Marvel Engineering
ILD 984837104
L0311860037/Cook Co.
SF/HRS

CERCLA Integrated Site Assessment

Illinois Environmental Protection Agency

2200 Churchill Road
P. O. Box 19276
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EPA Region 5 Records Ctr.
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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276 Mary A. Gade, Director

September 24, 1998

Ms. Jeanne Griffin
Early Action Project Manager
Emergency Response Branch
Region V Offices
Office of Superfund
U.S. Environmental Protection Agency
77 West Jackson
Chicago, Illinois 60604

Dear Ms. Griffin:

Please find enclosed copies of the CERCLA Integrated Assessment reports, Analytical results, Referral memorandums and PRESCORE worksheets, for the following sites which were scheduled for Fiscal 98 completions.

SITE NAME	ILD NUMBER	COUNTY	PRIORITY RANK
Marvel Engineering	984837104	Cook	Low

We are pleased to provide you with the attached reports. Should you have any questions or comments concerning this submission please feel free to contact me, or the authors of the specific report.

Sincerely,

Thomas Crause
Manager, CERCLA Site Assessment Programs
Division of Remediation Management
Illinois Environmental Protection Agency

rec'd 9/28/98

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1.0 INTRODUCTION

Marvel Engineering in Melrose Park (ILD 984837104) was placed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) in 1993. The facility was placed on CERCLIS as a result of a request for discovery action initiated by the State of Illinois. This action was taken because of information sent to the Illinois Environmental Protection Agency (IEPA) by the public concerning past industrial operations at the site and the possibility that soil and surface water could have been contaminated by these activities.

The purpose of the Integrated Assessment has been developed from USEPA directive and guidance information which outlines site assessment strategies. The information states:

The Integrated Assessment will be conducted to: 1) Collect data which would satisfy both site assessment and remedial program activities. This would incorporate hazardous waste, surface water, air and groundwater concerns. 2) The objectives of the assessment are to determine whether time or non time critical removals are warranted and to determine whether the site is National Priorities List (NPL) caliber. If the determination is made that the site is NPL caliber, additional data will likely be needed to complete the assessment. A sampling plan to accommodate removal and site assessment needs, as well as initial remedial needs should be developed. 3) Determination of site sampling needs will be accomplished with an understanding to assure adequate data for the removal assessment and the preparation of the Hazard Ranking System (HRS) score as well as the need for possible preliminary HRS score and removal action

information, the site will then be designated NFA or carried forward as an NPL listing candidate. Sites that are designated NFA or deferred to other statues are not candidates for an Integrated Assessment. 4) Upon completion of the data gathering, there will be a determination of whether the site should be forwarded within the superfund process, either through remedial or removal programs.

2.0 SITE BACKGROUND

2.1 INTRODUCTION

This section includes information obtained over the course of the formal CERCLA Integrated Assessment and previous IEPA activities involving this site. Specific Activities included an internal file search, interview with Marvel Engineering employees and the sampling event.

2.2 SITE DESCRIPTION

Marvel Engineering is located in Cook County and within the city limits of Melrose Park, Illinois. Melrose Park is located about 4 miles west of Chicago and contains an approximate population of 20,859 residents. The former extent of Marvel Engineering facility covers an area of approximately 10 acres. The legal description of the site is the southwest quarter of Section 33, Township 2 North, Range 12 West. The site is located southeast of the intersection between Armitage Street and Hawthorn Street. The site is located primarily in a urban industrial setting, however, there are residential houses within 1/4 mile north of the site. There is a large building

on the property where the Marvel Engineering plant is located. Marvel Engineering currently makes hydraulic oil filters. South of the Marvel Engineering building is a paved parking lot, south of that is a vacant lot. The north and east sides of the property are bordered by railroad tracks. The western side of the property (along Hawthorne Street) is not fenced.

The topography of the site is relatively flat, stormwater and natural runnoff drains east from the site into Silver Creek, which is a tributary of the Des Plaines River. Silver Creek is located about 1/4 miles east of the site and the Des Plaines River is located approximately 2 miles east from the site. The site is within the floodplain of the Des Plaines River and parts of the site are located within the 100 year floodplain of the Des Plaines River. Lake Michigan is located about 10 miles east from the site. Natural soils at the site are described as poorly drained silts and clays. The components of fill are common in the near surface soils due to industrial development in the area.

2.3 SITE HISTORY

The industrial history of the site is currently unclear. Peter Heinrich, Vice President of Operations for Marvel Engineering has indicated that Marvel Engineering purchased the site in 1974 from Sun Chemical. Since that purchase the main facility has been used for the manufacture of fuel oil filters. Another building was located south of the current facility and Mr. Heinrich believes that a plating facility was in operation there. This building burned down several years ago. Mr. Heinrich mentioned that he had heard that previous uses for the property ranged from the manufacture of timing devices for explosives and television components to plating operations. The building

currency used by Marvel Engineering was constructed in 1969. In the early 1990's Marvel Engineering sold approximately 5 acres of property located south of facility to Lypho-med (now known as Fujisawa USA). The portion of the site now owned by Fujisawa USA is currently being used for parking.

