY AND GEOHYDROLOGY

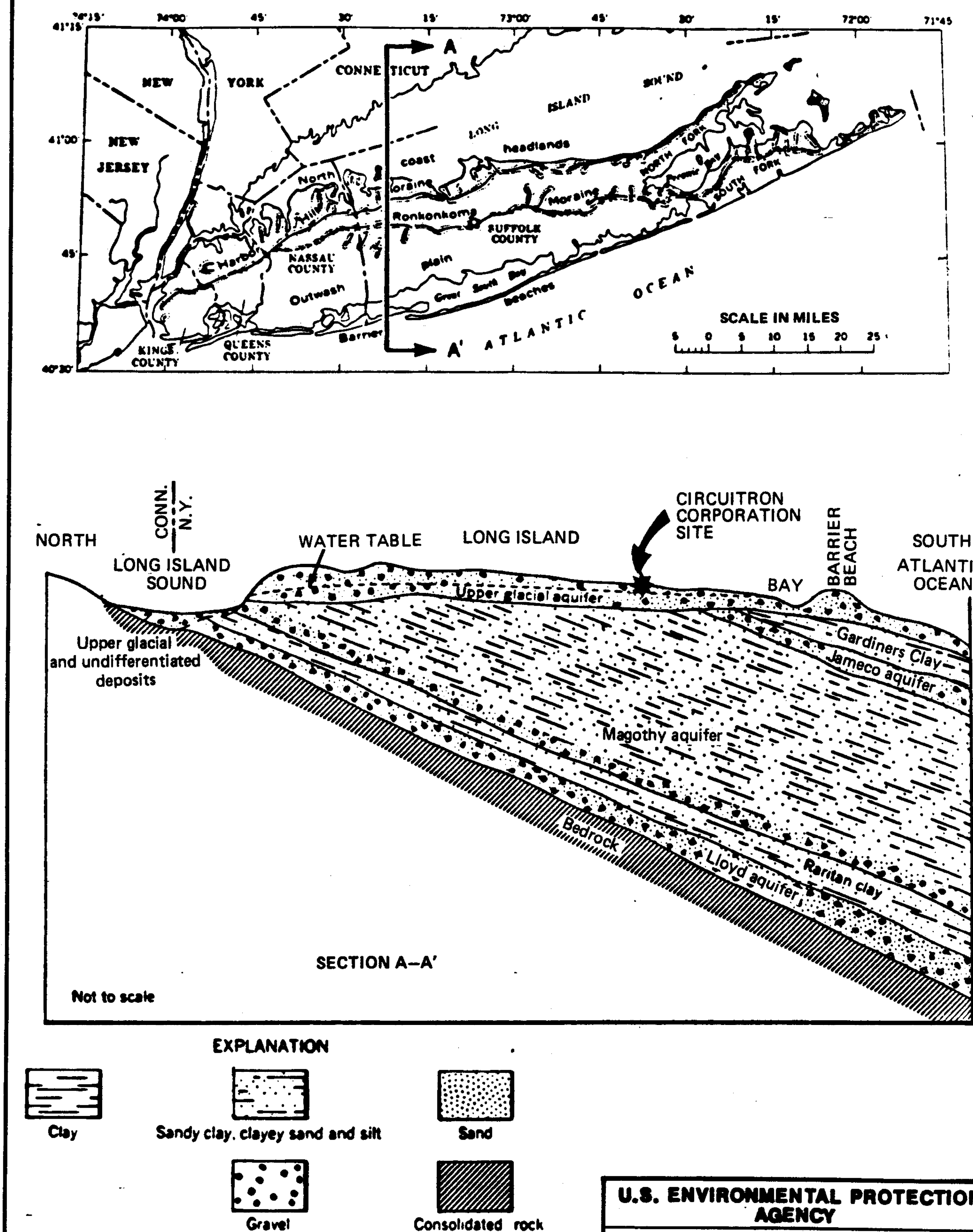
1.3.1 Regional Geology

The Circuitron Corporation circuit board manufacturing facility is situated on outwash plain deposits south of the Ronkonkoma recessional moraine. These deposits, consisting of a mixture of coarse sand and gravel, constitute the sediments of the Upper Glacial aquifer.

Figure 1-5 is a generalized geological cross-section trending north to south across Long Island which shows a southward sloping wedge of unconsolidated deposits unconformably overlying a crystalline bedrock of metamorphic and igneous rocks.

As illustrated in the diagram, three major aquifers, the Upper Glacial, the Magothy and the Lloyd sand member of the Raritan formation are present beneath the site. The unconsolidated deposits are late Cretaceous, Pleistocene, and Recent in age. The total thickness of the unconsolidated deposits ranges from 750 feet to 1700 feet with maximum thickness toward the southeast.

The two aquifers of concern are the Upper Glacial aquifer and the Magothy aquifer. Previous studies have indicated that the Upper Glacial and Magothy aquifers may be hydraulically connected east and west of the site.



SOURCE: (FRANKE AND MC CLYMONDS, 1972)

U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 1–5 **GENERALIZED GEOLOGIC CROSS-SECTION**
EBASCO SERVICES INCORPORATED

1.3.1.1 Upper Cretaceous Series

Raritan Formation

The Raritan formation of Late Cretaceous age is the deepest formation of unconsolidated deposits in the site area. It rests directly on the crystalline bedrock and is unconformably overlain by the Magothy formation. The Raritan formation occurs beneath the entire area of Long Island but does not outcrop. Formation thickness ranges from 300 to 600 feet. The formation is divided into a lower unit (the Lloyd sand member) and an upper unit (Raritan clay).

The clay member functions as an aquiclude (confining unit), and separates the Lloyd sand member from the overlying Magothy. The clay member also retards the movement of salt water from the overlying Magothy formation into the underlying fresh water in the Lloyd Sand member on southeastern Long Island.

Magothy Formation

The Magothy formation is the thick sequence of non-marine deposits of Late Cretaceous age that overlie the Raritan formation. The Magothy is overlain unconformably at some locations by the Jameco gravel and at others by younger units of Pleistocene age. The lower contact, which is an erosional unconformity, can be recognized by a change from gravelly beds at the lower contact of the Magothy to beds of clay or sandy clay in the Raritan formation. The upper contact of the Magothy formation can be recognized by differences in color, texture and composition between these sediments, the Jameco gravel, and Gardiners clay of the upper Pleistocene sediments.

The Magothy formation occurs throughout the subsurface of Long Island. Studies indicate that the surface is a gently sloping plain, moderately to highly dissected by streams flowing south and southwest. In response to the interdigitating i.e. interlocking of coarse and fine-grained materials, the permeability of the Magothy formation is greatest in a direction parallel to bedding and considerably less perpendicular to bedding.

1.3.1.2 Pleistocene and Recent Series

Jameco Gravel

The Jameco gravel is an irregular body of predominantly coarse sand and gravel deposited on the erosional upper surface of the Magothy formation. This gravel is considered to have been deposited as outwash by glacial "meltwater" streams, probably of pre-Wisconsin age. An irregularity in the upper portion of the Jameco suggests that the gravel was eroded before the Gardiners clay was deposited. The Jameco gravel underlies about 75 square miles in southeastern Queens and southwestern Nassau Counties.

Jameco gravel is thickest in the deepest parts of valleys cut into the surface of the Magothy formation. This formation is among the most permeable of the water bearing deposits on Long Island. Water in the Jameco gravel is under artesian pressure because of the confinement by the overlying Gardiners clay. As no extensive impermeable beds separate the Jameco gravel and the Magothy formation, both formations constitute a single aquifer.

Gardiners Clay

The Gardiners clay consists mainly of gray and greenish gray clay and silt and locally contains lenses of sand, gravel and sandy clay. It was deposited in shallow bays and estuaries in the southern half of Long Island during an interglacial stage. This clay is overlain by the Upper Pleistocene deposits and underlain at some places by the Jameco gravel and in others by the Magothy formation.

The top of the Gardiners clay ranges from about 50 to 120 feet below sea level. The large range in depth must be associated in part by erosion and in part by deposition on an irregular sea bottom.

The Gardiners clay has a very low permeability and serves as an aquitard and upper confining layer for the Magothy aquifer.

1.3.1.3 Upper Pleistocene and Recent Deposits

The upper Pleistocene and Recent deposits, with a total thickness of approximately 180 feet, encompass all sediments from the top of the Gardiners clay to ground surface. These sediments are composed of the following units:

(1) a body of glacial till which in part forms the Ronkonkoma recessional moraine;

(2) an extensive body of stratified sand and gravel deposited as glacial outwash;

(3) a thin deposit of marine clay, called the "20 foot" clay, which occurs in the southern part of Nassau and Queens counties and is sometimes interbedded in the outwash plain deposits; and

(4) discontinuous, lenticular bodies of peat, silt, clay, sand, gravel and artificial fill of Recent age which underlie bays, marshes, beaches and stream valleys.

The till occurs north, east and west of the site in terrain of high relief (Manneto Hills, northwest and the Half Hollow Hills to the northeast). The till is not water bearing except for small bodies of perched water.

Outwash

The outwash establishes the bulk of the upper Pleistocene deposits and also underlies the till and deposits of Recent age. These sediments rest unconformably on the Gardiners clay and upon the Magothy in areas where the Gardiners clay and Jameco gravel are absent. Logs of wells in the southern part of Long Island show the outwash can be separated into upper and lower portions by the "20-foot" clay.

The outwash ranges in thickness from about 30 to 120 feet, thickening toward the north in the direction of the Ronkonkoma moraine. The sediments consist of stratified beds of fine to coarse sand, and sand with gravel.

The outwash deposits are highly permeable and contain large quantities of water. Hydraulic conductivities of 1.9×10^3 gpd/ft^2 and transmissivities of 1.9×10^5 gpd/ft are common, with groundwater velocities ranging from 1 to 4 ft/day (Reference 2). The groundwater in the outwash occurs mainly under water table conditions. Outwash deposits are the most permeable beds of wide extent in the study area. The deposits are coarse grained and well sorted and have high permeability with porosities ranging from 30 to 40 percent.

"20-foot" Clay

The name "20-foot" clay is assigned to thin beds of green gray marine clay at elevations of 20 to 35 feet below sea level in the southern portion of Nassau County. The clay is lithologically similar to the Gardiners clay.

The "20-foot" clay ranges in thickness from 0 to approximately 40 feet. Well logs indicate this unit to be south of Sunrise Highway but a few suggest the clay may have been deposited in several narrow embayments north of Sunrise Highway. Little data are available regarding the permeability of the "20-foot" clay, although its grain size and degree of sorting indicate it is a poor transmitter of water (Reference 8).

Recent Deposits

The Recent deposits, not including soil and artificial fill, occur beneath bays, in marshlands, on barrier beaches and in stream valleys. Recent deposits are the uppermost and stratigraphically the youngest sediments, and are immediately underlain by outwash. The Recent deposits reach a maximum thickness of about 40 feet and are too thin to be represented on a geological cross-section.

1.3.2 Site Geology

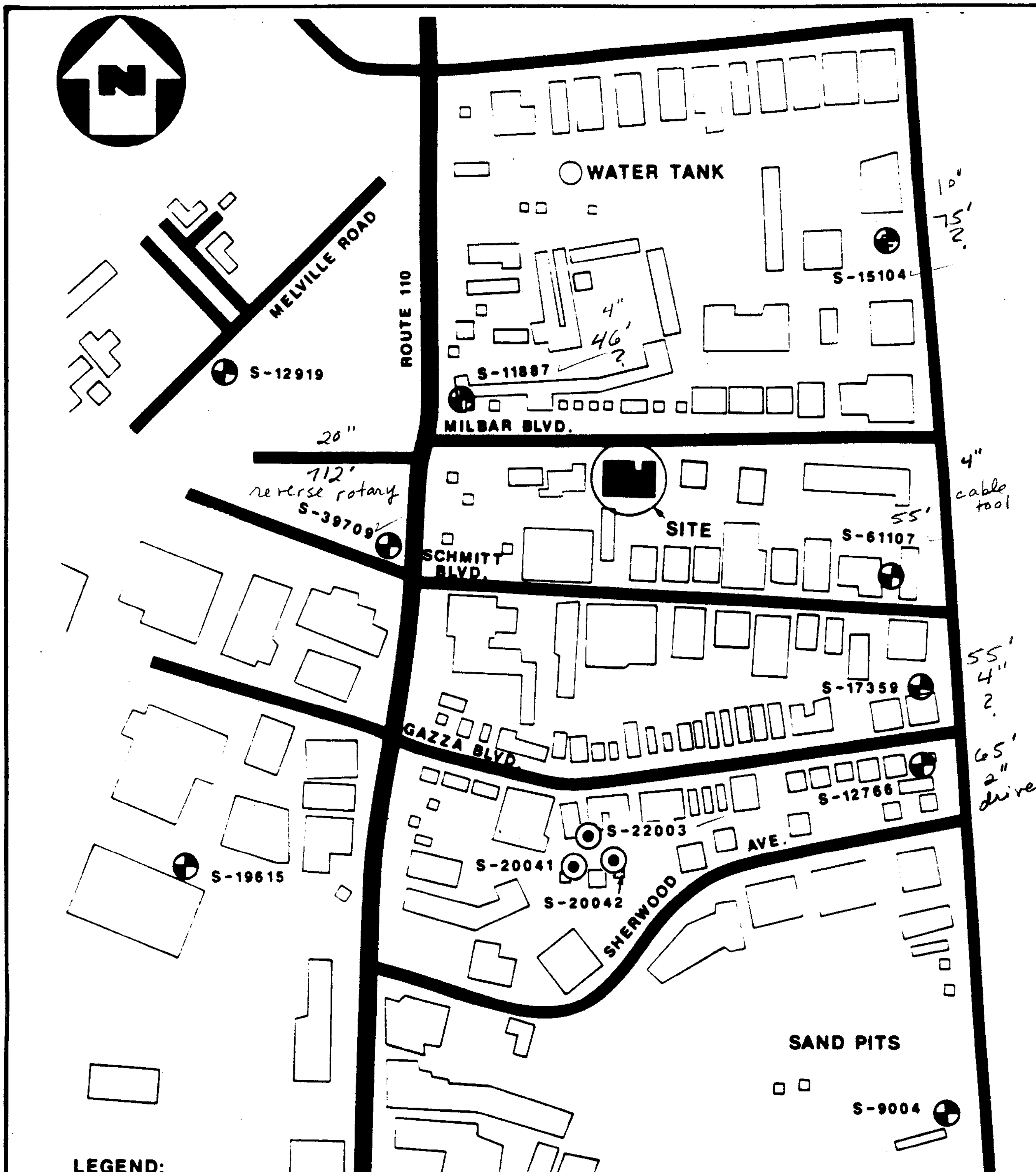
The Circuitron Corporation Site is situated on the northern edge of the north-south trending Outwash Plain. The site is too inland to have the Cardiens Clay or Jameco Gravel underlying the Upper Pleistocene deposits. The site stratigraphy consists of the Upper Glacial aquifer (Upper Pleistocene deposits), with a thickness that ranges from 80 to 110 feet. The Upper Glacial aquifer overlains the "20-foot clay" layer, which extends underneath the entire site (Reference 10) and has a thickness that varies from 10 to 40 feet (Reference 11). The "20-foot clay" layer could be considered as part of the Magothy Formation which is located underneath the Upper Glacial aquifer. In the vicinity of the site bedrock occurs at the bottom of the Magothy aquifer at approximately 1200 feet below ground surface.

1.3.3 Groundwater Resources

On June 12, 1978, the aquifer system underlying Long Island was designated as the sole groundwater source aquifer under the 1974 Safe Drinking Water Act. This aquifer system is composed of the Upper Glacial Aquifer, the Magothy Aquifer and the Lloyd Sands Aquifer. The Magothy formation is the primary source of drinking water in the area. This aquifer reaches a maximum thickness of approximately 1000 feet, with most well depths ranging from 90 to 700 feet below the ground surface. Many large municipal supply wells are screened in the 500- to 700-foot portion of the Magothy Aquifer, due to a greater amount of coarse gravels, higher yield, and greater distance from surface contamination. Many private wells, on the other hand, installed in areas where there is no tidal effect and therefore the water is not salty, are screened in the Upper Glacial aquifer.

Groundwater in the vicinity of the site moves in a south-southeast direction, but may be locally impacted by hydraulic gradients created by septic systems and pumping wells. Monitoring wells installed in the vicinity of the Circuitron Corporation Site indicate that the groundwater table is approximately 28 to 30 feet below the ground surface.

In the vicinity of the site, houses and businesses are supplied by two water companies. The East Farmingdale Water District services the site and areas to the north. Suffolk County Water Authority supplies areas to the south. Each wellfield may consist of one or more wells. Each well generally supplies one million gallons of water per day or more when in operation, and each is completed in the Magothy aquifer. Figure 1-6 shows the existing private and municipal wells located in the vicinity of the Circuitron Corporation Site.



LEGEND:

LOCATION OF EXISTING PRIVATE WELLS

LOCATION OF EXISTING MUNICIPAL COMMERCIAL WELLS

(S-9004) NYSDEC WELL INDEX NUMBERS

0 250 500 750

SCALE IN FEET

SOURCE: NUS CORPORATION

U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 1-6

MUNICIPAL AND PRIVATE EXISTING WELLS

EBASCO SERVICES INCORPORATED

1.4 TOPOGRAPHY, SURFACE WATER AND DRAINAGE

The Circuitron Corporation Site is located approximately 85 feet above mean sea level (MSL), with an approximate site slope of less than 1 percent to the west-southwest. The surrounding topography is generally flat to gently sloping in a southerly direction. The nearest significant increase in elevation occurs approximately 0.9 mile to the west-northwest in Bethpage State Park, where a maximum elevation of 160 feet MSL is attained.

The nearest surface water body is an intermittent tributary to the Massapequa Creek originating approximately 2.4 miles southwest of the site. The Massapequa Creek becomes a perennial stream about 3 miles from the site, flowing in a south-southwesterly direction and connecting several lakes through the Massapequa Preserve. The slope of the intervening terrain from the Circuitron Corporation Site to the nearest intermittent tributary is also less than 1 percent.

The Circuitron Corporation Site is located in a densely populated industrial/commercial area east of Route 110 and the State University of New York (SUNY) Farmingdale Campus. Regional surface water drainage is to the south and southeast in the direction of South Oyster and Great South Bays. Most of the site is paved, with the exception of a narrow strip of land adjacent to the east and south sides of the facility. The paved portions of the property slope north to Milbar Boulevard and west toward a storm sewer line that runs along the west side of the property. Site runoff is channeled toward several storm drains along the length of this storm line. This storm line is not connected to the main public storm sewer under Milbar Blvd. Runoff entering the main storm sewer flows east into two leaching pools 300 feet from the site, where it is dispersed into the ground. There is no viable overland route for surface runoff from the site to any surface water body due to the distance, the extent of urban development, and the numerous intervening storm drains between the site and the nearest creek tributary.

1.5 LAND USE AND ENVIRONMENTAL RESOURCES

Aerial photographs indicate that in 1959 the site and the surrounding area were primarily agricultural and Milbar Boulevard did not exist. The nearest commercial development was located along the north side of Gazza Boulevard approximately 1000 feet to the south. Within the following 16 years, commercial and industrial development had replaced most of the agricultural land north, south and southeast of the site. A 1977 aerial photograph shows the presence of the completed Circuitron Corporation facility.