2.3.1 REGULATORY HISTORY

In 1991 and 1992 two sets of underground storage tanks were removed from the FUJISAWA property near the site (LUST Incident Numbers 913235 and. 913236), it is possible that some contamination from those tanks migrated onto the property being investigated during the IEPA IA. Prior to the IEPA Leaking Underground Storage Tank investigation no IEPA or USEPA regulatory history is known to exist.

2.3.2 ENVIRONMENTAL INVESTIGATIONS

With the exception of the 1995 Woodward Clyde Consultants report concerning the UST removal (discussed in Section 2.3.1 of this document) no results of any environmental investigation prior to the IEPA 1997 IA have been presented to the IEPA concerning this site.

2.4 APPLICABILITY OF OTHER STATUTES

IEPA files give no indication that the Marvel Engineering site is subject to the environmental regulations from the Resource Conservation and Recovery Act (RCRA), Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), Atomic Energy Act (AEA), or Uranium Mill Tailings Radiation Control Act (UMTRCA).

3.0 SITE INSPECTION AND ANALYTICAL RESULTS

3.1 INTRODUCTION

This section outlines the procedures utilized and observations made during the field activities action portion of the CERCLA Integrated Assessment conducted at the Marvel Engineering facility. Individual subsections address the site representative interview, reconnaissance inspection, field sampling and procedures, analytical results and key sample summary. The Integrated Assessment for Marvel Engineering was conducted in accordance with the various workplans which were developed and submitted to the USEPA Region V offices prior to the initiation of field activities.

3.2 SITE REPRESENTATIVE INTERVIEW

The site representative interview was conducted on June 22, 1997 with Peter Heinrich Vice President of Operations for Marvel Engineering. During the interview he discussed the current and past operations which occurred at the site (see Section 2.3 of this document).

3.3 RECONNAISSANCE INSPECTION

On June 22, 1997 Mark Densmore of the IEPA conducted a site assessment visit of the Marvel Engineering site. The IEPA representative was met by Peter Heinrick of Marvel Engineering. Upon touring the facility it was noted that a majority of the current Marvel Engineering property was occupied by the factory building or paved parking lot. A fenced portion of the site, south of

the main factory building and east of the main parking lot had signs on the fence warning of "No Smoking". This indicated that the small fenced lot at one time might have contained a flammable substance. The eastern half of the lot was paved, and contained several submerged cylinders with a diameter of approximately two feet and a depth of about three feet. The cylinders are metal lined and have lids. Mr. Heinrick said that he had heard that in the past that this area had been used to test detonating devices. The remainder of the lot was wooded. The lot was fenced and for the most part unused, except as a storage area for a few pieces of obsolete equipment and old wooden pallets and tires. There was evidence that trespassers had been present in the lot.

South of the current Marvel Engineering facility there is a portion of the asphalt parking lot which is used for parking and is owned by FUJISAWA and south of that a gassy-gravel lot, also owned by FUJISAWA. Mr. Heinrick stated that along the eastern end of this lot was a facility that had burned down that he thought had been a plating facility in the past.

The east of the grassy portion owned by FUJISAWA is a paved area which is used as a parking lot by FUJISAWA. This paved parking lot was also once a part of the Marvel Engineering property. A FUJISAWA representative stated that he thought that there had been a Leaking Underground Storage Tank (LUST) removal somewhere in that area prior to the lot being paved.

The eastern side of the entire site was walked during the Reconnaissance and was found to be fenced and bordered by the railroad tracks. Northeast of the facility, along Armitage Street an outfall to Silver Creek was noted. It is probable that other facilities in the area, in addition to

Marvel Engineering contribute flow to the outfall.

3.4 FIELD SAMPLING

During the field investigation portion of the CERCLA Integrated Assessment, samples were collected to determine the levels of USEPA Target Compound List (TCL) compounds present at the site. On 12-13 August, 1997 14 soil/sediment samples were collected at and near the Marvel Engineering site.

3.4.1 SOIL SAMPLING PROCEDURES

The soil/sediment samples were collected to compare on-site and off-site information and determine if contamination existed at locations where the majority of the previous site activity had taken place. Samples were collected using either a stainless steel trowel or stainless steel bucket auger. After sampling at each location, all sample containers were capped with their respective lids and placed into coolers immediately after obtaining the samples.

All samples where analyzed for the Target Compound List (TCL) constituents. The Target Compound List is provided in Appendix F of this report. Samples taken by IEPA personnel in 1997 were analyzed under the Federal Contract Laboratories Program and samples for organic analysis were sent to Southwest Labs of Oklahoma located in Broken Arrow, Oklahoma and samples for inorganic analysis were sent to Sentinel INC. Located in Huntsville, Alabama.

3.4.2 DECONTAMINATION PROCEDURES

Standard IEPA decontamination procedures were followed prior to the collection of samples taken by IEPA personnel. All sampling equipment had been previously decontaminated at the IEPA warehouse prior to its transport to the site. Decontamination procedures included the cleaning of all equipment with a liquid Alconox solution, rinsing with hot water at least twice. All equipment was either dried with paper towel or air dried, then wrapped and stored in heavy aluminum foil.

3.5 ANALYTICAL RESULTS

This section includes a summary of the analytical results of samples collected by the IEPA during the CERCLA Integrated Assessment conducted at Marvel Engineering in Melrose Park, Illinois. Qualification of the final data packages were performed by each of the respective laboratories.

Chemical analysis of soil samples collected by IEPA personnel revealed the presence of volatile and semivolatile organic compounds and heavy metals in the soil/sediment samples. Table 2 is a summary of key soil/sediment results which are compared to human health benchmarks and removal action limits.

3.5.1 KEY SAMPLES

Table 1 describes the physical appearance of the samples and include pertinent information concerning the sample locations. Photographs of the sample locations are contained in Appendix A. Table 2 identifies the key samples that were taken during the course of the Marvel Engineering Integrated Assessment that were shown to contain contaminants at a level greater than background concentrations. For a review of all results see Volume 2 (Analytical Results) .

4.0 IDENTIFICATION OF SOURCES

4.1 INTRODUCTION

This section discusses the various hazardous waste sources which have been identified at the Marvel Engineering site during the Integrated Assessment.

Information concerning the size, volume, waste type and waste composition of each source is compiled during the reconnaissance visits and field activities of the Integrated Assessment. The source identified during the Integrated Assessment is contaminated soil. Sediment samples were taken in Silver Creek upstream and downstream from an outfall which receives effluent from the Marvel Engineering site. The on-site soil samples revealed the presence of elevated levels of PAH's, lead, PCB's and chlorinated solvents. The downstream sediment sample revealed the presence of elevated PAH's.

4.2 CONTAMINATED SOIL

Soil sample locations were chosen on the basis of suspected past industrial activities. Analysis of the soil samples obtained indicate elevated levels of volatiles, semivolatiles, PCB's and heavy metals. Elevated PAH's were encountered in every on-site soil sample except X102 (Appendix B). The area of elevated PAH contamination is approximately 160,000 square feet. Elevated levels of trichloroethene were detected in sample X103 which was taken in an area now enclosed with a fence. Elevated levels of lead were detected in samples X104 and X109/X110. Elevated levels of PCB's (specifically Aroclor-1254) were detected in samples X107 and X114. Sample X114 was collected outside of a retaining wall around some transformers located along the east side of the Marvel Engineering building. Sample X114 was collected in the soil near a crack in the retaining wall around the transformers, leading to the suspicion that PCB contaminated soil might exist within the retaining wall around the transformers. None of the soil contaminants were detected at levels above the USEPA's Removal Action Levels (RAL's), however, several were detected at levels above Superfund Chemical Data Matrix (SCDM's) human health based benchmarks (Table 2) and above the Tier 1 objectives from the Tiered Approach to Cleanup Objectives (TACO). See Section 6 for a discussion of TACO objectives.

4.3 CONTAMINATED SEDIMENT

Two samples were taken near an industrial outfall east of the Marvel Engineering site. Sample X113 was taken upstream from the outfall and sample X112 was taken downstream from the outfall. Sample X112 contained elevated levels of semi-volatile organic compounds in comparison to sample X113. The Ontario Sediment guide is used to determine the sediment

quality. The total PAH effect of the sediment quality in Silver Creek based upon sample X112 would be between the lowest effect level and the severe effect level.

5.0 DISCUSSION OF MIGRATION PATHWAYS

5.1 INTRODUCTION

The CERCLA Site Assessment Program identifies three migration pathways and one exposure pathway by which hazardous substances may pose a threat to human health and /or the environment. Consequently, sites are evaluated on their known impact on these four pathways. The pathways evaluated are the groundwater migration, surface water migration, soil exposure and air migration.

This section presents and discusses information collected during the CERCLA Integrated Assessment of the Marvel Engineering Site. This information, together with information gathered from other sources, will be utilized in analyzing the site's impact on the four pathways and the various human and environmental targets within the established target distance limits. A map showing residences and geographic features within a four mile radius of the site is contained in Appendix D.

Discussions of the pathways will include pathway descriptions, contaminant sources and targets

such as human populations, fisheries, endangered species, wetlands and other sensitive environments.

5.2 GROUNDWATER

The surficial geology of the Melrose Park area would be described as 50-80 feet of Pleistocene age deposits consisting of silts and clays. The Silurian age bedrock consists of Niagaran and Alexandrian dolomites at 80-400 feet deep. The Ordovician deposits consist of the Maquoketa Shale and the St. Peter Sandstone at 400-1000 feet. The Cambrian-Ordovician deposits age deposits consist of the Oneata and Jordan dolomites at 1000-1100 feet; Franconia sandstone and shale from 1400-1550 feet; and the Eau Claire Dolomite and Sandstone from 1550-1900 feet. In northeastern Illinois region groundwater can be obtained from four major systems: the glacieral drift system, shallow bedrock system and two deep bedrock systems.

The groundwater pathway was not evaluated at the Marvel Engineering site because the drinking water supply is taken from Lake Michigan.