Most of the area in the immediate vicinity of the Circuitron Corporation Site consists of commercial/industrial development, with the exception of the State University of New York (SUNY) Farmingdale Campus immediately west and northwest along Route 110. Other land usage within a 1-mile radius of the site includes an amusement park, 800 feet to the north and west; the Pinelawn Cemetery 1500 feet to the southeast; the Republic Airfield 0.7 mile to the south; and a fringe of the Bethpage State Park 0.9 mile to the northwest. The main line of the Long Island Railroad forms the northern border of the Republic Airfield property. There are scattered residences along Rutland Road approximately 0.75 mile north of the site, and a densely populated residential area 0.5 mile to the southwest. There are currently about 50 active businesses along the 2-block area bounded by Milbar Blvd. to the north, Schmitt Blvd. to the south, New Highway to the east, and Route 110 to the west. Route 110 is a major transportation corridor utilized by approximately 40,000 cars on a daily basis.

The populations within a 1-, 2-, and 3-mile radius of the Circuitron Corporation Site are approximately 1,220, 14,600, and 59,130, respectively. Although exact numbers are unknown, it is estimated that the employee population of the business within a 1-mile radius could easily account for several thousand more people. The students, faculty, and staff at SUNY provide an estimated additional population of 12,000.

1.6 CHEMICAL CHARACTERIZATION

The Suffolk County Department of Health Services has extensively sampled the authorized leaching pools, sanitary cesspools and storm drains of the Circuitron Corporation Site for heavy metals and volatile organics. Tables 1-2 through 1-6 present the SCDHS analytical results from these sampling activities.

1.6.1 <u>On-Site Contamination</u>

SCDHS sampling of the Circuitron Corporation facility included dye-testing of piping systems to determine discharge points at the site. The dye testing revealed that untreated wastewater discharges were going directly to the SPDES leaching pool; to a storm drain in the southwest corner of the site; and to at least two unauthorized leaching pools below the floor of the plating room. Sampling revealed that each of these discharge points was contaminated with heavy metals and solvents. Although never sampled, it is likely that the soil surrounding and below these leaching areas is also contaminated.

Analysis of samples collected from the SPDES industrial discharge leaching pool (see Table 1-2) indicated the presence of particularly high levels of copper (4,400 ppb) and 1,1,1-trichloroethane (580 ppb).

TABLE 1-2

CIRCUITRON CORPORATION SITE

SUMMARY OF SCDHS ANALYTICAL RESULTS
SPDES INDUSTRIAL DISCHARGE LEACHING POOL LIQUID SAMPLES

PARAMETER	CONCENTRATION*				
DATE:	04/23/81	10/28/81	11/16/83	05/23/84	12/13/84
Copper	6,000		800,000	12,000	4,400
Lead	1,000		920,000	400	
Iron			560,000		
Nickel			3,000		
Silver			430		
Methylene chloride		73	83,000		66
1,1,1-Trichloroethane		80	190		580

DATE:	03/26/85	04/08/85	04/17/85	05/07/85	01/17/86
Copper	3,000	2,300	2,700	2,100	
Methylene chloride		62	37		190
1,1,1-Trichloroethane		60	36		30
Chloroform			47		

*All results are reported in ug/l.

Source: Suffolk County Department of Health Services.

TABLE 1-3

CIRCUITRON CORPORATION SITE

SUMMARY OF SCDHS ANALYTICAL RESULTS
SANITARY CESSPOOL LIQUID SAMPLES

PARAMETER	CONCENTRATION*				
DATE:	04/23/81	09/02/81	11/16/83	12/13/84	01/17/86
Methylene chloride	100				
1,1,1-Trichloroethane		3,400			
Copper			1,800		
Iron			3,500		
Lead			200	200	200
Silver			200		

*All results reported in ug/l.

Source: Suffolk County Department of Health Services.

TABLE 1-4

CIRCUITRON CORPORATION SITE

SUMMARY OF SCDHS ANALYTICAL RESULTS
DISTRIBUTION POOL (NORTHEAST CORNER) LIQUID SAMPLES

PARAMETER	CONCENTRATION*		
DATE:	04/23/81	09/02/81	10/28/81
Methylene chloride	290		
1,1,1-Trichloroethane	42,000		460
Copper	3,200		
Lead	400		

*All results reported in ug/l.

Source: Suffolk County Department of Health Services.

TABLE 1-5

CIRCUITRON CORPORATION SITE

SUMMARY OF SCDHS ANALYTICAL RESULTS
UNAUTHORIZED LEACHING POOLS SAMPLES

A. Unauthorized Leaching Pool #1 - Middle of Plating Room

	Sediment Sample 11/14/84	Aqueous Sample 11/14/84
Methylene chloride	1,200	410
1,1,1-Trichloroethane	180,000	11,000
1,1,2-Trichloroethylene	330	30
Tetrachloroethylene	5,100	160
Chloroform	40	
Methyl ethyl ketone		230
Copper		6,600
Zinc		1,600

B. Unauthorized Leaching Pool #2 - South End of Plating Room

	Sediment Sample 04/04/85	Aqueous Sample 04/04/85
Copper	360,000	
Iron	550,000	
Nickel	4,200	
Zinc	470,000	
Lead	3,300,000	
Silver	2,100	
Methylene chloride		26,000
1,1,1-Trichloroethane		6,500
1,1,2-Trichloroethylene		550
Tetrachloroethylene		4,400
Toluene		6,000

*All results reported in ug/l for aqueous samples and ug/kg for sediment samples.

Source: Suffolk County Department of Health Services.

TABLE 1-6

CIRCUITRON CORPORATION SITE

SUMMARY OF SCDHS ANALYTICAL RESULTS
STORM DRAINS LIQUID SAMPLES

Storm Drain - Southwest Corner

PARAMETER	CONCENTRATION*		
DATE:	12/13/84	04/04/85	01/17/86
Copper	1,400		
1,1,1-Trichloroethane		260	22

*All results reported in ug/l

Source: Suffolk County Department of Health Services.

Analysis of samples collected from the sanitary cesspool (see Table 1-3) indicate that it received organic solvents such as methylene chloride (100 ppb) and 1,1,1-trichloroethane (3,400 ppb) and metals such as copper (1,800 ppb) and iron (3,500 ppb).

In 1981, samples from the distribution pool (see Table 1-4) in the northeast portion of the site also indicated that organic solvents, such as 1,1,1-trichloroethane (42,000 ppb), had been discharged. The distribution pool directed wastewater to the three leaching pools in the northeast portion of the site.

The storm drain in the southwest corner had been "cleaned" at least once, and the unauthorized leaching pool in the southern end of the plating room has been cleaned, the sides scraped, and the pool backfilled. No samples have been analyzed to determine if all contaminated sediment in these two pools was removed.

The building floor in the area where plating baths were operated is severely corroded. The cement can be removed as a sludge. At one of the locations, SCDHS inspectors were easily able to hammer a copper pipe directly through the concrete and into the ground beneath. SCDHS tested the cement sludge with pH paper and found the sludge to have a pH of approximately 1. It is possible that the soil below the floor is also contaminated. Soil samples below the floor have never been collected.

There are also at least six below-ground concrete tanks in the building, as shown in Figure 1-4, that have not been sampled to date. The content and structural integrity of these tanks are unknown. The tanks may be possible sources of contamination if they contain contaminated liquids or solids, if cracks have developed or if wastes stored in them are able to leach through the cement.

Three above ground tanks exist at the rear of the building (see Figure 1-3). These tanks have never been sampled and there is no information on the nature of their content, if any. Reportedly, they were used for the storage of methylene chloride and other solvents. The tanks may be a potential source of contamination to the surface and subsurface soil if leakage occurs.

An above grade vent and fill tube at the rear of the building indicate the possible existence of an underground storage tank. There is information neither on the nature of the tank nor on its contents and structural integrity. This tank may be considered as a source of contamination if wastes stored in it are able to leach through the walls into the surrounding soil.

1.6.2 Groundwater Contamination

Five groundwater monitoring wells (MW-8, MW-9, MW-10, MW-11 and MW-12) were installed by Circuitron Corporation (refer to Figure 1-3 for well locations); however, they were never approved. A site inspection on May 14, 1987, revealed that these wells were constructed of 2-inch diameter PVC pipe. Well depths were approximately 30 feet, and water levels were approximately 28-29 feet. SCDHS sampled the wells on September 10, 1985 and found the three downgradient wells to be contaminated with 1,1,1-trichloroethane ranging in concentration from 60-520 ppb. Table 1-7 presents SCDHS sampling results from the five on-site wells.

Figure 1-6 shows the locations of the numerous public supply wells, industrial/production wells, and monitoring wells that exist within the immediate vicinity of the Circuitron Corporation Site. The municipal commercial well S-22003 located at the Gazza Blvd. well field, approximately 1500 feet south-southeast of the site, has been restricted due to volatile organic contamination. However, because of the industrial/commercial nature of the area, contamination of the Gazza Blvd. well cannot be definitely attributable to the site. Table 1-8 presents sampling results from the Gazza Blvd. public supply wells.

There is no record of any studies conducted in the Circuitron Corporation Site area to determine the extent of groundwater contamination.

1.6.3 Surface Water Contamination

Surface water drainage is directed to the line of storm drains on the west side of the site (refer to Figure 1-3). These storm drains are interconnected but do not connect with the public storm drains on Milbar Blvd. The SPDES leaching pool was observed to be overflowing on at least two occasions and the overflow of industrial wastewater was observed entering the storm drain line on the west side of the site and also entering storm drains on Milbar Blvd. The storm drains on Milbar Blvd. discharge to leaching pools which allow the storm water to slowly seep into the ground. The storm drain leaching pools on Milbar Blvd. have not been sampled to date.

1.6.4 Air Contamination

There are no documented incidents of an air release outside the building. The storm drain in the southwest corner, which received untreated wastes, has a slotted manhole cover as do the remaining storm drains along the storm drain line. It is possible that air contaminants may have been released from wastewater contaminated with organic solvents. ~~Since the discharges to the storm drains have ceased, the potential of an air release no longer exists.~~ The storm drains were monitored

8884b

TABLE 1-7

CIRCUITRON CORPORATION SITE

SCDHS ON-SITE MONITORING WELL ANALYTICAL RESULTS

Well	Parameter	Concentration*
Well MW-8 North upgradient well	No Contaminants Detected	-
Well MW-9 South upgradient well	No Contaminants Detected	-
Well MW-10 North downgradient well	1,1,1-Trichloroethane	60
Well MW-11 Middle downgradient well	1,1,1-Trichloroethane	120
Well MW-12 South downgradient well	1,1,1-Trichloroethane	520

*All results reported in ug/l.

Source: Suffolk County Department of Health Services.

TABLE 1-8

CIRCUITRON CORPORATION SITE

SCDHS ANALYTICAL RESULTS FROM THE
GAZZA BOULEVARD WELLS WATER SAMPLES

A. East Farmingdale Water District Well S-22003 - Shallow well

PARAMETER	CONCENTRATION*						
DATES:	12/27/76	2/1/77	3/15/77	4/12/77	6/21/77	11/22/77	6/12/78
Chloroform	25						
Trichloro- ethane	110	21	32			53	37
Trichloro- ethylene	85		27	15	23	19	20
Tetrachloro- thylene	15						
Copper							

PARAMETER	CONCENTRATION*						
DATES:	10/4/78	11/20/78	12/27/78	7/16/79	3/10/80	1/21/81	4/29/81
Chloroform			25				
Trichloro- ethane	47	59	110	372	178	79	72
Trichloro- ethylene	16		85	21	18		
Tetrachloro- thylene			15				
Copper				260	410		

B. East Farmingdale Water District Well S-20042 - Deep Well**

PARAMETER	CONCENTRATION			
DATES:	1/28/85	4/8/85	1/22/86	4/14/86
Copper	150	260	230	150
Zinc	30			
Lead				11,000

* All results reported in ug/l.
** All organic samples for this well are listed as nondetected.

Source: Suffolk County Department of Health Services.

using an HNu photoionization detector, OVA flame ionization detector, and an explosimeter during the May 14, 1987 site inspection. There were no readings above the background level detected in or above the storm drains.

There is a documented air release from one of the hidden leaching pools in the building. One of the SCDHS inspectors sampling the pool collapsed while wearing a respirator. SCDHS described waste in the pool as having a strong solvent odor. Air contamination within the building may pose a significant health and safety hazard to on-site workers. This hazard arises from the drums left in the building, the six underground cement holding tanks, and the two leaching that have not been backfilled.

2.0 SCOPING OF THE RI/FS

2.1 PRELIMINARY RISK ASSESSMENT

This section presents a preliminary risk assessment of the public health risks associated with the Circuitron Corporation Site. This assessment is based on historic data available for the site contaminants and the initial Phase I Engineering Investigation performed by EA (Reference 1), as well as information pertaining to site history, hydrogeology, land use, and demography. The data are not sufficient to permit a full evaluation of the human health risks and environmental impact of site contaminants, however, they do provide a useful basis for a preliminary assessment. The samples proposed to be collected during the field investigations are expected to overcome the gap caused by the lack of background data on the contamination of the site.

As summarized in the previous section, the data collected to date suggest the presence of several Target Compound List (TCL) volatile organic compounds and metals in the groundwater on the site, in the leachate sludges and water, and in the pipes discharging to the leachate pools. The analytes listed in the previous investigations suggest that the complete Priority Pollutant List (PPL), Hazardous Substance List (HSL) and Target Compound List analytes were not quantified. Most notable was the absence of base neutral analytes (BNA), pesticides and PCBs and several inorganics including cyanide. Table 2-1 summarizes the compounds found in the various matrices at the site.

The areas of concern at the site include the following: groundwater in the Upper Glacial aquifer; the contents of subsurface and "hidden" tanks; the contents of the drums in the building; the contents of the underground authorized and unauthorized leaching pools, cesspools and storm drains; the contents of above and underground tanks; and the surface and subsurface soils adjacent to all these above and below ground structures. Only the readily accessible underground authorized leaching pool, the distribution pool, the sanitary cesspools and the southernmost storm drain have been sampled to date. The lack of data from groundwater and site soils, will be addressed as part of the remedial investigation. The hidden tanks, the unauthorized leaching pool in the middle of the plating room, the drums, the above and underground tanks, as well as the spills on the floor and walls of the building, will be addressed in a remedial investigation, that will be performed by the EPA under a separate work assignment.

2.1.1 Selection of Potential Indicator Compounds

The data collected during previous studies can be used to create a preliminary list of compounds which may pose a potential risk to human health. Generally, a total of 10 to 15 indicator

TABLE 2-1

CIRCUITRON CORPORATION SITE

SUMMARY OF EXISTING CHEMICAL DATA

	MW	SPDES POOL	UNAUTHORIZED LEACH POOLS LIQUID	UNAUTHORIZED LEACH POOLS SEDIMENT	DISTRIBUTION POOL	SW STORM DRAIN	PIPE AND STORM DRAIN	SANITARY CESSPOOLS
MEK			X					
1,1,1-trichloroethane	X	X	X	X	X	X		
1,1,2-trichloroethylene			X	X				X
Tetrachloroethylene			X	x				
Methylene chloride		X	X	X				
Chloroform		X	X	X				
Toluene		X	X	X				
Copper		X	X	X		X	X	X
Iron		X	X	X			X	X
Zinc		X		X			X	
Lead		X		X			X	
Silver		X		X				
Nickel		X		X			X	
Cadmium	X						X	
Chromium							X	

NOTES: MW: Perimeter Monitoring Well
MEK: Methyl ethyl ketone

Source: EA, 1987 (Reference 1)

compounds are chosen to represent the remaining analytes on the site for the risk assessment. The existing data suggests that all the analytes can be used as indicator compounds, but this selection is hampered by the lack of data in the soils, and groundwater. The necessary information on the extent of contamination in the soil and groundwater will be provided from the chemical analysis of the soil and groundwater samples collected from the soil borings and the monitoring wells that are proposed to be installed at the site. Selection of indicator compounds is based upon four criteria:

1. frequency of detection;

2. measured concentrations relative to background levels and/or relevant groundwater and drinking water standards;

3. toxicity; and,

4. the availability of toxicological criteria.

Table 2-2 presents the chemical indicators that will be used in the preparation of the risk assessment.

Exposure to these chemicals via different pathways will be evaluated in the RI. Exposure pathways considered to be of potential significance are outlined below.

2.1.1.1 Groundwater

Analysis of samples from monitoring wells installed on the western perimeter of the building indicated the presence of 1,1,1-trichloroethane and cadmium. These wells were constructed of PVC, but well logs are not available to determine their depth, screen size, etc. Pumping from the shallow municipal well S-20042, located south-southwest of the site, was discontinued following the identification of contaminants exceeding drinking water standards. The depth of this well is 226'-4". These results indicate that contaminants from the site may be entering the groundwater.

On the basis of the contamination summarized in Table 2-1, the potential exists for exposure to contaminants via ingestion of groundwater. The potential also exists for exposure to contaminants via inhalation and dermal contact while washing, bathing and swimming in the water. Ingestion of vegetables that were watered with contaminated water will also be assessed.

The magnitude of such exposures would depend on (a) the amount of time spent washing, bathing, or swimming, (b) the fraction of contaminant absorbed through the skin, (c) the skin surface area of the individual(s) exposed, (d) the accumulation rates of contaminants by the vegetables and (e) the fraction of contaminant

TABLE 2-2

CIRCUITRON CORPORATION SITE

LIST OF POTENTIAL INDICATOR COMPOUNDS*

	SPDES POOL	DISTRIBUTION POOL	SANITARY CESSPOOL	STORM DRAINS	GW
1,1,1-trichloroethane	X	X			X
1,1,2-trichloroethylene		X	X		
Methylene chloride	X				
Chloroform	X				
Toluene	X				
Copper	X		X	X	
Iron	X		X	X	
Zinc	X			X	
Lead	X			X	
Silver	X				
Nickel	X			X	
Cadmium	X			X	X
Chromium				X	

*Contaminated soil data are not available.

absorbed following ingestion of contaminated food. However, qualitative evidence suggests that the latter exposure pathways (inhalation, dermal absorption and ingestion) present less risk of toxicity or carcinogenicity than ingestion of groundwater. These pathways will be evaluated in the RI risk assessment on the basis of existing data in conjunction with that collected for this investigation.

2.1.1.2 Soils and Sediments

No data are currently available concerning the contamination of on-site soils. Sampling was limited to sediments in the authorized pools, the sanitary cesspool and the southernmost storm drain. A review of Table 2-1 indicates that the sediments were highly contaminated with chlorinated alkanes, alkenes and metals.

Most of the site is occupied by the building or is paved. Narrow grassy areas are located between the building and property line on the south and east sides of the building. There is no visual contamination on the east exterior of the building but three above ground tanks and possibly an underground oil storage tank are located at the rear of the building. The underground oil storage tank may be leaking. The presence of contaminants in the soils in this area will be evaluated as part of the RI.

All of the underground structures (authorized and unauthorized pools, sanitary cesspools and storm drains) are covered with soils and/or manhole covers, while the underground tanks are completely covered with soil and there is no visible access to them. It seems, therefore, unlikely that dermal contact with soils or sediments would occur. However, if results of the analyses of soils surrounding the tanks or in other "stressed" areas indicate organic contaminants or inorganic contaminants above background information, the soil ingestion pathway will be assessed. Subsurface soils and sediments can serve as sources for groundwater contamination.