5.3 SOIL EXPOSURE

Undisturbed soils in the Melrose Park area are made up primarily from clays and silts which were deposited in a glacieral lake. Due to the extensive industrialization which has taken place in the area of the Marvel Engineering Site, most of the soils have been disturbed and contain rubble and urban debris.

There are no schools or daycares located within 200 feet of the Marvel Engineering site. There are residences to the north of the site, however, the drainage system associated with the railroad and Armitage Street (both located between the site and the residences) make migration of contaminants north to the residences unlikely. There are several industries located to the west, east and south of the site. The site is fenced along the east side but unfenced along the other boundaries. Due to its urban setting the site is unlikely to attract hunters or campers but there is some evidence that trespassers have been on the site.

Soil samples collected during the CERCLA site inspection indicate soil contamination by volatile and semivolatile compounds at the site. The primary targets for this pathway would be the employees of Marvel Engineering. The population potentially affected through the soil exposure pathway are as follows:

Distance (miles)	Population
On-site	50
0-1/4	500
1/4-1/2	2000
1/2-1	5,000
1-2	7,000
2-3	15,000
3-4	25,000

5.4 SURFACE WATER PATHWAY

During the CERCLA site assessment conducted by personnel of the IEPA it was noted that the topography of the area is extremely flat and there appeared to be no defined drainage pathway for surface water runnoff.

The target included in the surface water pathway is Silver Creek, which is a small stream located about 1/4 of a mile east-northeast from the site (Figures 3 and 4). Stormwater from Marvel Engineering (and others) enters the stream via an outfall which discharges into Silver Creek just south of Armitage Street (Figures 3 and 4). Silver Creek has been evaluated as a Class D stream (Appendix C). Class D streams are considered to be limited aquatic resources with the fishery consisting of primarily carp (Appendix C). Silver Creek flows to the Des Plains River. The 15 mile target distance limit is in the Des Plains River (Appendix E). There are no potable water intakes within the 15 mile target distance.

The presence of elevated levels of semi-volatile organics were detected in the downgradient sediment sample X112 at levels of more than three times the background sediment concentration. Lead and nickel were also elevated in downgradient sample X112. Section 6.2 of this report includes a discussion of the sediment screening benchmarks.

5.5 AIR ROUTE

During the course of the formal CERCLA site investigation there were no air samples collected. For the most part the site is either paved or well vegetated so the possibility of particulate hazard is minimal.

6.0 ADDITIONAL RISK BASED OBJECTIVES

6.1 INTRODUCTION

This section provides an evaluation which compares data generated during IA activities with additional analytical benchmarks. These benchmarks are used in this report to compare soil and sediment with specific risk based criteria.

6.2 TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO)

The IEPA TACO guidance document (effective July 1, 1997, under 35 IL Adm. Code Part 742), can be used to develop site specific remediation objectives for sites being addressed under the Illinois Site Remediation Program. This document discusses key elements required to develop risk-based remediation objectives, how background values may be used, and provides guidance through the three tiers of the risk-based approach. The IEPA uses this guidance, and the groundwater standards established in 36 IL Adm. Code 620, to determine soil and groundwater remediation objectives.

The soil contaminants from the 1997 IA investigation will be compared to the Tier 1 soil corrective action objectives established for industrial/commercial properties, with the inhalation and ingestion pathways evaluated. Tier 1 consists of "look- up" tables, which considers limited site-specific information and are based on simple numeric models. Soil samples detected levels of Benzo(a)anthracene, Benzo(b)Fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene,

Benzo(g,h,i)perylene, Aroclor-1254, Arsenic and Lead at/or above Taco Tier 1 corrective action objectives (Table 3).

6.3 ONTARIO SEDIMENT GUIDE AND USEPA ECOTOX THRESHOLDS

The Ontario Sediment Guide and USEPA ECOTOX Thresholds are used for sediment screening benchmarks. The analytical results from sediment samples X112 and X113 from Silver Creek were compared to the lowest values of the two systems (Table 4). Several semivolatile compounds, lead and nickle were above the benchmarks in sediment sample X112.

Figure 1. Map of the state of Illinois showing the location of the Marvel Engineering Site.

Figure 2. Topographic map showing Marvel Engineering site and the location of background sample X101.

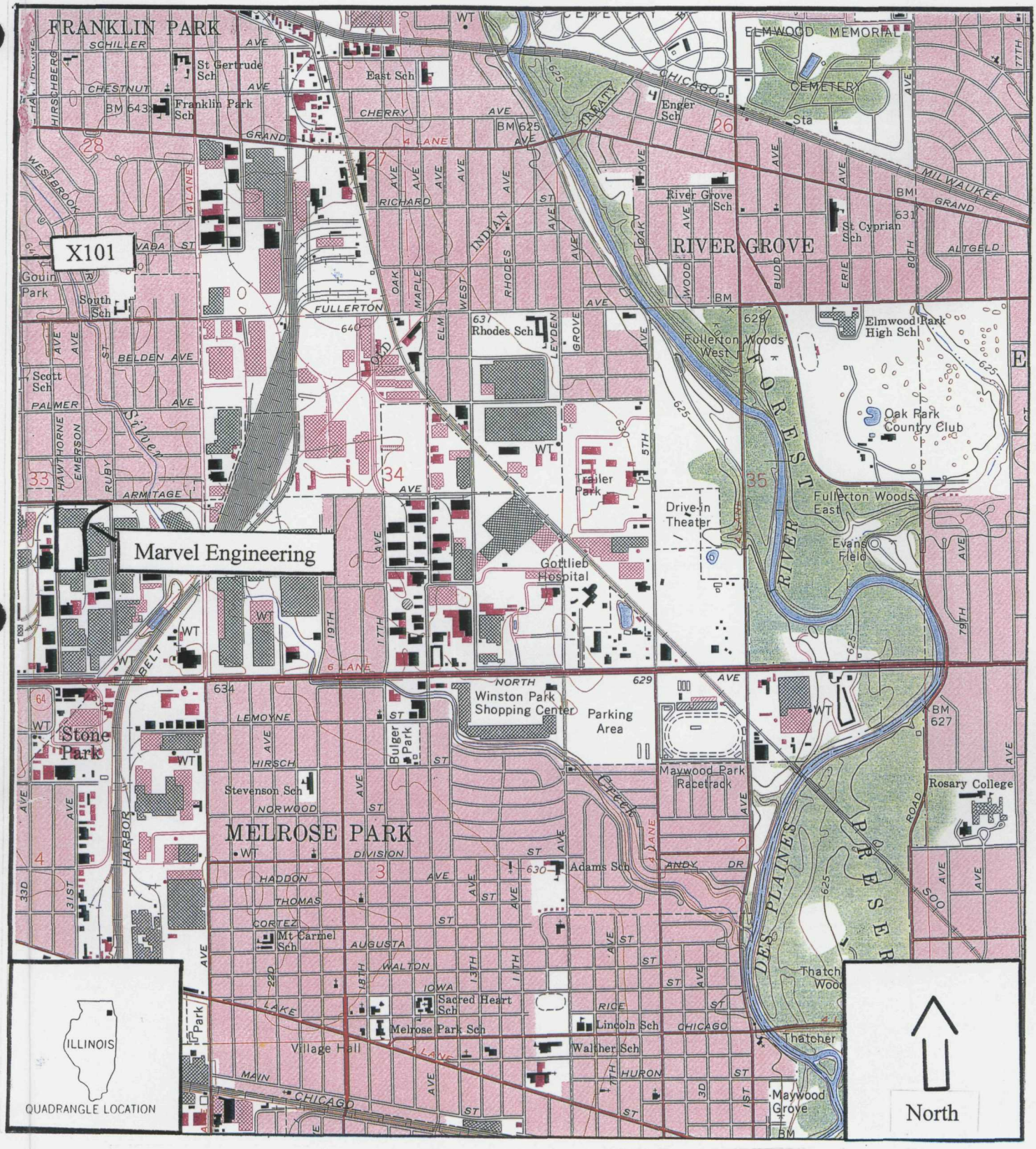
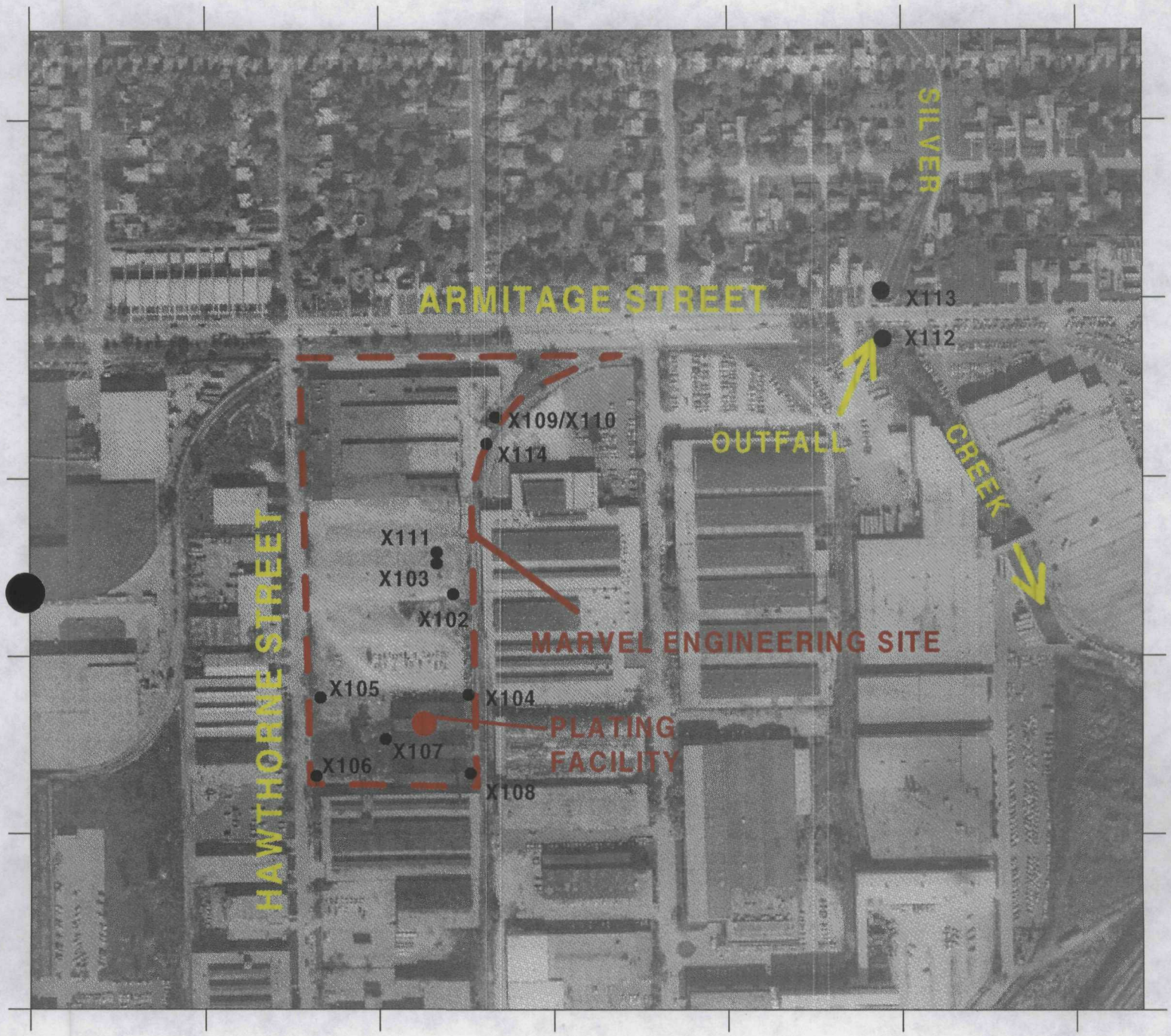