Data are required to establish the nature and extent of soil and sediment contamination at the Circuitron Corporation Site, since they represent the probable source of all site contaminants.

2.1.1.3 Air

~~In its current condition, the Circuitron Corporation Site does not represent a hazard with regard to air transported contaminants.~~ The leaching pools and the "hidden" tanks are all below ground and covered with soil and/or manhole covers. A recent inspection by the Field Investigation Team (FIT) revealed no volatiles present beneath the accessible manhole covers. Any sampling activity for the RI will be carried out with proper respiratory protection and with air monitoring by health and safety personnel.

The air monitoring will be performed for the health and safety of the personnel involved in sampling during the RI/FS, and will ~~not~~ be used to develop a risk assessment for the site.

Surficial soils will be sampled to quantitate the presence of naturally capped volatile organic compounds and, with methods detailed in the Superfund Exposure Assessment Manual and the Superfund Public Health Evaluation Manual, be used to estimate exposures under the "no-action" alternative. Quantitative air sampling and analysis methods will be incorporated into any remedial activity which involves disturbance and removal of deeper (and presumably more contaminated) soils.

2.2 PRELIMINARY ARARs IDENTIFICATION

As part of the RI, Federal and State regulations will be evaluated to determine if they are Applicable or Relevant and Appropriate Requirements (ARARs). This section provides a preliminary listing of the Federal and New York State environmental and public health requirements that are potentially applicable or relevant and appropriate to the Circuitron Corporation Site. In addition, this section presents a listing of other Federal and State criteria, advisories, and guidance that could be used for evaluating and selecting among the remedial alternatives.

2.2.1 Definition of ARARs

The requirements identified below may be "Applicable or Relevant and Appropriate Requirements" (ARARs) and "to be considered" material, based on the USEPA's Superfund Amendments and Reauthorization Act of 1986 (SARA) interim guidance that addresses development and utilization of ARARs (Reference 24). ARARs and "to be considered" material will be used primarily during the Feasibility Study to evaluate the remedial alternatives during initial screening and detailed evaluation.

SARA defines a potential ARAR for a given site as:

- any standard, requirement, criterion, or limitation under any Federal environmental law and any promulgated standard, requirement, criterion, or limitation under a State environmental or facility siting law that is more stringent than any Federal standard, requirement, criterion, or limitation.

The purpose of this definition is to ensure that CERCLA responses are consistent with both Federal and State environmental requirements.

Within these jurisdictional boundaries, ARARs are further defined according to the activity, contaminants, or location they are expected to affect. ARARs that relate to the level of pollutant allowed are called contaminant-specific; ARARs that relate to the presence of a special geographic or archeologic area are called location-specific; and ARARs that relate to a method of remedial response are called action-specific.

When ARARs do not exist for a particular chemical or remedial activity, or when the existing ARARs are not protective of human health or the environment, other criteria, advisories and guidance known as "to be considered" (TBCs) may be useful in designing and selecting a remedial alternative.

2.2.2 Consideration of ARARs During the RI/FS

Specifically, ARARs will be considered during the following intervals during the RI/FS process.

(1) Scoping of the RI/FS. Identify contaminant-specific and location-specific ARARs on a preliminary basis.

(2) Site characterization phase of the Remedial Investigation, when the public health evaluation is conducted to assess risks at the site. Identify the contaminant specific ARARs and "to be considered" material and location-specific ARARs more comprehensively and use them to help determine the cleanup goals.

(3) Development of remedial alternatives in the Feasibility Study. Identify action-specific ARARs for each of the proposed alternatives and consider them along with other ARARs and "to be considered" material.

(4) Detailed evaluation of alternatives. Examine all the ARARs and "to be considered" material for each alternative as a package to determine what is needed to comply with other laws and to be protective.

As the RI/FS process continues, more ARARs may be considered particularly as guidances are issued by the State of New York. Primary consideration should be given to remedial alternatives that attain or exceed the requirements found in ARAR regulations.

These ARARs will be used as a guide to establish the appropriate extent of site cleanup; to aid in scoping, formulating and selecting proposed treatment technologies; and to guide the implementation/operation of the selected action. At each interval, ARARs are identified and utilized by taking into account the following:

- o contaminants suspected to be at the site;
- o chemical analyses to be performed;
- o types of media to be sampled;
- o geology and other site characteristics;
- o use of the resource/media;
- o level of exposure and risk;
- o potential transport mechanisms;
- o purpose and application of the potential ARARs, and
- o remedial alternatives that will be considered for the site.

2.2.3 <u>Preliminary Identification of ARARs for the Circuitron Corporation Site</u>

Table 2-3 presents a summary of the preliminary ARARs for the Circuitron Corporation Site. The selection of these ARARs was based on the limited available data obtained from previous SCDHS field investigations and chemical analyses.

2.2.3.1 Potential Applicable or Relevant and Appropriate Requirements

The National Contingency Plan (NCP) (40 CFR 300) and the SARA/CERCLA Compliance Policy guidance provide definitions for applicable or relevant and appropriate requirements. The following post-SARA definitional language appears in USEPA's July 24, 1987, Interim Guidance on ARARs.

During execution of the RI, an evaluation will be made of the following requirements to determine if they are applicable or relevant and appropriate to the Circuitron Corporation Site.

1) <u>Contaminant-Specific</u>

<u>Federal</u>

- o Clean Water Act, Water Quality Criteria (Section 304)

- o Safe Drinking Water Act, National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs) (40 CFR 141.11-141.16)

- o Resource Conservation and Recovery Act (RCRA) Maximum Concentration Levels (MCLs) (40 CFR 264 Subpart F), as shown in Table 2-4.

TABLE 2-3

CIRCUITRON CORPORATION SITE

SUMMARY OF SITE PRELIMINARY ARARs

Analyte (ppb)	Leach pools Liquid	Drain Liquid	Pipe Liquid	MW	Federal MCLs	Clean Water Act W.Q. Criteria	RCRA MCLs(3)	NYS Ambient W.Q. Stds.	State MCLs	SDWA MCLs(4)	NYS Groundwater Std.(6)
Organics											
MEK	ND-230	ND	ND	ND	50	*	*	*	50	*	*
111-trichloroethane	36-11000	33-260	ND	60-520	200	18400	*	50	5	200	50
112-trichloroethylene	ND-550	ND	ND	ND	5	*	*	*	5	5	*
tetrachloroethylene	ND-4400	ND	ND	ND	*	0.8	*	0.7	5	*	0.7
methylene chloride	37-2600	ND	ND	ND	5	*	*	50	5	*	50
toluene	ND-6000	ND	ND	ND	2000	14300	*	50	5	*	50
Inorganics (ppb)											
copper	1700-6600	520-800	360000-420000	ND	1300	1000	*	200	1000	*	1000
iron	1200-5600	200-700	120000-140000	ND	*	*	*	310	300	*	300
zinc	10-1300	ND	14000	ND	*	5000	*	300	5000	*	5000
lead	60-92000	ND	3600-6200	ND	5	50	50	50	50	50	25
nickel	2300-3000	ND	4000-6000	ND	*	13.4	*	*	*	*	*
cadmium	ND	ND	70-100	ND-650	5	10	10	10	10	10	10
chromium	ND	ND	11000	ND	100	170	50	50	50	50	*
silver	200-430	30-50	*		50	50	50	50	50	50	50

NOTES: *No applicable criteria available at this time

MW: Monitoring Well
MCLs: Maximum Contaminant Levels
WQ: Water Quality
Stds: Standards
MEK: Methyl ethyl ketone
ND: Not Determined

Sources:
1) EA, 1987 (Reference 1)
2) NYSDEC, 1987 (Reference 6)
3) 40 CFR 264
4) 40 CFR 141.11-16
5) 10 NYCRR Part 5
6) 6 NYCRR Part 701

State of New York

- o New York Public Water Supplies Requirements, Maximum Contaminant Levels (MCLs) (10 NYCRR 51)

- o New York Standards for Raw Water Quality (10 NYCRR 170.4)

- o New York Standards for Protection of Human Health and Potable Water Supplies (Ambient Surface Water Quality Standards) (6 NYCRR 701)

- o New York Groundwater Quality Standards (Article 17 of ECL, 6 NYCRR 703)

2) **Location-Specific**

Federal

- o Executive Orders on Floodplain Management and Wetlands Protection (CERCLA Floodplain and Wetlands Assessments) # 11988 and 11990

State of New York

- o New York Standards for Construction in Flood Hazard Areas (6 NYCRR 500)

- o New York Freshwater Wetlands Act Requirements (ECL, Article 24)

3) **Action-Specific**

Federal

- o RCRA Subtitle C Hazardous Waste Treatment, Storage, Disposal Facility Standards (design and operating standards for landfill, tanks, containers, etc.) (40 CFR 264 and 265)

- o RCRA Subtitle C Closure and Post-Closure Standards (40 CFR 264, Subpart G)

- o RCRA Groundwater Monitoring Requirements (40 CFR 264, Subpart F)

- o RCRA Subtitle D Non-Hazardous Waste Management Standards (40 CFR 257, 258)

- o Safe Drinking Water Act, Underground Injection Control Requirements (40 CFR 144 and 146)

TABLE 2-4

CIRCUITRON CORPORATION SITE

MAXIMUM CONCENTRATION OF CONSTITUENTS FOR GROUNDWATER PROTECTION

CONSTITUENT	MAXIMUM CONCENTRATION (ppm)
Arsenic	0.05
Barium	1.00
Cadmium	0.01
Chromium	0.05
Lead	0.05
Mercury	0.002
Selenium	0.01
Silver	0.05
Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy- 1,4,4a,5,6,7,8,9a-octahydro-1, 4-endo, endo-5,8- dimethono naphalene)	0.0002
Lindane (1,2,3,4,5,6-hexachloro-cyclohexane, gamma isomer)	0.004
Methoxychlor (1,1,1-Trichloro-2,2-bis (p-methoxyphenylethane))	0.1
Toxaphene ($C_{10}H_{10}Cl_6$ Technical Chlorinated camphene, 67-69% chlorine)	0.005

Source: 40 CFR Subpart F, paragraph 264.94

- o Clean Water Act - National Pollution Discharge and Elimination System (NPDES) (Discharges to Groundwater and Surface Water) (40 CFR 122-125, 129)

- o RCRA Land Disposal Restrictions (40 CFR 268) (on and off-site disposal of excavated soil and contaminated debris)

- o Department of Transportation (DOT) Rules for Hazardous Materials Transport (49 CFR 107, 171.1-171.500)

- o RCRA Standards Applicable to Hazardous Waste Transporters (40 CFR 263)

- o Occupational Safety and Health Standards for Hazardous Responses (Worker Safety) (29 CFR 1904, 1910)

<u>State of New York</u>

- o New York Air Pollution Control Regulations (6NYCRR 212-254)

- o New York's General Prohibitions for Air Emissions (6 NYCRR 211) (Fugitive dust generated during implementation of remedy)

- o New York State Pollutant Discharge Elimination System (SPDES) Discharge to Groundwater and Surface Water Requirements (6 NYCRR 750-758)

- o Manifest Requirements for Generators and Transporters of Hazardous Waste (6 NYCRR 372)

- o New York Standards for Nonhazardous Waste Transport (6 NYCRR 364)

- o New York RCRA-equivalent Hazardous Waste Management Regulations (6 NYCRR 370-373)

2.2.3.2 Other Potentially Applicable Materials

When ARARs do not exist for a particular chemical or remedial activity or when the existing ARARs are not protective of human health or the environment, other criteria, advisories and guidance known as "to be considered" (TBCs) material may be useful in designing and selecting a remedial alternative. The following criteria, advisories and guidance were developed by USEPA, other Federal agencies and the State of New York.

1) <u>Federal</u>

- o Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs)

- USEPA Drinking Water Health Advisories
- USEPA Health Effects Assessment (HEAs)
- TSCA Health Data
- Toxicological Profiles, Draft, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service
- Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 Federal Register 9016)
- Cancer Assessment Group (National Academy of Science) Guidance
- Groundwater Classification Guidelines
- Groundwater Protection Strategy
- Waste Load Allocation Procedures

2) <u>State of New York</u>

- Underground Injection/Recirculation of Groundwater, Technical Operating Guidance, April 11, 1987.
- New York Department of Health's Proposed Contaminant Levels for Volatile Organics in Drinking Water Proposed MCLs (10 NYCRR 5-1) (Expected Final January 1989)
- New York State Ambient Water Quality Guidance Values, Technical Operating Guidance (TOG) Series, April 1, 1987.

2.3 PRELIMINARY EVALUATION OF REMEDIAL ALTERNATIVES

2.3.1 Preliminary Remedial Response Objectives

Although the existing data base is inadequate to define whether a threat to public health and the environment exists, several preliminary remedial response objectives may be formulated based on the preliminary risk assessment and the previous site investigations.

On the basis of the existing data, two remedial response objectives were identified to mitigate the potential risks associated with the site. These objectives include:

1. Minimize human exposure to contaminants in the surface waters, sediments, and subsurface soils.

2. Minimize the migration of contaminants in the subsurface soil and into the groundwater.

After data are gathered and evaluated in the Remedial Investigation/Feasibility Study (RI/FS), the response objectives will be refined and developed or, as appropriate, eliminated. The RI will provide a basis for evaluation of these preliminary remedial response objectives. Completion of the RI, including assessment of chemical distribution and migration, will also allow better definition of the potential risk associated with direct contact by site contaminants.

2.3.2 Preliminary Identification of General Response Actions and Remedial Technologies and Alternatives

To meet the preliminary remedial response objectives, a set of general response actions were identified for each media. These general response actions fall into the following categories:

- No Action
- Containment
- Treatment and Disposal

For each remedial response action, potentially applicable remedial technologies have been identified. Table 2-4 summarizes the general response actions and potential remedial technologies and applicability to the following media.

- Groundwater
- Soils
- Sediments and Groundwater

A preliminary description of remedial technologies that address these general response actions are presented in the following five subsections together with a preliminary evaluation of which media would be treated by each remedial technology category.

2.3.2.1 No Action

The No Action alternative will be evaluated to provide a comparative basis for other remedial alternative evaluations. In the No Action alternative, no remedial actions (containment or treatment and disposal) will be designed or implemented at the site. Implementation of the No Action alternative might include long-term monitoring of groundwater, and might include institutional controls (e.g., public awareness program or restricting access and use of portion(s) of the site. The No Action alternative will be evaluated for each medium.

Because disposal of listed hazardous waste occured after July 26, 1982, RCRA Corrective Action requirements for releases to the environment, promulgated at 40 C.F.R. 264.100 and 264.101,

TABLE 2-5

GENERAL RESPONSE ACTIONS AND POTENTIAL REMEDIAL TECHNOLOGIES APPLICABLE TO VARIOUS SITE MEDIA

General Response Action	Potential Remedial Technologies	Ground-Water	Soils	Sediments/ Ground Water	Controlling Factors
No Action	o Fences/Warning Signs		X	X	Risk Assessment
	o Long-Term Monitoring	X	X	X	
	o Public Awareness Program	X	X	X	
	o Restrict Access and Use	X	X	X	
Containment	o Grouting/Sealing		X		Geohydrological conditions, soil and contaminants - characteristics, ARARs
	o Capping/Surface Sealing		X	X	
	o Impermeable Vertical Barriers		X		
Treatment/ Disposal	o Pumping/Treatment/Disposal	X		X(2)	Contaminant characteristics, ARARs
	o Chemical Precipitation	X		X(2)	
	o Air Stripping	X		X(2)	
	o Carbon Adsorption	X		X(2)	
	o UV Oxidation	X		X(2)	
	o Excavation/Soil Washing		X	X(1)	
	o Excavation/Solidification		X	X(1)	
	o Excavation/Incineration		X	X(1)	
	o Excavation/Biodegradation		X	X(1)	
	o Enhanced Volatilization		X	X(1)	
	o Discharge to POTW	X			
	o In Situ Fixation		X	X(1)	Soil/sediment and contaminant characteristics, ARARs
	o In Situ Soil Flushing		X		
	o In Situ Biodegradation		X		

(1) Sediment Fraction only
(2) Liquid Fraction only

are applicable. RCRA will only consider this "No Action" alternative if all media (soil, groundwater, surface water and air) have contaminant concentrations below health-based limits. These health-based limits are based on information obtained from EPA's Integrated Risk Information System (IRIS), in conjuction with EPA's exposure assumptions.

2.3.2.2 Containment

The containment alternatives would potentially include utilization of impermeable barriers (i.e., slurry walls, sheet pilling, etc) and single or multilayer caps to isolate the contaminated soil/sediment from rainfall runoff, surface water and groundwater.

Closure with waste in place ("Landfill Closure") in this situation requires a final RCRA cover, post closure maintenance and groundwater monitoring. The performance standard of the cover is specified in 40 C.F.R. Part 264 Subpart G and 264.310 of Subpart N. Regulations relating to landfill closure are applicable to this site because disposal of listed hazardous waste occured after July 26, 1982.

2.3.2.3 Treatment/Disposal/Decontamination

Contaminated media (such as soils) at the site can be handled by either excavation and on-site or off-site treatment/disposal, or in situ treatment. These remedial technologies include treatment of contaminated media to reduce or eliminate potential risk to public health and the environment. Several chemical and physical processes are currently available to accomplish this.

The technologies for treating groundwater include biological, physical, and chemical processes.

Physical treatment of ground or surface water employs technologies such as air stripping and carbon adsorption which separate the contaminants from the water. The treated water could subsequently be returned to the ground.

Chemical treatment uses chemicals to react with the contaminant to form non hazardous gases, liquids or solid substances.

Biological treatment of organic contaminants consists of breaking down the molecules to simpler substances by micro-organisms under aerobic or anaerobic respiration.

2.3.2.4 In Situ Treatment

Technologies capable of treating contaminated soil will be considered. These technologies include solidification and bioreclamation, and extraction (i.e., soil flushing).

In situ fixation (an option for metals contamination but not for volatile organics contamination), uses a mechanical mixer/ injector to introduce and mix fixation materials directly into the contaminated materials to fix the contaminants within the solidified soil, thereby reducing the leachability of contaminants into the groundwater.

In situ biodegradation is a technique for treating zones of organic contamination by microbial degradation. The basic concept involves altering environmental conditions by supplying bacteria, oxygen and nutrients (i.e., nitrogen and phosphorus) to enhance microbial degradation of organic contaminants, resulting in the breakdown and detoxification of those contaminants.

Soil flushing is an in situ extraction of inorganic or organic compounds from soil by passing appropriate extraction solutions through the soil to dissolve or solubilize contaminants. If natural aquitards are not present, the area to be treated must be isolated by vertical and horizontal groundwater containment barriers. Water or an aqueous solution is flooded or injected into the area of contamination and the contaminated elutriate is collected for removal, recirculation, on-site treatment or reinjection. During elutriation, sorbed contaminants are mobilized into solution by solubility, formation of an emulsion, or by chemical reaction with the flushing solution. These solutions may include water, surfactants, acids or bases, chelating agents, and oxidizing and reducing agents.

2.4 RISK ASSESSMENT AND ENGINEERING GAPS

Large data gaps exist in the data which would preclude a quantitative risk assessment from being performed. Review of this data and the nature of the site indicate that an extensive evaluation of the groundwater-mediated pathways, and the sources to the groundwater, are warranted.