Figure 3. Marvel Egineering 1973 aerial photograph showing Integrated Assessment sample locations.



SCALE

0 1000 FEET

NORTH

Figure 4. Marvel Engineering 1993 aerial photograph showing Integrated Assessment sample locations.

SCALE

0 1000 FEET

NORTH

TABLE 1. SAMPLE DESCRIPTIONS

Sample number	Sample depth	Sample description
X101	0-3 inches	Background soil sample taken in Gouin Park. Sample located 120' north of parking lot and 28' west of Scott Street. Sample consisted of black silt loam.
X102	1.5 feet	Soil sample collected from east-central part of the site. Sample located 20' north of south fence in enclosure and 80' east of western fence in the enclosure. The sample consisted of dry, hard, gray clay.
X103	1.0 feet	Soil sample collected from east-central part of the site. Sample located 72' west of east fence and 40 feet south of north fence in the enclosure. The sample consisted of black cindery material and clay.
X104	1.5 feet	Soil sample collected from the southeast part of the site. Sample located 8' west of site and 17' south of the north end of parking lot. The sample consisted of a brown silty clay.
X105	1-2 feet	Soil sample collected from the southwest part of the site. Sample located 98' south of the parking lot entrance and 24' east of Hawthorn Street. The sample consisted of sandy-silty fill with gravel, asphalt roofing material, and some black, tarry material. The sample had a burnt odor.
X106	0-6 inches	Soil sample collected from the southwest part of the site. Sample located 33 feet north of the parking lot and 29.5 feet east of Hawthorne Street. The sample consisted of silty clay fill with gravel and black organic material.
X107	0-5 inches	Soil sample collected from the south-central part of the site. Sample located 15 feet west of a fence seperating the gravel and asphalt parking lots on the south part of the site, and 68' south of asphalt pavement to the north.. The sample consisted of a dark silty clay fill with gravel.
X108	1-2 feet	Soil sample collected from the south-east part of of the site. Sample located 12 feet west from the east fence and 23 feet north of the east fence. The sample consists of brown silty clay with black mottling. The sample had a strong hydrocarbon odor.

TABLE 1. SAMPLE DESCRIPTIONS (continued)

Sample number	Sample depth	Sample description
X109/X110	0-6 inches	Soil sample collected from the northeast part of the site. Sample located 66 feet south of the small brick building and 30 feet east from the main building. The sample consisted of black sandy fill and some gravel.
X111	0-3 inches	Black waste tarry waste sample collected from the enclosed area. Sample located 40' south north fence and 72' west of the east fence.
X112	0-7 inches	Sediment sample collected in Silver Creek downstream from the outfall east of Marvel Engineeri building. Sample located 20' south of confluence of th outfall and Silver Creek. The sample consisted of gray-brown silty clay with cinders and gravel.
X113	0-7 inches	Sediment sample collected in Silver Creek upstream from the outfall east of Marvel Engineering building. Sample located along west bank of Silver Creek and 31 feet north of Armitage Street. The sample consists of gray silty clay.
X114	0-2 inches	Soil sample collected along a retaining wall on the east side of the main building. Behind the retaining wall are transformers. Sample located 14 feet north where the retaining wall joins the building near crack in wall. The sample consisted of silty fill.