Two known sources of contaminants exist at the site. These include: (a) the SPDES leach pools north of the building and (b) the unauthorized leach pools beneath the building. Only the SPDES leach pools have been sampled and these have exhibited the greatest contamination at the site. The SPDES leach pools are located beneath the asphalt paved parking lot. Percolation of precipitation in these areas is less likely than that expected in soils, so vertical transport to the water table through the vadose zone may be limited.

The unauthorized leach pools are located beneath the floor of the plating room in the building. Although the cement floor is in poor condition, the roof is intact, which would eliminate precipitation from entering the contaminated area limiting the vertical transport through the vadose zone.

However, in both cases, vertical transport may have been mediated by the discharge volume to these pools. The "head" would work in an analogous manner to precipitation in soils allowing the contaminants to be transported vertically. This situation may actually enhance vertical transport by the discharged materials serving as better "solvent" for the contaminants than percolating rainfall.

Additional sources of contaminants at the site include (a) the old abandoned leaching pools at the northeast corner of the site, (b) the surface and subsurface tanks on the south side of the building, (c) the cement underground holding tanks beneath the floor of the building, (d) the multiple PVC pipes within the buildings, (e) the pipe connecting the building to the sewer, (f) the sewer distribution system and potential unknown surface spills and (g) storm water runoff.

Monitoring wells will be installed upgradient, on-site and down-gradient of the site to evaluate the vertical and horizontal extent of the plume of contaminants. In addition, private and/or municipal well analyses will be evaluated in the FS to determine whether the contaminated plume has reached any potential receptors.

2.5 DATA QUALITY OBJECTIVES (DQO)

Data quality objectives are based on the concept that different data uses may require different levels of data quality. Data quality can be defined as the degree of uncertainty in the data with respect to precision, accuracy, and completeness. The five levels of data quality are:

(1) <u>Screening</u> (Level 1): This provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at the site, preliminary comparison to ARARs, initial site characterization to locate areas for subsequent and more accurate analyses, and for engineering screening of alternatives (bench-scale tests). These types of data include those generated on-site through the use of HNu, pH, conductivity, and other real time monitoring equipment at the site.

(2) <u>Field Analyses</u> (Level 2): This provides rapid results and better quality than in Level 1. Analyses include mobile lab generated data.

(3) <u>Engineering</u> (Level 3): This provides an intermediate level of data quality and is used for site characterization. Engineering analyses may include mobile lab generated data and some analytical lab methods (e.g., laboratory data with quick turnaround used for screening but without full quality control documentation).

4) Confirmational (Level 4): This provides the highest level of data quality and is used for purposes of risk assessment, engineering design, and cost analyses. These analyses require full CLP analytical and data validation procedures in accordance with the USEPA.

5) Non-Standard (Level 5): This refers to analyses by non-standard protocols, for example, lower detection limits, or analysis of an unusual chemical compound, are required. These analyses often require method development or adaption. The level of quality control is similar to Level 4 data.

Ebasco will primarily generate Levels 1, 4 and 5 analytical data at the Circuitron Corporation Site. The Level 1 data to be generated includes field OVA or HNu readings gathered during the routine field activities. Field measurements of parameters such as pH, temperature, or specific conductivity are also examples of Level 1 data. These types of data may be used to demonstrate the adequacy of well development/purging procedures or in the case of HNu or OVA readings, to help protect the health and safety of workers.

DQO level 3 would be utilized in any treatability studies (as discussed in Task 7), but not during the field investigation.

Laboratory analytical testing of environmental samples from the Circuitron Corporation Site will be performed to obtain Level 4 and Level 5 data. Testing for VOC's will be performed to obtain detection limits in the range of 1 to 2 ppb for individual compounds in groundwater samples for comparisons to ARARs. The other compounds to be analyzed will be at the standard detection limits in the Contract Laboratory Protocols (CLP).

The analytical data gathered during previous investigations at the site will be assumed to be Level 3 data, which has had only partial Quality Assurance/Quality Control (QA/QC) verification, (i.e., good laboratory practice) unless review of the data and QA/QC packages, show that the data is invalid or otherwise unsuitable for use in the RI/FS process.

3.0 TASK PLAN FOR THE RI/FS

3.1 TASK 1 - PROJECT PLANNING

The project planning task includes work efforts related to initiating a project after the Work Assignment is issued. The activities included in this task are:

- o Work Plan memorandum
- o Kickoff meeting
- o Site visit/meeting
- o Easements/permits
- o Site reconnaissance & limited sampling
- o Site survey/topo map/review of existing aerial photos
- o RI/FS brainstorming session
- o Collect & evaluate existing data
- o Preliminary remedial alternatives identification
- o Preliminary risk assessment
- o Expedited response alternatives screening
- o Applicable, Relevant, and Appropriate Requirements determination
- o RI scoping
- o Preparation of project plans
- o Task management and quality control

The project plans include preparation of a detailed Work Plan and a Field Operations Plan (FOP). The FOP consists of three subsections: the Field Sampling and Analysis Plan (SAP) with the Brossman short form, the Site Management Plan (SMP), and the Health and Safety Plan (HSP). The FOP will be prepared after completion of the draft Work Plan. A brief description of each subsection of the FOP is indicated below.

The SAP will provide detailed procedures for each field activity. Specifically, the SAP will address:

- o Standard Operating Procedures (SOPs) for Field Investigations including Sampling, Monitoring, and Field Instrument Calibration

- o Number, Location and Types of Samples

- o Analyses to be Performed on Each Sample

- o Chain-of-Custody Procedures

- o Sample Packaging and Shipment Procedures

- o Decontamination Procedures

- QA/QC of Field Sampling and Procedures for Field Changes and Corrective Action

- Responsibilities of Site Personnel

- Parameters to be Analyzed and Analytical Methods

Each SOP of QA/QC protocol will be prepared in accordance with USEPA Region II guidelines and the site-specific Health and Safety Plan.

The QA/QC portions of the SAP will be prepared in accordance with USEPA Region II procedures and Section 10 of the USEPA publication entitled "Test Methods for Evaluation Solid Waste" (SW-846), using the "Brossman Short Form". The form requires information such as sample quality objectives, detection limits, preservation techniques, laboratory testing protocols, and laboratory accuracy and precision goals.

The form also requests information on data validation. All chemical data generated by laboratories for Ebasco, will be validated by an Ebasco chemist using USEPA's Contract Laboratory Program (CLP) Standard Operating Procedures HW-2 and HW-4, as well as Ebasco's own data validation guidelines.

The SMP describes site control, field investigation activities (site operations), and the corresponding field operations schedule. The site control section describes how the approval to enter the areas of investigation will be obtained, along with the site security control measures and the field office/command post for the field investigation. The logistics of all field investigation activities are also described. The site operations section includes a project organization chart and delineates the responsibilities of key field and office team members. The last section includes a field operations schedule, showing the proposed scheduling of each major field activity.

The HSP includes site-specific information, a hazard assessment, training requirements, monitoring procedures for site operations, safety procedures, disposal procedures, and other sections required by USEPA. The HSP also includes a contingency plan which addresses site specific conditions that may be encountered.

3.2 TASK 2 - COMMUNITY RELATIONS

ARCS Community Relations Staff will assist EPA in preparing and implementing a community relations plan for the Circuitron Corporation Site. Community relations implementation assistance will be provided as specifically requested by USEPA and is expected to include the following:

3.2.1 Preparation of Community Relations Plan (CRP)

ARCS community relations staff will prepare and submit a draft CRP in January 1989 to EPA. The final CRP is expected to be approved by EPA by February 1989.

3.2.2 Maintenance of Information Repositories

Information repositories will be established at a public facility. Site information approved for public release will be available for public review.

3.2.3 Identification of EPA Information Contact

Concerned public and private citizens will be provided with an EPA representative who can respond directly to public inquiries about the Circuitron Corporation Site.

3.2.4 Design and Distribution of Fact Sheets

One fact sheet will be distributed following release of the work plan. It will include description of the activities conducted or planned as part of the RI/FS.

3.2.5 Public Meeting Support

ARCS community relations staff will provide logistical support and attend meetings on the RI/FS Workplan. A public meeting summary for the RI/FS Workplan will be prepared.

3.2.6 Phone Contact With Local Officials

Public officials will be updated concerning site activities, schedule changes, major findings during the RI/FS, and unforeseen site development.

3.2.7 Contact With Newspapers

ARCS community relations staff will assist EPA in the preparation of news releases to the local media concerning significant events during the RI/FS.

3.2.8 Coordination, Planning and Management Support

ARCS community relations staff will provide general planning, management, analytic and coordination support to EPA and ARCS technical staff during the community relations activities of the Circuitron Corporation Site. This may include: meetings with EPA to discuss plannings and scheduling community relations activities, providing information and analysis about concerns expressed by local officials and residents in the area during the development of the revised community relations plan.

3.3 TASK 3 - FIELD INVESTIGATIONS

This task includes all efforts related to implementing a field investigation at the Circuitron Corporation Site. The objectives of the field investigations are to:

- o delineate the areal and vertical extent of the soil contamination of the Upper Glacial aquifer in the vicinity of the site area;
- o delineate the areal and vertical extent of the groundwater contamination in the vicinity of the site area;
- o further characterize sediment contamination;
- o gather data to support a public health risk assessment, and environmental impact assessment, and
- o gather data to adequately evaluate potential remedial action technologies/alternatives.

The field investigations will consist of the following activities:

1. Subcontracting
2. Mobilization and Demobilization
3. Geophysical Survey
4. Installation and Development of Monitoring Wells
5. Groundwater Sampling
   - 5a. Monitoring Wells
   - 5b. Existing Wells
   - 5c. Pumping Test (optional)
6. Soil Sampling
   - 6a. Surface Soil
   - 6b. Subsurface Soil
7. Sediment Sampling
   - 7a. SPDES Authorized Pools
   - 7b. Sanitary Cesspools
   - 7c. Storm Drains
8. Site Survey

Table 3-1 presents a summary of the analytical program associated with the field investigation.

3.3.1 Subcontracting

This subtask includes the letting of subcontracts to perform selected field activities. The following subcontracts will be required:

insert Att. 1 (next page)

ATTACHMENT 1

(As per comment No.5
this attachment should be inserted on page 55
in the end of Section 3.3)

Air monitoring will be performed with and HNu, OVA and an explosimeter (for the leaching pools) during all the drilling and sampling activities. The readings of the instruments will be recorded in the field logbook and the sample log sheet of each corresponding sample. Finally , the readings will be included in the final RI report and will be evaluated. If the evaluation shows that there are potential dangerous air emissions at the Circuitron Corporation Site, detailed air monitoring and air sampling may be required to be perfomed prior to the beginning of the remedial activities.

TABLE 3-1

CIRCUITRON CORPORATION SITE
SUMMARY OF ANALYTICAL PROGRAM

Sample	Matrix	Number of Sample Location	TCL VOA (LDL)[1]	TCL Metals[3]	TCL B/NAs	Inorganics Cyanide	Cr(VI)[3]	Full TCL	TOC	Grain Size
Monitoring Wells										
-new	aqueous	14	28	56	28	28	56			
-existing	aqueous	5	5	10	5	5	10			
Private and Municipal Wells	aqueous	8	16	32	16	16	32			
MW borings	soil	4					8	32	8	8
Surface Soil	Soil	2						2		
Building Floor (Concrete)	Concrete	2						2		
Soil borings (bldg)										
-interior	soil	4						36	9	
-exterior	soil	2						18	9	
Leaching pools[2]										
-liquid	aqueous	2					2	2		
-sediment	soil	2					2	2		
Cesspools										
- liquid	aqueous	2						2		
- sediment	sediment	2						2		
Storm drains										
-liquid	aqueous	3						3		
-sediment	sediment	3						3		
Duplicates	aqueous	7	7	12	7	7	15	8	2	
	soil	8				6	2			
Field blanks (est)	aqueous		5	10	5	5	12	11	2	
Trip blanks (est)	aqueous		2					11		
Water blanks (est)	aqueous		2					5		

Notes: 1: LDL - Lower detection limit
2: Two authorized leaching pools
3: Filtered and unfiltered samples
MW: Monitoring Wells

8884b

- a surveying subcontract for the surveying of surface soil sample locations, soil boring locations, and the new monitoring well locations and elevations upon completion of the field investigation activities; and

- a drilling subcontract for auger boring, soil sampling, and monitoring well installation and development.

3.3.2 Mobilization and Demobilization

This subtask will consist of field personnel orientation, equipment mobilization, staking of sample locations and demobilization.

Each field team member will attend an orientation meeting to become familiar with the history of the site, health and safety requirements, and field procedures.

Equipment mobilization will entail the ordering, purchase, and, if necessary, the fabrication of all sample equipment needed for the field investigation. A complete inventory of currently available USEPA equipment will be conducted and any additional equipment required will be secured. A field office trailer will be set up and necessary utility hookups will be made as part of the mobilization effort.

Locations for the soil borings, surface soil samples and groundwater monitoring wells will be staked at the start of the site operations. These locations will be measured from existing landmarks.

Equipment will be demobilized at the completion of each phase of field activities as necessary. Equipment demobilization may include, but will not be limited to sampling equipment, drilling subcontractor equipment, health and safety decontamination equipment, and field office trailer and utility hookups.

3.3.3 Geophysical Survey

An attempt will be made to determine the location and to delineate the configuration of several of the underground structures. These structures and their possible location are as follows:

- SPDES authorized leaching pools, in front of the building;

- old abandoned distribution pool and its leaching pools, in front of the northwest corner of the building, and

- underground oil storage tank at the rear of the building.

The possible location of each of these structures is shown in Figure 1-3.

Ground penetrating radar (GPR) will be used at the site to aid in the location of the previously mentioned below grade structures. The GPR operates on the same principle as aircraft radar. A pulse of electromagnetic radiation is beamed into the ground by a special antenna, and reflections occur from any discontinuity in dielectric constant. The reflected pulse returns to the receiving antenna, and a display of reflected intensity versus depth is presented on an air oscilloscope and a recorder. This work is highly specialized and the results must be interpreted properly. This work will be conducted by specially trained Ebasco personnel.

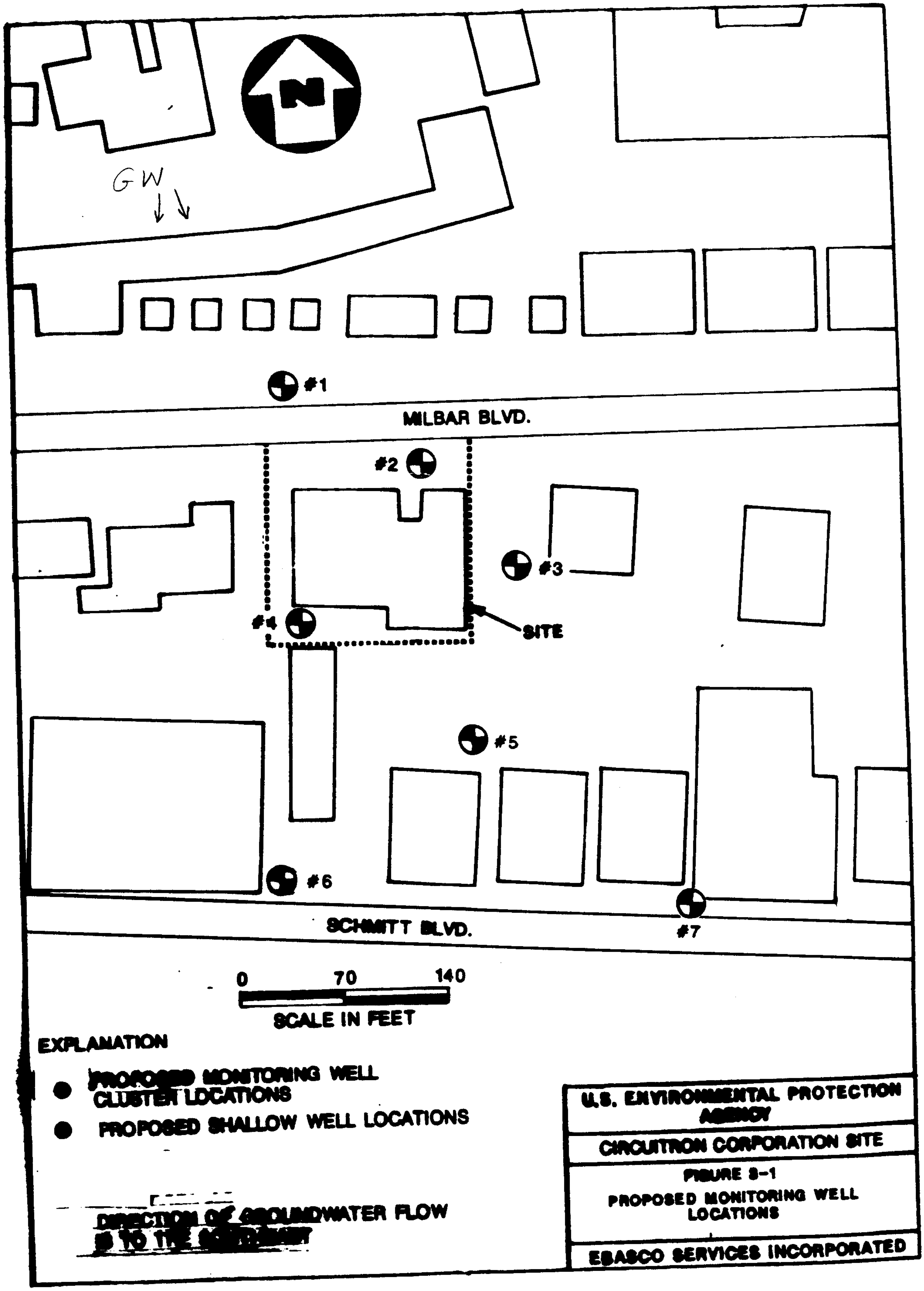
The method will be tested and executed in a one to two day period. Buried or nearby metallic objects, such as rebar, pipes and drums, may affect the operation of the GPR and the interpretation of the results. A major advantage in the case of the Circuitron Corporation Site is that the approximate location of the underground structures of concern are known. Therefore, the geophysical survey will be conducted at specific areas of the site and the potential risk for misinterpretation of the results will be minimized. Specifically these areas include the parking lot in front of the building and the rear of the building by the oil vent.

The GPR method will be performed prior to the installation of the monitoring wells and the soil borings.

3.3.4 Monitoring Well Installation

Seven (7) ~~Six (6)~~ monitoring well clusters ~~and one shallow well~~ will be installed at the Circuitron Corporation Site, as indicated on Figure 3-1. The groundwater program is designed to characterize and delineate possible contaminant transport, both vertically and horizontally, and to determine upgradient water quality parameters. Groundwater elevations will also be recorded in the wells. Data obtained from this program will also be used to model aquifer parameters such as groundwater flow direction and permeability of subsurface stratigraphic units. The cluster locations were selected to provide one cluster upgradient (for background sampling), one cluster between the leaching pools (to act as a point source), and ~~four~~ five clusters ~~plus a shallow well~~ downgradient to identify possible contaminant plume movement offsite.

The ~~six~~ seven well clusters will allow for vertical characterization of the water in the Upper Glacial aquifer to the approximate depth of the confining layer (approximately 80 to 110 feet). Each cluster will consist of one deep well and one shallow well.


N
GW
#1
MILBAR BLVD.
#2
#3
#4
SITE
#5
#6
#7
SCHMITT BLVD.
0
70
140
SCALE IN FEET
EXPLANATION
PROPOSED MONITORING WELL CLUSTER LOCATIONS
PROPOSED SHALLOW WELL LOCATIONS
DIRECTION OF GROUNDWATER FLOW
U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 3-1
PROPOSED MONITORING WELL LOCATIONS
EBASCO SERVICES INCORPORATED

The shallow well will be screened to intercept the water table, with suitable screen length to allow for seasonal fluctuations. The deep well will be screened just above the "20-foot clay" layer after confirmation of clay depth is established during drilling. The "20-foot clay" layer is expected to be reached at a depth of 80 to 110 feet below the ground surface. At each cluster location, the deep well will be installed first. Split spoon sampling in deep wells will provide the stratigraphic information needed to establish subsurface site geology.

A typical groundwater monitoring well is shown on Figure 3-2.

insert Att. 2 (next page)

The monitoring wells will not be considered complete until properly developed. Well development clears the well screen and sandpack of fine material which may clog the screen, and stabilizes the formation material immediately surrounding the well screen. The wells will be developed by pumping and surging. The surging may be done by periodically shutting off the pump, or with a surge block. This will help to avoid bridging of the formation materials and will permit a more uniform flow through the well screen.

Each well will be developed to the satisfaction of the site geologist who will monitor pumping rates, water color, turbidity, pH, and conductivity to determine the effectiveness of the development. Development will last at least one hour, and possibly longer, depending upon site conditions. Following installation of wells in each phase, the elevations of the ground surface and the tops of the riser pipe and security casing will be surveyed.

3.3.5 Groundwater Sampling

The objectives of the groundwater sampling program are to determine the types and vertical and horizontal extent of groundwater contamination in the Upper Glacial aquifer in the vicinity of the Circuitron Corporation Site. The data will be used to determine potential risks to residents in the vicinity of the site. In addition, the groundwater sampling program data will be used to determine the feasibility of potential remedial alternatives.

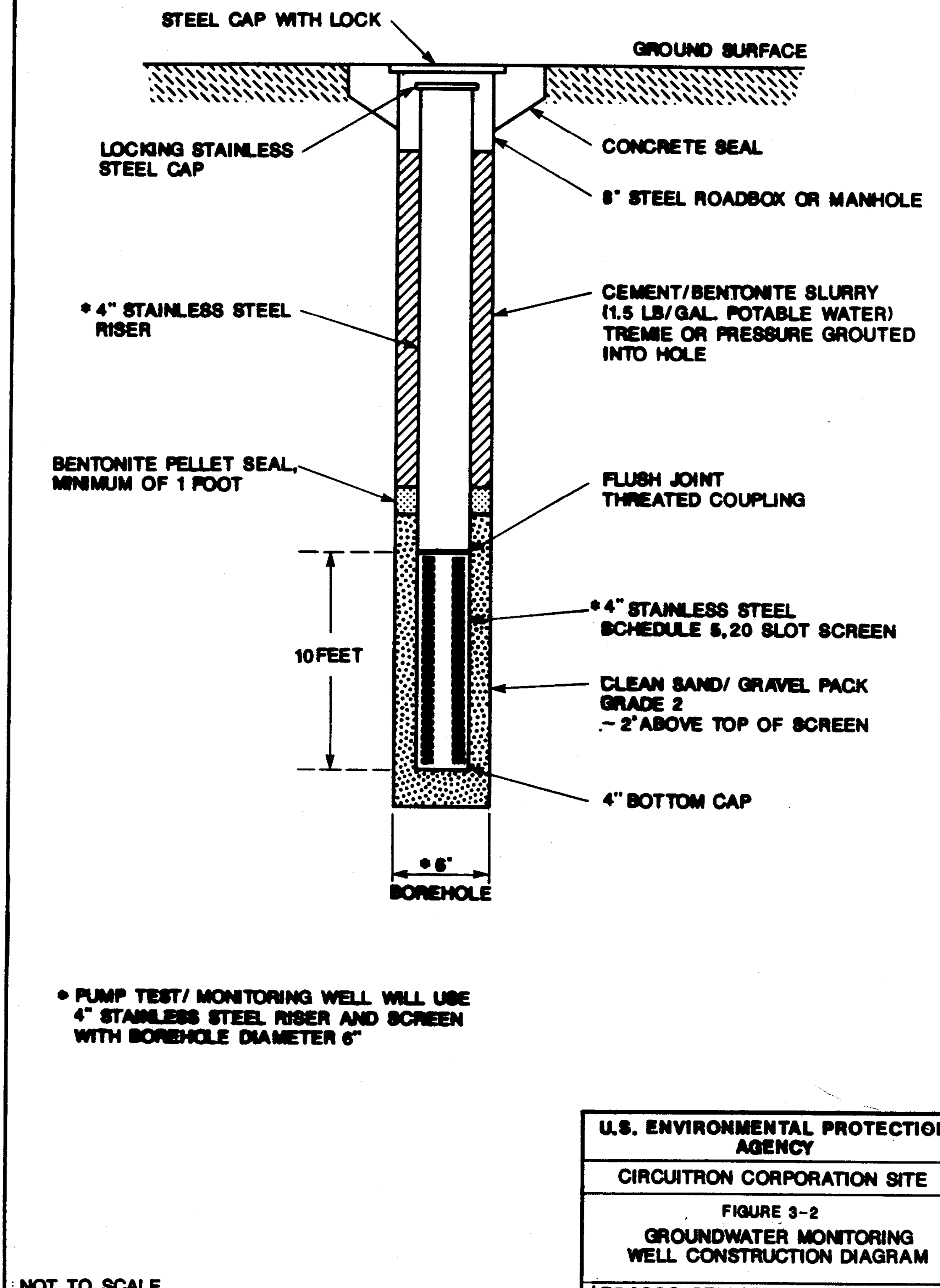
3.3.5.1 Monitoring Wells

Seven ~~Six~~ clusters and ~~one shallow well~~ will be installed at the locations shown on Figure 3-1. In each cluster, a shallow well will be set near the water table, approximately 30-40 feet deep, to monitor the interval 1 foot above the water table to 9 feet below the water table, and a deep well will be set near the base of the Upper Glacial aquifer to monitor the interval 10 feet above the "20-foot clay" layer (approximate depth 80 to 110 feet below the ground surface). The deep well in cluster #5 will be used as both a monitoring well and an aquifer testing well (if needed).

ATTACHMENT 2

(As per comment No.11
this attachment 1 should be inserted on page 60
following the first paragraph of this page)

In case a confining layer is not encountered during the remedial field investigations at the depth of 100 to 110 feet below the ground surface, the deep monitoring wells will be screened at the 110 feet and the chemical data from the subsurface soil and the groundwater samples will be evaluated. If the evaluation of the laboratory results indicates that the soil and groundwater contamination extends below the 110 feet from the ground surface, a Phase II field investigations will be recommended to be performed under a separate ARCS II work assignment.



U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 3-2 GROUNDWATER MONITORING WELL CONSTRUCTION DIAGRAM
EBASCO SERVICES INCORPORATED

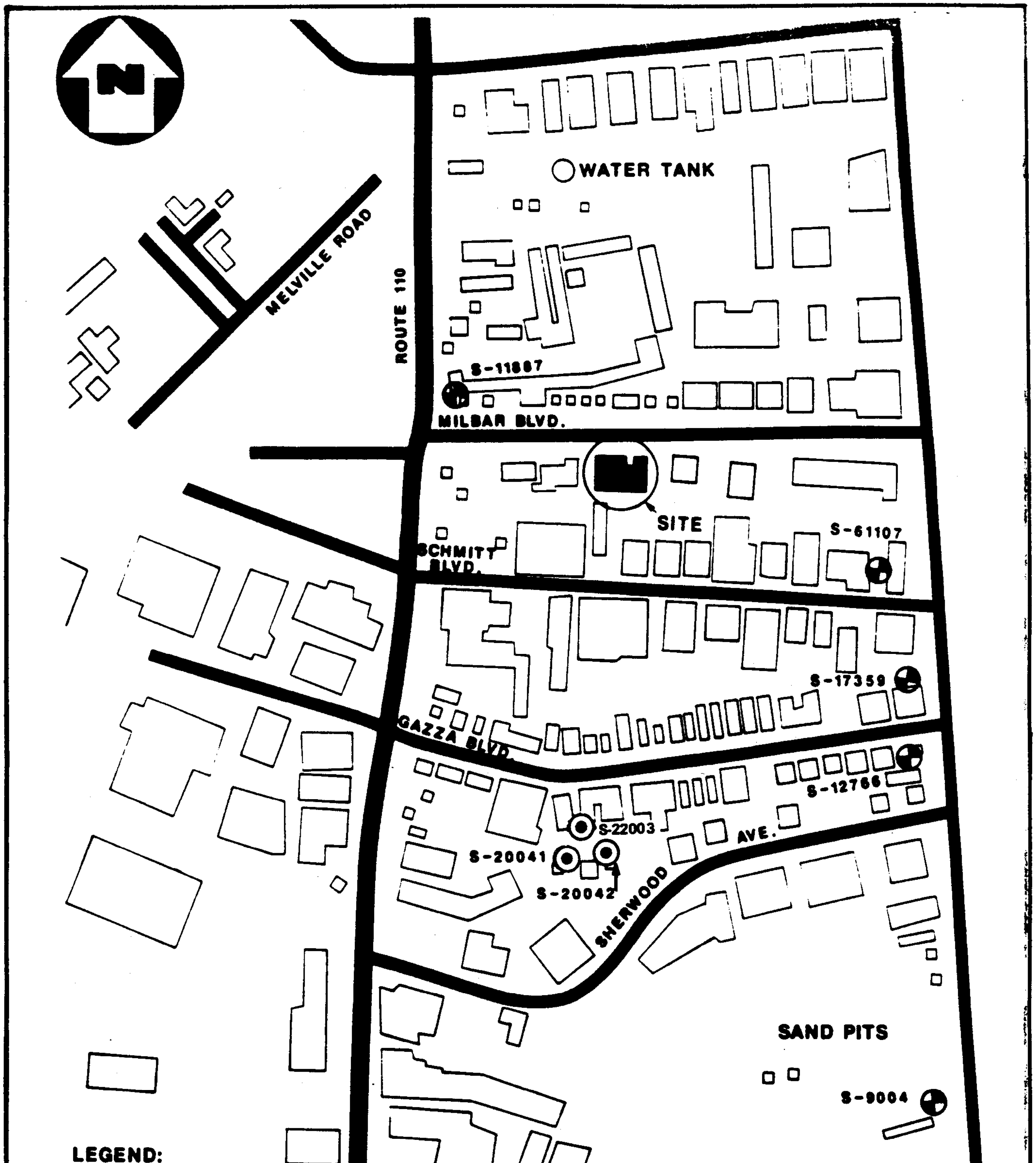
Development of the monitoring wells will commence after the installation of the wells has been completed. The development of all thirteen monitoring wells will be completed within approximately one week. The first round of groundwater samples will be taken at least 72 hours after the last of the monitoring wells has been developed. The two upgradient (MW-8 and MW-9) and three downgradient (MW-10, MW-11 and MW-12) on-site monitoring wells installed by Circuitron Corporation will be included in the round 2 ground- water sampling schedule. The location of these wells is shown on Figure 1-3. The reason for sampling these wells is to compare them with the existing data obtained by the SCDHS and Circuitron Corporation.

In addition, three (3) municipal wells (S-20041, S-20042 and S-22003) and five (5) private wells (S-11887, S-61107, S-17359, S-12766 and S-9004), shown in Figure 3-3, will be sampled as part of the round 1 and round 2 ground- water sampling program. Sampling of the existing wells is considered necessary for the completion of the groundwater data base. Table 3-2 lists the private and municipal wells that are scheduled to be sampled. A second round of groundwater sampling, three weeks after the first round of groundwater sampling, is planned as a means of confirming first round analytical results.

A total of ~~294~~ 308 groundwater samples will be obtained during the two rounds of monitoring well sampling from the ~~13~~ 14 proposed monitoring wells and the 8 private and municipal wells. In addition, 35 groundwater samples will be collected during the second round of groundwater sampling from the 5 existing on-site monitoring wells installed by Circuitron Corporation (see Figure 1-3). The samples will be analyzed for TCL, VOA, TCL B/NAs, TCL cyanide, TCL metals and hexavalent chromium, as noted on Table 3-1.

Two complete rounds of water level measurements will be made on all of the monitoring wells, before and after each round of groundwater sampling. These measurements will determine the vertical and lateral head distribution within the aquifer, thus providing data on direction of groundwater flow from the Circuitron Corporation Site. This data will also determine the final location of the piezometers, which will be required to be installed at the site, if the pumping test is considered necessary.

Ebasco has designed its schedule and critical path for the RI/FS to accommodate sampling of subsurface soils and groundwater at an early stage of the field investigation. At that time, it is planned that samples would be collected for delivery to the EPA/CLP contractor laboratory. Exact logistics for this activity will be arranged prior to expected drilling and sampling, in order for the EPA/CLP contractor to be notified of samples and sampling activities.



LEGEND:

- LOCATION OF EXISTING PRIVATE WELLS
- LOCATION OF EXISTING MUNICIPAL COMMERCIAL WELLS

(S-9004) NYSDEC WELL INDEX NUMBERS

0 250 500 750

SCALE IN FEET

SOURCE: NUS CORPORATION

U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 3-3

LOCATION OF PRIVATE & MUNICIPAL WELLS TO BE SAMPLED

EBASCO SERVICES INCORPORATED

TABLE 3-2

CIRCUITRON CORPORATION SITE

PRIVATE AND MUNICIPAL WELLS TO BE SAMPLED

NYSDEC I.D. NO.	OWNER	TOTAL DEPTH*
S-20041	East Farmingdale Water District	268'
S-20042	East Farmingdale Water District	585'
S-22003	House of Plastics	226'4"
S-12766	Role Realty Co., Inc.	65'
S-17359	M & S Co.	61'11"
S-61107	Canadian American Extruders, Inc.	55'
S-11887	Anthony Santa Maria	46'
S-9004	J.W. Robinson & Sons	83'5"

Note: *Total depth is as indicated on respective well logs.

Source: EA,. 1987 (Reference 1)

3.3.5.2 Pumping Test (Optional)

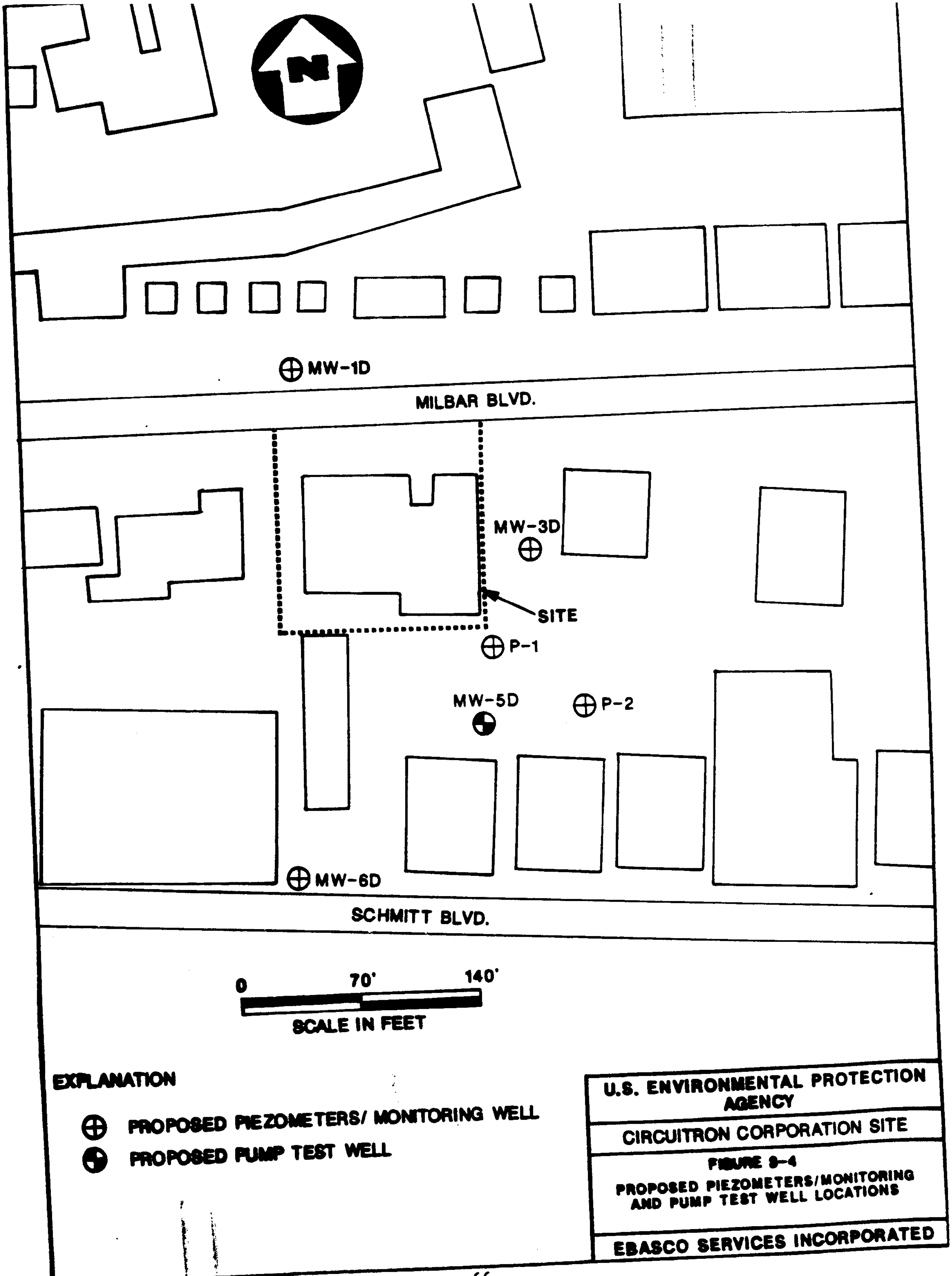
The purpose of the pumping test is to support the groundwater model and give accurate site specific information on the Upper Glacial aquifer. The pumping test is an option that will only be executed if unusual site conditions are encountered during the investigations, that would indicate a substantial deviation from existing background information. Background information searches have been performed to obtain hydrogeologic information on the Upper Glacial aquifer in the vicinity of the site. This information includes recent pumping tests performed on one or more of the existing private and/or municipal wells screened in the Upper Glacial aquifer and located in the immediate vicinity of the Circuitron Corporation Site. If the data is determined to be reliable based on the characterization of on-site geology during drilling, and sufficient for the execution of the groundwater modeling, the pumping test will not be conducted. Otherwise, a constant rate pump test will be used, where the pumping well (Well MW-5D) (see Figure 3-4) will be pumped at a constant rate, suitable for straining the aquifer, for a time period of 72 hours. This rate will be determined prior to pumping by using available data from existing wells.