SITE NAME: MARVEL ENGINEERING

TABLE 2
SUMMARY

SAMPLING POINT PARAMETER	BENCHMARK SCDM's	X 101 Background soil	X 102 Soil	X 103 Soil	X 104 Soil	X 105 Soil	X 106 Soil	X107 Soil	X108 Soil	X109 Soil	X110 Soil	X111 Tarry waste	X112 Sediment	X113 Sediment background	X114 Soil
VOLATILES (ppb)															
Methylene Chloride	78000	--	--	--	--	5 J	2 J	22	--	--	--	--	--	3 J	8 J
Acetone	58000000	7 J	--	120	19	--	--	--	24	--	--	--	10 J	13 J	--
Carbon Disulfide	58000000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	970	--	120	220	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	58000000	--	--	--	--	--	--	--	4 J	--	--	--	--	--	--
1,2-Dichloroethene(total)	--	--	--	--	4 J	--	--	--	--	2 J	--	--	--	--	--
1,1,1-Trichloroethane	52000000	4 J	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	--	--	--	2100	--	--	--	--	--	20	74	--	--	--	2 J
Benzene	20000	--	--	--	--	3 J	--	--	--	--	--	--	--	--	--
Tetrachloroethene	11000	--	--	48	--	--	--	--	5 J	--	--	--	--	--	--
Toluene	120000000	--	--	--	--	10 J	--	--	--	--	--	--	--	--	--
Ethylbenzene	58000000	--	--	--	--	5 J	--	--	--	--	--	--	--	--	--
Xylene(total)	--	--	--	--	--	6 J	--	--	--	--	--	--	--	--	--
SEMIVOLATILES (ppb)															
Naphthalene	2300000	--	--	74 J	--	960	51		500	280 J	390 J	--	150 J	24 J	78 J
2-Methylnaphthalene	--	--	68 J	200 J	--	440	38 J		1100	--	--	11000	110 J	23 J	74 J
2-Chloronaphthalene	47000000	--	--	--	--	--	--	--	--	--	--	--	--	--	430
Acenaphthylene	--	--	--	--	--	24 J	32 J	32 J	--	580 J	480 J	--	580 J	73 J	260 J
Acenaphthene	35000000	--	--	--	--	1300	--	--	40 J	870 J	960 J	4900 J	370 J	55 J	140 J
Dibenzofuran	--	--	--	52 J	--	760	58	--	63 J	550 J	560 J	4200 J	--	--	--
2,4-Dinitrotoluene	860	--	--	--	--	--	--	--	--	--	--	--	640 J	98 J	270 J
Fluorene	35000000	--	--	--	--	1600	130 J	--	96 J	970 J	890 J	5600 J	--	--	--
Phenanthrene	--	61 J	70 J	520	180 J	7600	1200	110 J	250 J	10000	12000	31000 J	7800	1200	3400
Anthracene	170000000	--	--	96 J	34 J	2500	320 J	29 J	--	1900 J	2600 J	4400 J	1400 J	220 J	7900
Carbazole	--	--		56 J	29 J	1800	150 J	24 J		1500 J	1500 J		910 J	220 J	530
Di-n-Butylphthalate	58000000	29 J	23 J	31 J	120 J	--	59 J	190 J	130 J	--	--	--	--	81 J	--
Fluoranthene	--	160 J	29 J	1000	370 J	6500	1900	210 J	150 J	19000	25000	26000	12000	2600	6400
Pyrene	--	100 J	26 J	670	250 J	7600	1400	150 J	150 J	13000	22000	17000	8900	1800	4200
Benzo(a)anthracene	--	65	--	540	120 J	4900	890	84 J	61 J	8300	12000	5800 J	4100	920	3200
Chrysene	--	85	30 J	600	170 J	4900	920	120 J	160 J	10000	13000	8500 J	4500	1300	3500
bis(2-Ethylhexyl)phthalate	42000	--	--	--	--	--	--	--	--	7000	3900 J	--	86	650	1500
Di-n-Octylphthalate	12000000	--	--	--	--	--	--	--	--	--	--	--	--	--	29 J
Benzo(b)fluoranthene	--	200 J	--	820	98 J	5600	1000	150 J	--	7900	10000	5100 J	3600	1600	5600
Benzo(k)fluoranthene	--		--	490	170 J	--	--	--	--	8400	12000	4800 J	3100	820	1600
Benzo(a)pyrene	51	730.0	--	610	140 J	4400	800	110 J	72 J	8300	12000	--	2900	920	3200
Indeno(1,2,3-cd)pyrene	--	--	--	500	110 J	3100	450	98 J	94 J	7200	7000	--	2100	800	2700
Dibenz(a,h)anthracene	--	--	--	190 J	42 J	1500	210 J	34 J	42 J	2500 J	2700 J	--	750	280 J	980
Benzo(g,h,i)perylene	--	--	32 J	490	120 J	2900	420	140 J	120 J	7200	8100	--	2100 J	730	2500
PESTICIDES (ppb)															
beta-BHC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4 J
delta-BHC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3 J
Heptachlor	130	--	--	--	--	--	--	--	--	4 J	--	--	3 J	--	5 J
Aldrin	34	--	--	--	--	--	--	--	2 J	6 J	--	--	2 J	--	--
Heptachlor epoxide	64	--	--	--	--	--	--	--	--	--	--	--	--	--	3 J
Endosulfan I	29000	--	--	--	--	--	--	7	--	8 J	--	--	3	--	15
Dieldrin	36	1 JP	--	--	--	--	--	7 J	--	6 J	--	--	--	--	34
4,4'-DDE	1700	40 J	--	--	--	--	42 J	30 J	--	35 J	120 J	--	--	--	57
Endrin	170000	--	11 J	--	--	--	--	42 J	--	180 J	260 J	320 J	7 J	--	130
Endosulfan II	29000	--	--	4 J	--	8 J	--	21 J	--	200 J	280	340 J	--	--	180
4,4'-DDD	2400	--	--	--	--	10 J	8 J	--	--	190 J	--	--	10 J	6 J	20
Endosulfan sulfate	--	--	--	--	--	--	--	92	--	74 J	--	--	--	--	--
4,4'-DDT	1700	15 J	--	--	--	--	72 J	--	--	20 J	1900 J	850 J	--	10 J	460
Methoxychlor (Mariate)	2900000	--	--	--	--	--	--	8 J	13	2400 J	--	--	--	--	74
Endrin Ketone	--	--	--	21 J	--	6	6 J	14 J	--	180 J	--	--	--	--	63
Endrin aldehyde	--	--	--	--	--	--	--	12 J	--	140 J	--	--	--	--	71
alpha-Chlorodane	--	--	--	--	--	--	--	34	--	47 J	--	--	--	--	42
gamma-Chlorodane	--	2	--	--	--	3 J	--	--	--	72 J	190 J	54 J	--	--	110
Toxaphene	530	--	--	--	--	--	--	--	--	62 J	--	--	--	--	--
Aroclor-1254	76	--	--	--	--	--	--	360 J	--	--	--	--	--	--	1400
INORGANICS (ppm)															
Arsenic	320	7 J	2 J	7 J	1 J	6 J	10 J	6 J	5 J	2 J	5 J	--	7	2 J	3
Barium	41000000	109	86	75	110	90	76	106	91	85	106	--	38	81	86
Chromium	2900000	20	17	19	20	18	15	24	377	30	21	--	51	41	18
Cobalt	--	11	9	9	11	12	13	10	8	5	7	--	13	11	10
Copper	22000000	29 J	34 J	178 J	71 J	27 J	36 J	40 J	1440 J	392 J	382 J	--	46 J	81 J	131
Lead	--	56	23	164	970	21	32	29	30	670	620	--	162	118	90
Manganese	58000000	456	303	281	385	544	596	301	237	310	1140	--	386	499	434
Nickel	12000000	22	26	31	28	26	28	26	37	23	27	--	29	25	27
Vanadium	5200000	28	23	17	26	29	23	29	30	17	20	--	19	22	25
Zinc	120000000	85 J	56	227	99 J	59 J	70 J	100 J	182 J	1760	1660	--	87	245 J	324