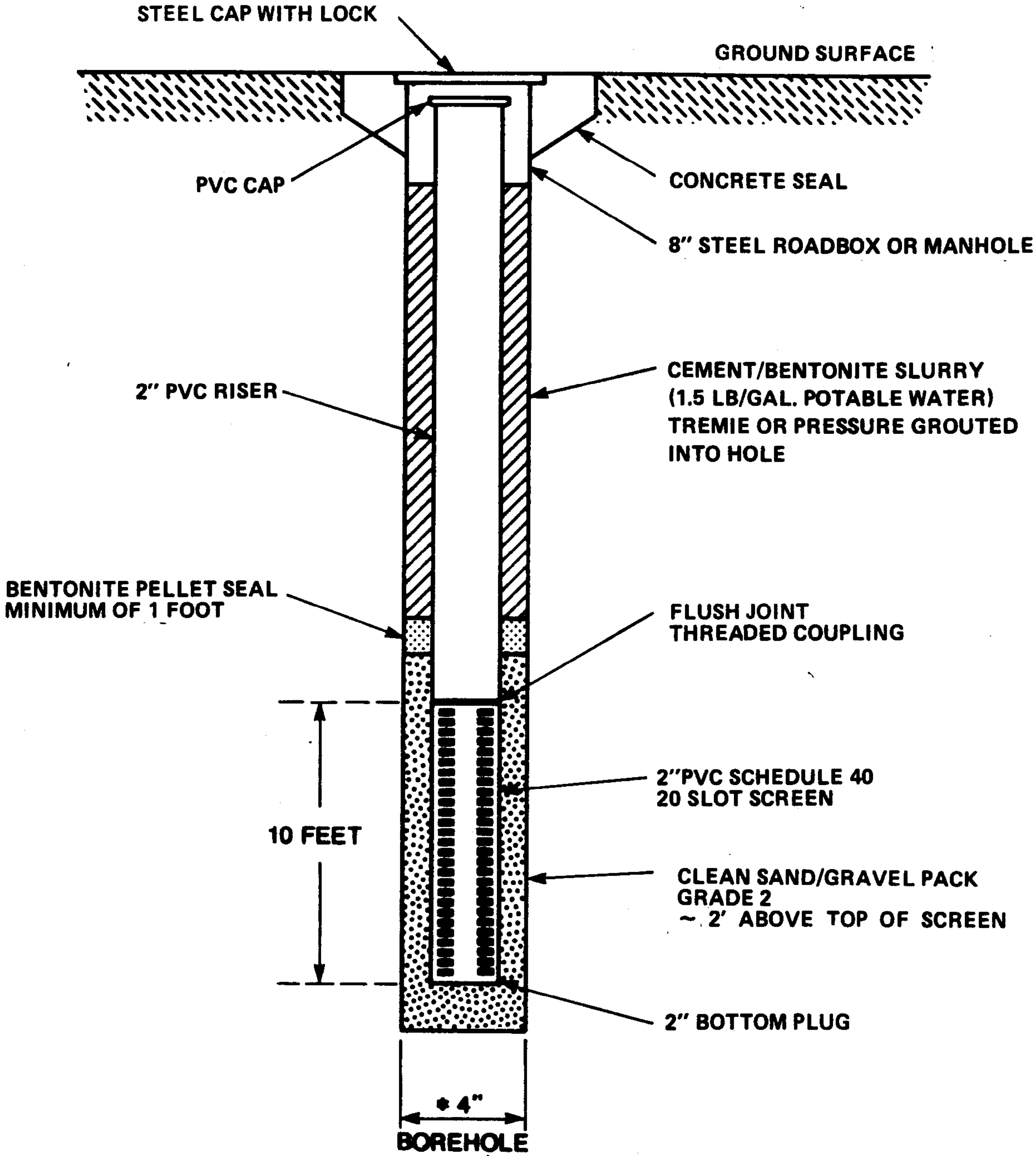
The pumping test will require the use of four monitoring wells (MW-1D, MW-3D, MW-5D and MW-6D) and two piezometers (P-1 and P-2). The two piezometers (P-1 and P-2) will be installed at the Circuitron Corporation Site at the locations shown in Figure 3-4 and will be used during the aquifer testing for water level recording.

Figure 3-5 illustrates a typical piezometer well diagram.

The piezometers will not be considered complete until properly developed. The development clears the piezometer screen and stabilizes the formation material immediately surrounding the piezometer screen. The piezometers will be developed by pumping and surging. The surging may be done periodically shutting off the pump or with a surge block. This will help to avoid bridging of the formation materials and will permit a more uniform flow through the piezometer screen.

The conceptual locations of the wells and piezometers, presented in Figure 3-4, are based on access concentrations and the local groundwater flow direction of the Upper Glacial aquifer. The wells used for water level measurements will be situated with the first one (MW-3D) approximately 100 feet upgradient from MW-5D, the second (MW-1D) approximately 250 feet upgradient from the pumping well and the third (MW-6D) 75 feet downgradient from the pumping well. Piezometer P-1 will be located 50 feet upgradient in line with the hydraulic gradient from MW-5D and


N
MW-1D
MILBAR BLVD.
MW-3D
SITE
P-1
MW-5D
P-2
MW-6D
SCHMITT BLVD.
0
70'
140'
SCALE IN FEET
EXPLANATION
PROPOSED PIEZOMETERS/ MONITORING WELL
PROPOSED PUMP TEST WELL
U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
PROPOSED PIEZOMETERS/MONITORING AND PUMP TEST WELL LOCATIONS
EBASCO SERVICES INCORPORATED



NOT TO SCALE

U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 3-5

PIEZOMETER
WELL CONSTRUCTION DIAGRAM

EBASCO SERVICES INCORPORATED

piezometer P-2 50 feet east of well MW-5D at a 90° angle from the hydraulic gradient (see Figure 3-5). The piezometers and monitoring wells will be used to monitor water level fluctuations of the Upper Glacial aquifer during pumping.

Prior to pumping, water level fluctuations and barometric pressure will be monitored for 3 days so diurnal water level trends may be observed. At least 12 hours before testing, the well will be pumped to flush the well of fines and to determine pumping rate and maximum drawdown.

The constant rate aquifer pumping test is to operate for a duration of seventy-two hours, which is considered sufficient for an unconfined aquifer (see Reference 2) such as the Upper Glacial aquifer. Because the well water may be contaminated, water discharged from the pumping will either be stored in a 5,000 gallon tank truck for proper disposal or into municipal sewers, in which case either a temporary discharge must be obtained for the NYSDEC, Region 1 Regional Water Engineer, or approval must be obtained from the POTW operator and the discharge point must be located on-site.

After the 72-hour test has been completed, a recovery test will be conducted on all observation wells and the pumping well. This test will be conducted in a manner similar to the pump test.

Drawdown observations provide the data necessary to calculate the Upper Glacial aquifer permeability. The determination of specific aquifer characteristics from the pump test will be accomplished using the Jacob graphical method. Graphical results will provide the parameters needed to calculate the aquifer's transmissivity, hydraulic conductivity and storage coefficient.

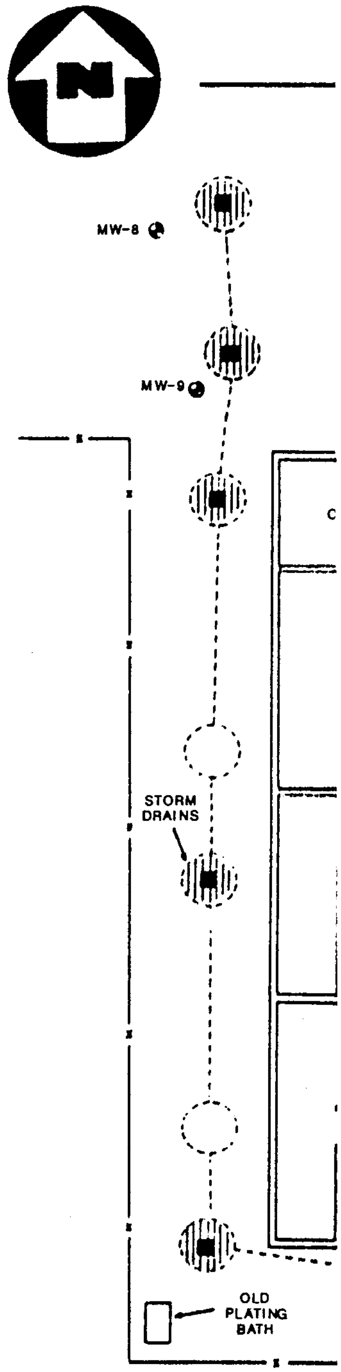
and MW-4D four (4)

3.3.6 Soil Sampling

The objective of the soil sampling program is to determine the nature and extent of the soil contamination at the Circuitron Corporation Site. Soil samples collected during this field investigation will be obtained from the ~~three (3)~~ deep monitoring well borings (MW-1D, MW-2D ~~and~~ MW-3D), ~~the one (1) shallow monitoring well boring (MW 4S),~~ the two (2) surface soil locations, and the six (6) soil borings, as described below. Figure 3-6 shows the proposed soil borings locations and Figure 3-7 illustrates the surface soil sampling locations.

3.3.6.1 Surface Soil

Surface soil samples will be collected from 0-6 inches at the two locations shown on Figure 3-7, to determine the presence of surface soil contamination caused by possible leakage from the three above ground tanks at the rear of the building.



CIRCUITRON CORP.
EAST FARMINGDALE, N.Y.

LEGEND:

- UNDERGROUND CEMENT-LINED TANKS
- EXISTING MONITORING WELL
- SPILLS
- STORM DRAIN
- LEACHING POOL
- SANITARY CESSPOOL
- UNDERGROUND OIL STORAGE TANK
- PROPOSED SOIL BORING

NOT TO SCALE

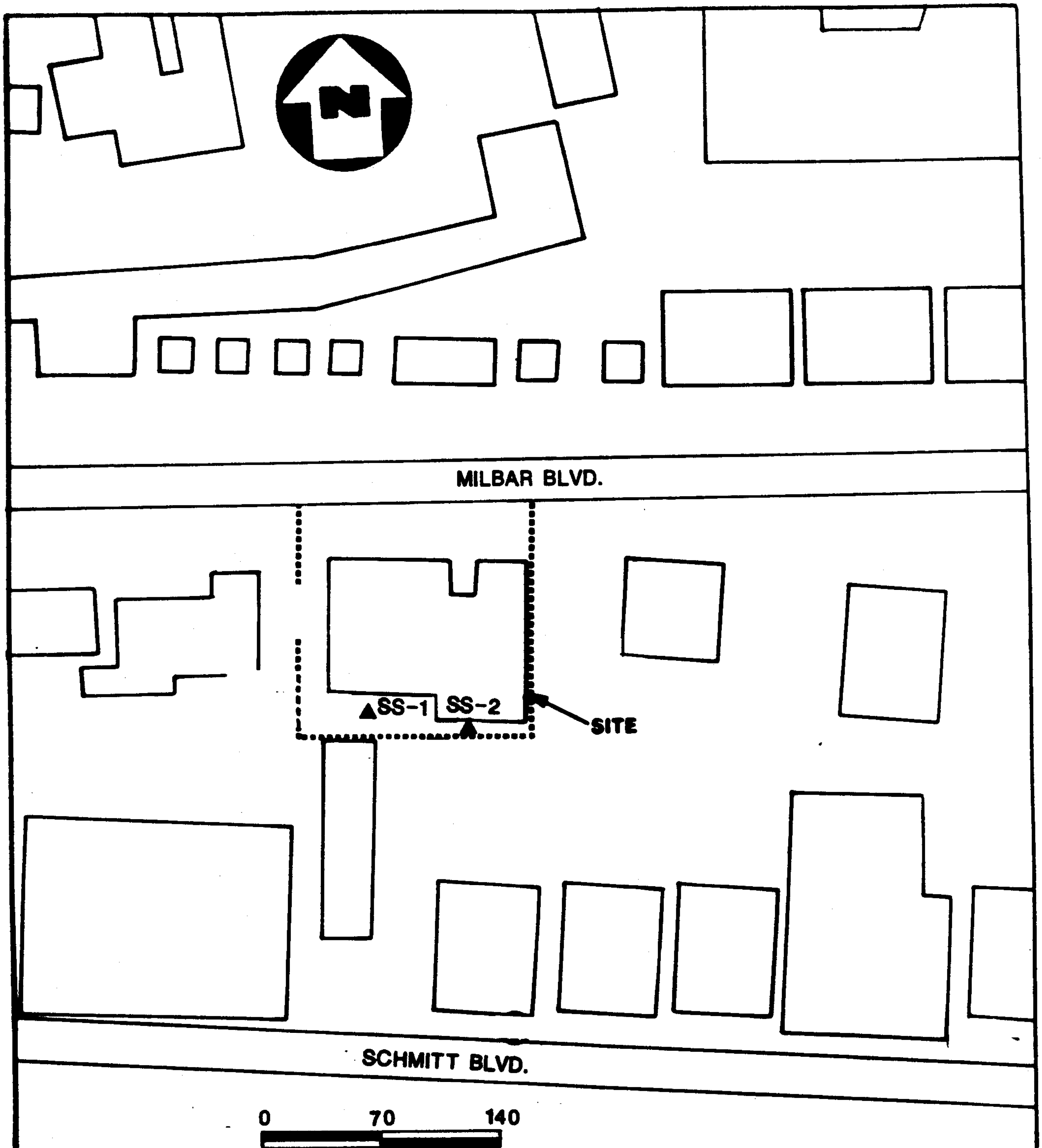
U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 3–6

PROPOSED SOIL BORING LOCATIONS

EBASCO SERVICES INCORPORATED



EXPLANATION

▲ PROPOSED SURFACE SOIL SAMPLES

DIRECTION OF GROUNDWATER FLOW IS TO THE SOUTHEAST

U.S. ENVIRONMENTAL PROTECTION AGENCY

CIRCUITRON CORPORATION SITE

FIGURE 3-7

PROPOSED SURFACE SOIL SAMPLING LOCATIONS

EBASCO SERVICES INCORPORATED

All surface soil samples will be analyzed for the full TCL screen analytes as the subsurface soil samples.

3.3.6.2 Subsurface Soil MW-4D.

Subsurface soil samples will be obtained during drilling of the deep wells MW-1D, MW-2D, ~~and~~ MW-3D and ~~from shallow well MW-4S.~~ Split-spoon sampling will provide the stratigraphic and water table information needed to determine the proper depths of the shallow wells. Two-foot split-spoon samples will be collected at 5-foot intervals, and will be described using the Unified Soil Classification System (USCS). Seven split-spoon samples from the vadose zone of the well borings, that are proposed to be sampled, will be retained for the full TCL screen analyses. Two samples from the same well borings will be retained for grain size, TOC and hexavalent chromium analyses. The final number of split spoon samples retained for chemical analysis will be dependent on sample recovery and the depth to the water table. Two foot split-spoon samples will be collected at 10-foot intervals during the installation of the deep monitoring wells MW-5D, MW-6D and MW-7D, which will be used for geological characterization of the soil downgradient of the Circuitron Corporation Site.

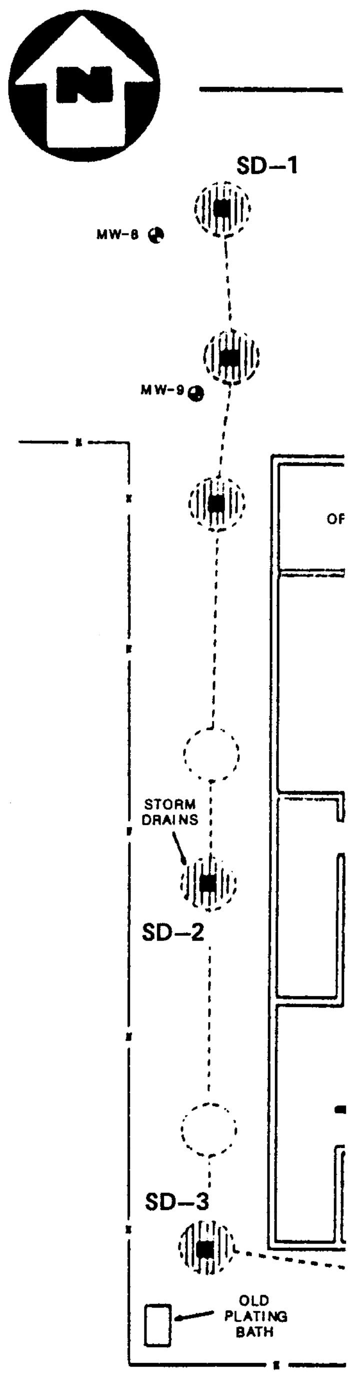
Figure 3-6 presents the approximate location of the soil borings.

Prior to the drilling, the GPR method will be used to ascertain the existence, location and configuration of the underground structures at the front of the building. Then one soil boring (SB-1) will be drilled in front of the building between the authorized pool and the sanitary cesspools, one (SB-2) in the drilling and silkscreening room, three (SB-3, SB-4 and SB-5) in the plating room and one (SB-6) at the rear of the building just downgradient of the underground oil storge tank. All six borings will be drilled 10 feet below the groundwater table, in order to determine the vertical extent of the contamination. A total of nine samples will be extracted from each of the six soil borings and will be analyzed for full TCL. Nine samples collected from SB-2 and SB-4 will be analyzed for TOC. Floor samples will be obtained during the drilling of soil borings SB-2 and SB-4 and will be analyzed for the full TCL to determine the condition of the concrete floor.

3.3.7 <u>Sediment Sampling</u>

3.3.7.1 Leaching Pools

The authorized leaching pool includes the main SPDES pool with all its interconnected pools and the old (abandoned) leaching pools, all located in front of the building at the north side of the Circuitron Corporation Site, as shown on Figure 3-8.



CIRCUITRON CORP.
EAST FARMINGDALE, N.Y.

LEGEND:

- UNDERGROUND CEMENT-LINED TANKS
- EXISTING MONITORING WELL
- SPILLS
- STORM DRAIN
- LEACHING POOL
- SANITARY CESSPOOL
- UNDERGROUND OIL STORAGE TANK

NOT TO SCALE

U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 3–8 PROPOSED SEDIMENT AND AQUEOUS SAMPLING LOCATIONS
EBASCO SERVICES INCORPORATED

Prior to all sampling activities, a GPR survey will be performed in order to determine the location of any additional leaching pools and to delineate the configuration of the known ones.

Both the SPDES permitted industrial discharge pool (LP-1) and the old abandoned distribution pool (LP-2) will be sampled. Since the facility has been vacated and discharge to the pools has ceased for several years, there should be no aqueous material in these pools. Samples of the sludge material at the bottom of each pool will be taken. If aqueous materials are found to exist in the leaching pools, the aqueous material will also be sampled.

Access to these two pools will be gained by removing the manhole covers. Two sediment samples (one from the main receiving pool and one from the shallower distribution pool) will be collected utilizing an Eckman Dredge, and a split spoon sampler, respectively. Two aqueous samples (one from the bottom of each pool) will also be collected utilizing a stainless steel or glass beaker.

All sediment and aqueous samples will be analyzed for the full Target Compound List and hexavalent chromium.

3.3.7.2 Sanitary Cesspools

The sanitary cesspools are located at the northwest corner of Circuitron Corporation Site, as shown in Figure 3-8.

Both cesspools (CP-1 and CP-2) will be sampled. Sediment samples will be collected with separate Eckman Dredges lowered to the bottom of each cesspool. Aqueous samples (if any) will also be collected from both cesspools using a stainless steel or glass beaker. All sediment and aqueous samples will be analyzed for the full Target Compound List (TCL).

3.3.7.3 Storm Drains

The storm drain in the southwest corner of the site is reported to have received direct untreated wastewater. This is the southernmost storm drain in the storm drain line on the west side of the property. As all the storm drains in the line are interconnected, each one may have received contaminated wastewater at some time. In addition, the northernmost storm drain in the line along the public storm drain on the south side of Milbar Boulevard, may have received contaminated wastewater from the SPDES leaching pool which was observed to be overflowing on several occassions.

The northern (SD-1), middle (SD-2) and the southernmost (SD-3) storm drains, as shown in Figure 3-8 will be sampled. The sediment samples will be collected from the bottom of each storm drain utilizing an Eckman Dredge, if sediment is evident, while the aqueous samples (if any) will be collected using a stainless steel or glass beaker. All three sediment and three aqueous samples will be analyzed for the full TCL.

3.3.8 <u>Site and Well Location Survey</u>

A New York State licensed land surveyor will perform a survey of the new and existing well locations and elevations in addition to locating the surface soil and soil boring locations. The surveyor will locate and establish elevations of the (6) six monitoring well clusters, (1) one water table monitoring well, (5) five on-site monitoring existing wells, (8) eight existing private and municipal wells, (6) six soil borings and (2) two surface soil samples, on and around the Circuitron Corporation Site. This information will be plotted on a base map and also reported to Ebasco in tabular form. The field measurements will be oriented according to existing benchmarks or property information on or around the site and plotted according to New York State Plane Coordinate System.

3.4 TASK 4 - SAMPLE ANALYSIS AND VALIDATION

All environmental samples gathered as part of Task 3 will be subjected to a laboratory testing and data validation program. The data validation portion of the program will verify that the analytical results were obtained following the protocols specified in the QA/QC Brossman Short Form and are of sufficient quality to be relied upon in performing the risk assessment, performing the selection of and screening of potential remedial action alternatives, and in supporting a Record of Decision (ROD).

All samples obtained and analyzed by Ebasco will be subjected to data validation using the USEPA procedures provided in USEPA's (CLP) SOW HW-1 and HW-4, as well as Ebasco's own data validation guideline LS-4. The results of the data validation will be presented to USEPA as an Appendix to the RI report. The samples to be taken and the parameters to be analyzed for each sample are briefly described in Task 3 of this Work Plan and will be detailed in the Sampling Analysis Plan (SAP). The analytical testing methods, levels of detection and similar information are provided in the Brossman Short Form, a part of the Sampling Analysis Plan.

Sample tracking consists of handling the arrangements for allocation of testing with the CLP or with other laboratories. The task includes assuring proper protocol and transport of field samples to the laboratories, correspondence with organizations dealing with the sampling and assembly of analytical results as they are received. When necessary, selection of procedures to be used by laboratories providing Special Analytical Services (SAS) is provided by this task.

The proposed analytical program includes QA/QC samples. Duplicate samples will be analyzed at a frequency of 5% or more. Field blanks will be taken on each sampling day for each sampling procedure. One distilled water blank sample will be collected for each week of sampling. Duplicate samples, field blanks, and distilled water blanks will be analyzed for the same parameters as the original samples. Trip blanks will accompany each sample batch requiring analyses for TCL volatiles and will be analyzed for TCL volatiles only. Approximate numbers of duplicates and blanks have been included in Table 3-1.

3.5 TASK 5 - DATA EVALUATION

3.5.1 Data Reduction and Analysis

Data collected during prior sampling programs and data from this Remedial Investigation will be assembled, reviewed, and carefully evaluated to satisfy the objectives of the investigation. When possible, the data evaluation task will be performed concurrently with Tasks 3, 4, and 6, with the goal of preparing the Remedial Investigation Report (Task 8).

The data collected to characterize the site will be organized and analyzed to identify the extent and nature of contamination, determine groundwater flow direction(s), identify potential on-site source(s) of the contaminants and evaluate off-site transport of contaminants. An investigation will also be conducted with the East Farmingdale Department of Public Works, in order to identify the ultimate discharge point of the sewer lines originating on the Circuitron Corporation Site. It is expected that these sewers ultimately discharge in the groundwater. Field data and data resulting from laboratory analysis will be entered into a data base. Boring logs will be prepared for all completed borings, and stratigraphic information developed from the site borings will be displayed as cross sections or fence diagrams of the site. Water level elevations measured at the wells will be used to develop plot(s) of the piezometric surface in the aquifer. Both the horizontal and vertical hydraulic gradients will be determined.

The results of the water analyses will be evaluated and mapped to illustrate the areal extent of contaminants detected. The degradation products of contaminants detected will be considered to help evaluate potential sources of the contaminants and their environmental behavior.

Tables will be prepared to compare and evaluate (a) results from the previous sampling efforts to the current results and (b) the results of the various matrices sampled during the Remedial Investigation. Where differences are observed, field and laboratory procedures, the passage of time and other factors will be evaluated to try and account for the differences. The results of the evaluation will be discussed in the Remedial Investigation Report.

3.5.2 Groundwater Modeling

The major objective of the RI/FS effort is to determine the extent and consequences of potential contaminant plume migration from the Circuitron Corporation Site. To delineate a potential downgradient groundwater contaminant plume, Ebasco will use computer models to characterize contaminants in soil and their interactions with groundwater on-site and downgradient from the Circuitron Corporation Site. The model will take into account important aspects of aquifer interactions with the contaminants such as retardation, adsorption, degradation and dispersion.

Ebasco will employ both a groundwater flow model and a transport model which have been successfully used in the past on EPA projects. The Prickett and Lonnquist flow model and the modified Rapid Assessment model for transport will initially be utilized. This initial proposal does not preclude the use of alternative models, such as CFEST, SUTRA, SWIFT or MUDFLOW. However, the actual models applied to the project will be selected based on accuracy and availability of data necessary to perform the modeling. Ebasco will employ only well documented and accepted flow and transport models.

Anticipated Results from Modeling

Based on the results of the database, combined with preliminary fate and transport modeling, several important issues regarding offsite contaminant migration can be addressed:

- Potentially immediate health risks can be more accurately defined for downgradient locations at which groundwater is utilized.
- The location and extent of contamination of the plume can be more accurately defined.
- FS efforts will be more effective in determining various groundwater and soil remediation alternatives.
- In the event that no contamination is found in the groundwater during the investigation then no action alternatives can be addressed.

3.6 TASK 6 - RISK ASSESSMENT

3.6.1 Public Health Evaluation

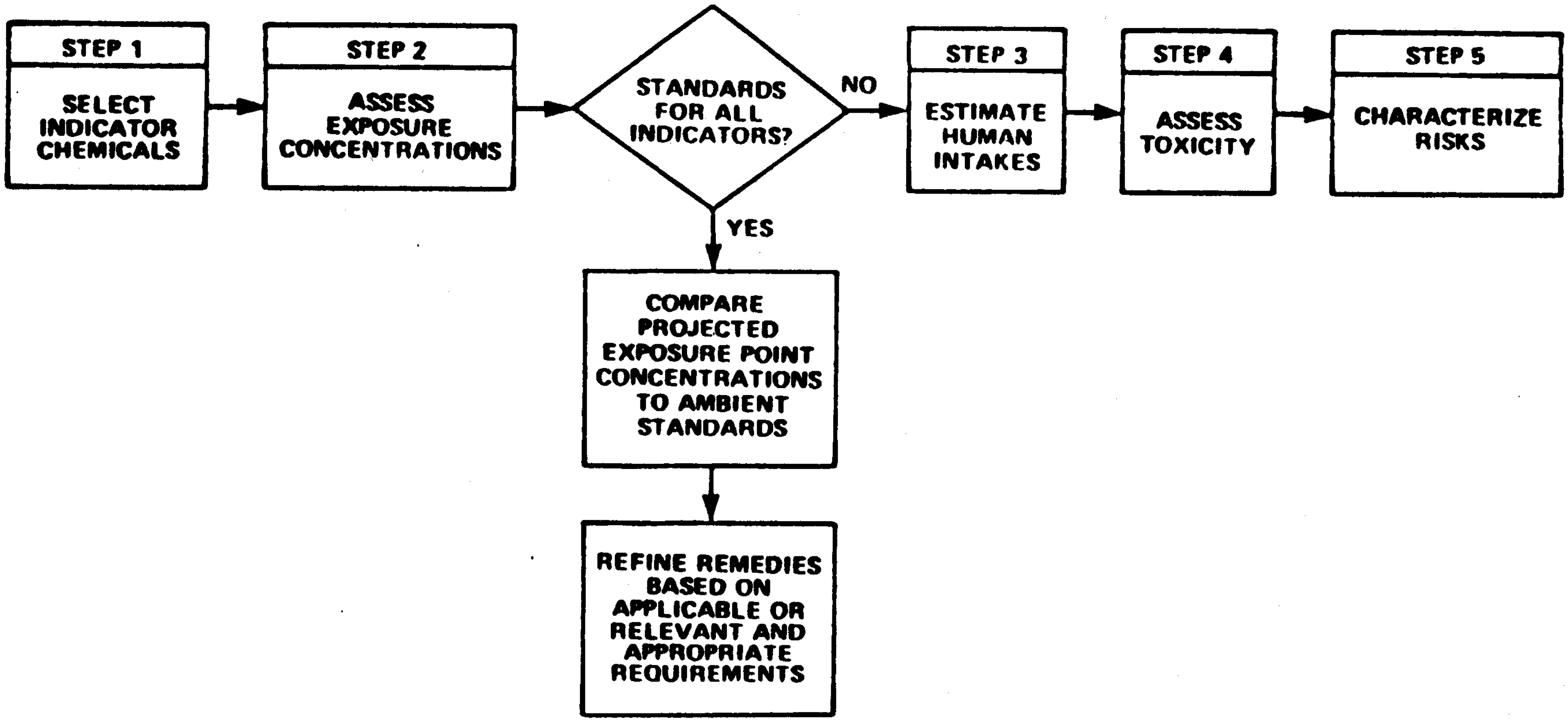
After the site investigation information has been evaluated and the database has been established, a preliminary baseline public health evaluation will be performed for the Circuitron Corporation Site. The objective of this assessment is to characterize health and environmental risks that would prevail if no further remedial action is taken.

The basic methodology to be employed is summarized in Figure 3-9. This process will be conducted in accordance with the procedures outlined in the EPA Superfund Public Health Evaluation Manual (Reference 21).

The first step in the public health evaluation is the selection of indicator chemicals for which quantitative risk analyses will be performed. Indicator chemicals will be selected on the basis of a number of factors including their magnitude, prevalence, distribution among area matrices, toxicity, and environmental fate in order to represent the entire spectrum of compounds measured on-site. Potential indicator chemicals for this site are discussed in Section 2.1.1 The most important indicator chemicals appear to be 1,1,1-trichloroethane, 1,1,2-trichloroethylene, methylene chloride, copper and lead.

The second step in the public health evaluation is the characterization of potential exposure pathways and receptors. A preliminary identification of the potential populations at risk and the most likely exposure routes were presented in Section 2.1. Given the nature of known existing contamination, primary emphasis will be placed on human exposure through consumption and/or contact with contaminated groundwater. Human exposure may be possible through contact with any of the other contaminated matrices which include surface soils and sludges. Given the large number and concentrations of volatiles at the site, air may represent an important pathway as well.

Concentrations of indicator chemicals in environmental media at relevant exposure points will then be estimated from the monitoring data using environmental fate and transport models as appropriate and necessary. The general basis and guidelines for exposure projections will be in accordance with the Draft Superfund Exposure Assessment Manual (Reference 14). Environmental chemistry and fate data from the literature will be considered and incorporated, where applicable, into all chemical concentration estimates. The estimated concentrations will then be compared to applicable or relevant and appropriate standards and criteria, which are reviewed in Section 2.2.



U.S. ENVIRONMENTAL PROTECTION AGENCY
CIRCUITRON CORPORATION SITE
FIGURE 3-9 BASELINE PUBLIC HEALTH EVAL. FLOW CHART
EBASCO SERVICES INCORPORATED

Applicable or relevant and appropriate standards may be available for many of the indicator chemicals in surface and groundwaters. If so, no further quantitative analysis of risk will be performed for these compounds in these matrices. For certain pollutants and critical exposure pathways where concentrations exceed or nearly exceed standards, additional risk analyses will be performed to confirm that the pollutant transport models adequately reflect conditions at the site and to determine additional data needs. If standards and criteria are not available for all of the indicator chemicals, quantitative analyses will be performed according to the general procedures outlined in the EPA Superfund Public Health Evaluation Manual (Reference 21).

For chemicals (or media-specific contamination) for which no applicable or relevant standards exist, individual pollutants will be separated into two categories of chemical toxicity depending on whether they exhibit carcinogenic or noncarcinogenic effects. Acceptable concentrations in environmental media for noncarcinogens will be developed using risk reference doses or Health Effects Assessments. Target risk levels for known or potential carcinogens will be derived using cancer potency factors developed by USEPA's Carcinogen Assessment Group (CAG) and an associated target risk level or range (e.g., 10^{-5} - 10^{-7}).

The primary source of toxicological data used in the analysis will be Appendix C of the Superfund Public Health Evaluation Manual (Reference 18), USEPA's Health Effects Assessments and USEPA's Air and Water Quality Criteria Documents. Target risk levels for carcinogens will be selected after consultation with USEPA. The USEPA will also be notified if it is felt that there are valid technical reasons for selecting toxicity values other than those found in the references cited above. In addition, using the references cited, a summary toxicity profile will be developed for each indicator chemical. This toxicity profile will summarize pertinent information regarding the chemical(s) based on USEPA contaminant profiles, health effects advisories, and water quality criteria support documents.

This assessment will characterize the nature and magnitude of potential risks associated with exposure to soils, groundwater, surface water, sediments and air at the Circuitron Corporation Site. The results should also allow an estimation of potential risks associated with any future remedial activity proposed for the site.

3.6.2 Environmental Assessment

There are no wetlands or waterbodies in the immediate area of the site. Long-distance transport of contaminants from the site are compounded by contaminant attenuation and contribution of other sources. The Circuitron Corporation Site is located in a densely industrial area where wildlife is not expected to be common. Based on this information, an environmental assessment does not seem warranted.

3.7 TASK 7 - TREATABILITY STUDY

The preliminary evaluation of the remedial alternatives, presented in Section 2.3 of this Work Plan, considered certain conventional and innovative technologies which may be applicable to the site. Treatability studies are typically conducted during the RI phase of an RI/FS project. The preliminary geohydrologic and chemical data seem to indicate that remediation, if any, could consist of conventional techniques for treating soils or sediments such as excavation of "hot spots" and on-site treatment and/or disposal. The treatment technologies may include incineration, if non-volatile organic chemicals are present, enhanced volatilization, if only volatile organic compounds need to be removed, and fixation if heavy metals must be remediated. Since heavy metal and organic chemical contamination have been documented in the site area, a treatability study may be required to address the concurrent treatment of both types of contaminants via a single or combined technology. The definitive need for a treatability study will be determined in the latter stages of the remedial investigation. Information from the study will be incorporated into the Feasibility Study Report.

3.8 TASK 8 - REMEDIAL INVESTIGATIONS REPORT

After completion of Tasks 3, 4, 5 and 6, a draft Remedial Investigation (RI) Report will be prepared and submitted to USEPA for review. The report will follow the latest USEPA format as described in USEPA guidance documents such as the 1985 "Guidance on Remedial Investigation Under CERCLA" (Reference 9) and the 1988 draft "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (Reference 22). A draft outline of the RI report, adapted from the 1988 guidance, is shown on Table 3-3. This outline should be considered a draft and subject to some revision, based on the data obtained.

The report will include discussions of the data from the previous sampling program performed by the SCDHS (Reference 25) and EPA, as well as the data and analyses performed as part of this Remedial Investigation.

When the draft RI report is completed, it will be submitted to the USEPA for review and comment. Within 20 business days of receipt of USEPA's written comments, Ebasco will revise the report and submit the final report to USEPA. When the USEPA determines that the report is acceptable, the report will be deemed the final RI Report.

TABLE 3-3

CIRCUITRON CORPORATION SITE

PRELIMINARY REMEDIAL INVESTIGATION REPORT FORMAT

Executive Summary

1. Introduction

1.1 Purpose of Report
1.2 Site Background
    1.2.1 Site Description
    1.2.2 Site History
    1.2.3 Previous Investigations
1.3 Report Organization

2. Study Area Investigation

2.1 Surface Features (topogaphic mapping, etc) (natural and manmade features)
2.2 Contaminant Source Investigations
2.3 Surface Water and Sediment Investigations
2.4 Geological Investigations
2.5 Soil Investigations
2.6 Groundwater Investigations

3. Physical Characteristics of the Study Area

3.1 Surface Features
3.2 Meteorology
3.3 Surface Water Hydrology
3.4 Geology
3.5 Soils
3.6 Hydrogeology
3.7 Demography and Land Use
3.8 Ecology

4. Nature and Extent of Contamination

4.1 Sources
4.2 Soils
4.3 Groundwater
4.4 Surface Water and Sediments

TABLE 3-3 (Cont'd)

CIRCUITRON CORPORATION SITE

PRELIMINARY REMEDIAL INVESTIGATION REPORT FORMAT

5. Contaminant Fate and Transport

   5.1 Potential Routes of Migration (i.e., air, groundwater, etc.)
   5.2 Contaminant Persistance
   5.3 Contaminant Migration

6. Baseline Risk Assessment

   6.1 Public Health Evaluation
      6.1.1 Exposure Assessment
      6.1.2 Toxicity Assessment
      6.1.3 Risk Characterization
   6.2 Environmental Assessment

7. Summary and Conclusions

   7.1 Summary
      7.1.1 Nature and Extent of Contamination
      7.1.2 Fate and Transport
      7.1.3 Risk Assessment
   7.2 Conclusions
      7.2.1 Data Limitations and Recommendations for Future Work
      7.2.2 Recommended Remedial Action Objectives

Appendices

A. Analytical Data QA/QC Evaluation Results
B. Risk Assessment Models

3.9 TASK 9 - REMEDIAL ALTERNATIVES SCREENING

After data from the existing database and those collected during the RI are evaluated and compared to the ARARs, (Task 3 through 6), the preliminary remedial response objectives will be developed and refined. Based on the established remedial response objectives and the results of the Risk Assessment (Task 6), the initial screening of remedial alternatives will be performed according to the procedures recommended in "Interim Guidance on Superfund Selection of Remedy" (Reference 20) and "Guidance for Conducting RI/FS under CERCLA" (Reference 24).

Development of alternatives will be performed concurrently with the RI. This Work Plan includes a preliminary identification and discussion of alternatives, although the process of identifying and screening potential alternatives will be ongoing throughout the RI, as new technological and/or site-specific data emerge. Task 9 will accomplish the following objectives:

- o development of remedial response objectives and general response actions;
- o identification and screening of remedial technologies; and,
- o development and screening of remedial alternatives.

3.9.1 <u>Development of Remedial Response Objectives and General Response Actions</u>

Based on the data collected in the RI along with other existing data, the remedial response objectives will be developed. Prior to the development of these objectives, any significant site problems and contaminant pathways will be identified. Considering these problems and pathways, the remedial response objectives which would eliminate or minimize substantial risks to public health and the environment will be developed further, including a refinement of the ARARs with consideration given to site-specific conditions. Based on the response objectives, general response actions will be delineated to address each of the site problem areas and to meet the clean up goals and objectives. These response actions will form the foundation for the screening of remedial technologies. General response actions considered will include the "no action" alternative as a baseline against which all other alternatives can be compared.

3.9.2 Identification of Applicable Technologies and Development of Alternatives

Based on the remedial response objectives and each identified general response action, potential treatment technologies and their associated containment or treatment and disposal requirements will be identified. A pre-screening of these potential treatment technologies for suitability as part of a remedial alternative will be conducted.

Those technologies that prove extremely difficult to implement, may not achieve the remedial objective in a reasonable time, or are not applicable and not feasible based on the site-specific conditions will then be eliminated. A preliminary identification of technologies has been completed and the results can be found in Section 2.3 - Preliminary Evaluation of Remedial Alternatives. However, this preliminary identification will be finalized based on the results of the RI and the established remedial response objectives. The revised list of potential remedial technologies and alternatives will be developed as part of Task 9.

The development of alternatives requires combining appropriate remedial technologies such as those listed in Table 2-3 in a manner that will satisfy the sited remediation strategies or response objectives established for the site and refined based on the results of the RI.

As required by SARA, treatment alternatives will be developed in each of the following categories:

- an alternative for treatment that would eliminate, or minimize to the extent feasible, the need for long-term management (including monitoring) at the site;
- alternatives that would use treatment as a primary component of an alternative to address the principal threats at the site;
- an alternative that relies on containment, with little or no treatment but is protective of human health and the environment by preventing potential exposure and/or by reducing mobility; and
- a No-Action alternative.

3.9.3 Screening of Remedial Alternatives

The list of potential remedial alternatives developed above will be screened. The objectives of this effort is to reduce the number of technologies and alternatives for further analysis while preserving a range of options. This screening will be accomplished by evaluating alternatives principally on the basis of effectiveness and implementability and cost as specified in the most recent USEPA guidance document (Reference 22). These screening criteria are briefly described below:

o <u>Effectiveness Evaluation</u>

The effectiveness evaluation will consider the capability of each remedial alternative to protect human health and the environment. Each alternative will be evaluated as to the protection it would provide, and the reductions in toxicity, mobility or volume of contaminants it would achieve.

o <u>Implementability Evaluation</u>

The implementability evaluation will be used to measure both the technical and administrative feasibility of constructing, operating and maintaining a remedial action alternative. In addition, the availability of the technologies involved in a remedial alternative will also be considered.

Innovative technologies will be considered throughout the screening process if there is a reasonable belief that they offer potential for better treatment performance or implementability, few or lesser adverse impacts than other available approaches, or lower costs than demonstrated technologies.

o <u>Cost Evaluation</u>

Cost evaluation will include estimates of capital costs, annual operation and maintenance (O&M) cost, and present worth analysis. These conceptual cost estimates are order-of-magnitude estimates, and will be prepared based on:

- o preliminary conceptual engineering for major construction components; and
- o unit cost of capital investment and general annual operation and maintenance costs available from USEPA documents (Reference 12 and Reference 13) and from Ebasco in-house files.

3.10 TASK 10 - REMEDIAL ALTERNATIVES EVALUATION

The remedial alternatives which pass the initial screening, will be further evaluated in conformance with the requirements of the NCP, in particular, Section 300.68 (h), Subpart F, and to the extent it attains or exceeds ARARs, and will consist of a technical, environmental and cost evaluation as well as an analysis of other factors, as appropriate. The detailed evaluation will follow the process specified in the "Guidance on Feasibility Studies Under CERCLA" (Reference 22), as updated in J.W. Porter's December 1986 and July 1987 Memoranda on "Interim Guidance on Superfund Selection of Remedy", and "Guidance for Conducting RI/FS under CERCLA" (Reference 23).

In the latter guidance, a set of nine evaluation criteria have been developed which are to be applied in the evaluation of each remedial alternative.

Table 3-4 presents the nine evaluation criteria and the factors considered for each evaluation criteria. A brief description of each criteria is provided below:

o <u>Short-Term Effectiveness</u>

This criterion addresses the effects of the alternative during the construction and implementation phase until the remedial actions have been completed and the selected level of protection has been achieved. Each alternative is evaluated with respect to its effects on the community and on-site workers during the remedial actions, environmental impacts resulting from implementation, and the amount of time until protection is achieved.

o <u>Long-Term Effectiveness</u>

This criterion addresses the results of a remedial action in terms of the risk remaining at the site after the response objectives have been met. The primary focus of this evaluation is to determine the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. The factors to be evaluated include the magnitude of remaining risk (measured by numerical standards such as cancer risk levels), and the adequacy, suitability and long-term reliability of management controls for providing continued protection from residuals (i.e., assessment of potential failure of the technical components).

o <u>Reduction of Toxicity, Mobility, and Volume</u>

This criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of the contaminants. The factors to be evaluated include the treatment process employed, the amount of hazardous material destroyed or treated, the degree of reduction expected in toxicity, mobility and volume, and the type and quantity of treatment residuals.

TABLE 3-4

CIRCUITRON CORPORATION SITE

DETAILED EVALUATION CRITERIA

- SHORT-TERM EFFECTIVENESS

  - Protection of community during remedial actions
  - Protection of workers during remedial actions
  - Time until remedial response objectives are achieved
  - Environmental impacts

- LONG-TERM EFFECTIVENESS

  - Magnitude of risk remaining at the site after the response objectives have been met
  - Adequacy of controls
  - Reliability of controls

- REDUCTION OF TOXICITY, MOBILITY AND VOLUME

  - Treatment process and remedy
  - Amount of hazardous material destroyed or treated
  - Reduction in toxicity, mobility or volume of the contaminants
  - Irreversibility of the treatment
  - Type and quantity of treatment residuals

- IMPLEMENTABILITY

  - Ability to construct technology
  - Reliability of technology
  - Ease of undertaking additional remedial action, if necessary
  - Monitoring considerations
  - Coordination with other agencies
  - Availability of treatment, storage capacity, and disposal services
  - Availability of necessary equipment and specialists
  - Availability of prospective technologies

TABLE 3-4 (Cont'd)

CIRCUITRON CORPORATION SITE

DETAILED EVALUATION CRITERIA

- o COST
  - Capital costs
  - Annual operating and maintenance costs
  - Present worth analysis
  - Sensitivity analysis

- o COMPLIANCE WITH ARARs
  - Compliance with chemical-specific ARARs
  - Compliance with action-specific ARARs
  - Compliance with location-specific ARARs
  - Compliance with appropriate criteria, advisories and guidances

- o OVERALL PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

- o STATE ACCEPTANCE

- o COMMUNITY ACCEPTANCE

o Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation. Technical feasibility considers construction and operational difficulties, reliability, ease of undertaking additional remedial action (if required), and the ability to monitor its effectiveness. Administrative feasibility considers activities needed to coordinate with other agencies (e.g., state and local) in regards to obtaining permits or approvals for implementing remedial actions.

o Cost

This criterion addresses the capital costs, annual operation and maintenance costs, and present worth analysis.

Capital costs consist of direct (construction) and indirect (nonconstruction and overhead) costs. Direct costs include expenditures for the equipment, labor, and material necessary to perform remedial actions. Indirect costs include expenditures for engineering, financial, and other services that are not part of actual installation activities but are required to complete the installation of remedial alternatives. Annual operation and maintenance costs are post-construction costs necessary to ensure the continued effectiveness of a remedial action. These costs will be estimated to provide an accuracy of +50 percent to -30 percent.

A present worth analysis is used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year, usually the current year. This allows the cost of remedial action alternatives to be compared on the basis of a single figure representing the amount of money that would be sufficient to cover all costs associated with the remedial action over its planned life. As suggested in the USEPA's guidance (1988), a discount rate of 5 percent will be considered unless the market values indicate otherwise during the performance of the FS.

o Compliance With ARARs

This criterion is used to determine how each alternative complies with applicable or relevant and appropriate Federal and State requirements, as defined in CERCLA Section 121.

o Overall Protection of Human Health and the Environment

This criterion provides a final check to assess whether each alternative meets the requirement that is protective of human health and the environment. The overall assessment of protection is based on a composite of factors assessed under the evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.

o <u>State Acceptance</u>

This criterion evaluates the technical and administrative issues and concerns the State of New York may have regarding each of the alternatives. The factors to be evaluated include those features of alternatives that the state supports, reservations of the state, and opposition of the state.

o <u>Community Acceptance</u>

This criterion incorporates public concerns into the evaluation of the remedial alternatives.

After each of the remedial alternatives has been assessed against the nine criteria, a comparative analysis will be performed. This analysis will compare all the remedial alternatives against each other for each of the nine evaluation criteria.

3.11 TASK 11 - FEASIBILITY STUDY

An FS report will be prepared to summarize the activities performed and to present the results and associated conclusions for Tasks 1 through 10. The report will include a summary of laboratory treatability findings (if performed), a description of the initial screening process and the detailed evaluation of the remedial action alternatives studied. The FS report will be prepared and presented in the format specified in "Guidance for Conducting RI/FS under CERCLA" (Reference 25).

The FS Report will be comprised of an executive summary and four sections. The executive summary will be a brief overview of the FS and the analysis underlying the remedial actions which were evaluated.

The FS will contain the following four sections:

- o introduction and site background;
- o identification and screening of remedial technologies;
- o development and initial screening of remedial alternatives; and
- o description and detailed analysis of alternatives.

A brief discussion of each section is presented below.

The introduction will provide background information regarding site location and facility history and operation. The nature of the problem, as identified through the various studies, will be presented. A summary of geohydrological conditions, remedial action objectives, and the nature and extent of contamination addressed in the RI Report will also be provided.

The feasible technologies for site remediation will be identified for general response actions, and the results of the remedial technologies screening will be presented.

Remedial alternatives will be developed by combining the technologies identified in the previous screening process. The results of initial screening of remedial alternatives, with respect to effectiveness, implementability and cost, will be described.

A detailed description of the cost and non-cost features of each remedial action alternative passing the initial screening of the previous section will be presented. The detailed evaluation of each remedial alternative with respect to nine evaluation criteria, 1) short-term effectiveness, 2) long-term effectiveness, 3) reduction of mobility, toxicity and volume, 4) implementability, 5) cost, 6) compliance with ARARs, 7) overall protection of human health and the environment, 8) state acceptance and 9) community acceptance will be presented. A comparison of these alternatives will also be presented.

3.12 TASK 12 - POST RI/FS SUPPORT

Upon approval of the final RI and FS reports, Ebasco personnel, if requested by USEPA, will provide additional services until the time the Record of Decision (ROD) is signed for the Circuitron Corporation Site. These tasks may include any or all of the following efforts:

1. Preparation of slides for presentation at the public meeting on the RI/FS.

2. Preparation and/or review of the Preferred Remedial Alternative Plan (PRAP) distributed by USEPA at the public meeting on the RI/FS.

3. Provide technical support to USEPA and attend meetings with any New York State, Federal, or local organizations regarding the RI/FS for the Circuitron Corporation Site.

4. Preparation of the Responsiveness Summary (or review if prepared by others).

4.0 PROJECT MANAGEMENT APPROACH

4.1 ORGANIZATION AND APPROACH

The proposed project organization is presented on Figure 4-1.

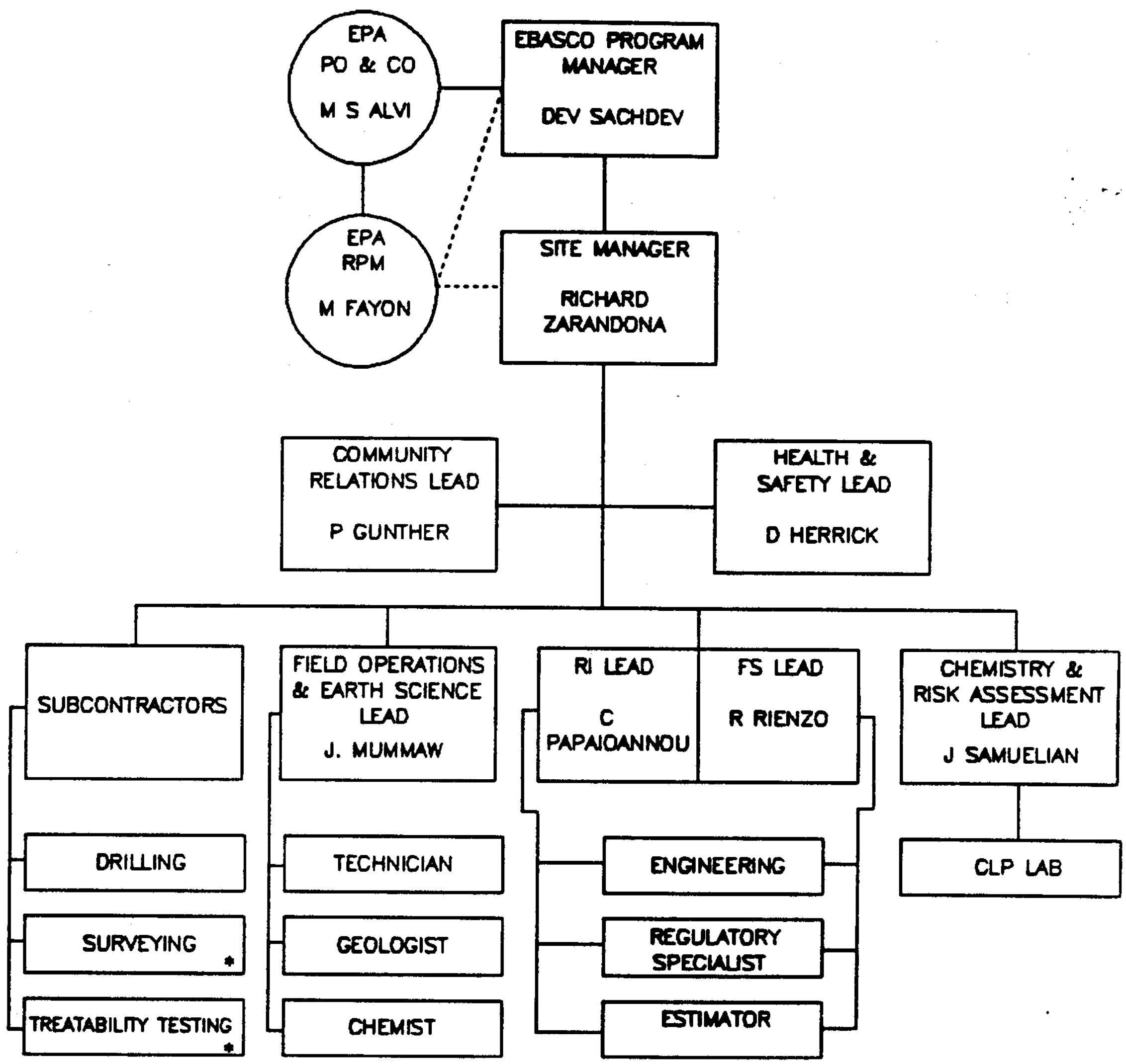
The Site Manager, Richard Zarandona, has primary responsibility for plan development and implementation of the remedial investigation and feasibility study, including coordination among the RI and FS leaders and support staff, development of bid packages, acquisition of engineering or specialized technical support, and all other aspects of the day-to-day activities associated with the project. The Site Manager identifies staff requirements, directs and monitors site progress, ensures implementation of quality procedures and adherance to applicable codes and regulations, and is responsible for performance within the established budget and schedule.

The Remedial Investigation Leader reports to and will work directly with the Site Manager to develop the FOP and will be responsible for the implementation of the field investigation, the analysis, interpretation and presentation of data acquired relative to the site, and preparation of the RI report.

The Feasibility Study Leader will work closely with the RI Leader to ensure that the field investigation generated the proper type and quantity of data for use in the initial screening of remedial technologies/ alternatives, detailed evaluation of remedial technologies/alternatives, development of requirements for and evaluation of treatability study, if required, and associated cost analysis. The Feasibility Study Report will be developed by the FS technical group.

The Field Operations Leader is responsible for on-site management for the duration of all site operations including the activities conducted by Ebasco such as sampling, and the work performed by subcontractors such as well drilling and surveying. The FOL will provide consultation and decide on factors relating to sampling activities and changes to the field sampling program.

The Chemistry and Risk Assessment Leader will ensure that the analytical laboratory(ies) will perform analyses as described in the SAP, and will be responsible for assuming that proper collection, packaging, preservation and shipping of samples is performed in accordance with USEPA guidelines.



* The need for these services will be determined in the development of the FSAP

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FIGURE 4-1
PROJECT ORGANIZATION CHART

EBASCO SERVICES INCORPORATED

The task numbering system for the RI/FS effort is described in this Work Plan. The Tasks are numbered as follows:

Task 1:	Project Planning
Task 2:	Community Relations
Task 3:	Field Investigations
Task 4:	Sample Analysis/Validation
Task 5:	Data Evaluation
Task 6:	Risk Assessment
Task 7:	Treatability Study/Pilot Testing
Task 8:	Remedial Investigation Report
Task 9:	Remedial Alternatives Screening
Task 10:	Remedial Alternatives Evaluation
Task 11:	Feasibility Study Report
Task 12:	Post RI/FS Support

Each of these tasks has been scheduled and will be tracked separately during the course of the RI/FS work. The key elements of the Monthly Progress Report will be sumitted within 20 calendar days after the end of each reporting period and will consist of a summary of work completed during that period and associated costs.

Project progress meetings will be held, as needed, to evaluate project status, discuss current items of interest, and review major deliverables such as the FOP, RI and FS reports.

4.2 QUALITY ASSURANCE AND DATA MANAGEMENT

The site-specific quality assurance requirements will be in accordance with the Quality Assurance Project Plan for the ARCS Program as approved by USEPA, and in accordance with the Brossman Guidance.

Data management aspects of the program pertain to controlling and filing documents. Ebasco has developed a program filing system (Administrative Guideline Number PA-5) that conforms to the requirements of the Environmental Protection Agency to ensure that the documents are properly stored and filed. This guideline will be implemented to control and file all data associated with the RI/FS for this site. The system includes document receipt control procedures, a file review and inspection system, and security measures.

4.3 PROJECT SCHEDULE

The project schedule for the Circuitron Corporation Site RI/FS is presented in Figure 4-2. The schedule allows 12 months for completion of the Final Draft of the RI/FS report from the date the work assignment was received. This assumes that the timely review and approval of documents is obtained from USEPA.

The schedule for this project is based on assumptions for the durations and conditions of key events occurring on the critical and non-critical pathways. These assumptions are as follows:

- The schedule for the field investigation is dependent on the expedited review and approval of the Work Plan and FOP by EPA.
- The schedule is based on three-week review periods for EPA of the draft Work Plan and FOP and three weeks for approval of the final Work Plan and FOP.
- The field activities will commence after the USEPA has completed its emergency response activities.
- The field schedule assumes weather conditions suitable for field work for the months of June, July and August. If field work is postponed the project schedule will be similarly impacted.
- Data validation of samples will be obtained within the eight weeks after the receipt of samples.
- Submittal of the draft FS is contingent on EPA approval during an alternatives screening meeting.
- The schedule is based on three week review periods for the draft RI and draft FS reports and a three week-review and approval of the revised documents.

4.4 PROJECT BUDGET

The estimated costs for completing Tasks 1 through 11 will be forwarded under separate cover. The primary assumptions used in preparing the cost estimates are the following:

1. Work by the Community Relations Department of Ebasco for preparation for the public meeting and the Responsiveness Summary are considered part of Task 2 not Task 12 Post RI/FS Support.
2. Field work will not be delayed once mobilization has begun because of weather.
3. Estimated budget for a treatability study has been included in the project costs, but may not be required.
4. Pumping Test is not included.
5. Groundwater modelling will be required.
6. The project budget will be submitted under a separate cover in the form of an Optional Form 60.

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