ppb = parts per billion
ppm = parts per million

TABLE 3. TACO Tier 1 objectives for soil (industrial/commercial scenario)
SITE NAME: MARVEL ENGINEERING

SAMPLING POINT PARAMETER	TIER 1 OBJECTIVE	X104	X105	X106	X109	X110	X114
SEMIVOLATILES (ppb)							
Benzo(a)anthracene	8,000				8,300	12,000	
Benzo(b)fluoranthene	8,000					10,000	
Benzo(a)pyrene	800		4,400	800	8,300	12,000	3,200
Dibenz(a,h)anthracene	800		1,500		2,500	2,700	980
Benzo(g,h,i)perylene	8,000					8,100	
PESTICIDES (ppb)							
Aroclor -1254							1,400
INORGANICS (ppm)							
Arsenic	10			10			
Lead	400	970			670	620	

ppb = parts per billion
ppm = parts per million

TABLE 4. Sediment Screening Benchmarks

SAMPLING POINT PARAMETER	Benchmark	X112 Sediment	X113 Sediment background
SEMIVOLATILES (ppb)			
Phenanthrene	850	7,800	1,200
Anthracene	85	1,400 J	220 J
Fluoranthene	2900	12,000	2,600
Pyrene	660	8,900	1,800
Benzo(a)anthracene	179	4,100	920
Benzo(b)fluoranthene	550	3,600	1,600
Benzo(a)pyrene	430	2,900	920
Indo(1,2,3-cd)pyrene	1560	2,100	800
Dibenz(a,h)anthracene	60	750	280 J
INORGANICS (ppm)			
Lead	47	162	118
Nickel	21	29	25

ppb = parts per billion
ppm = parts per million

-Sediment benchmarks are based upon the lowest objective between the Ontario Sediment Guide and the USEPA ECOTOX Thresholds.

APPENDIX A

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 13, 1997

TIME: 11:00

PHOTO BY: Mark Densmore

SAMPLE: X101

DIRECTION: NORTH

COMMENTS: Photo taken of background soil sample location in Gouin Park.

DATE: AUGUST 13, 1997

TIME: 11:00

PHOTO BY: Mark Densmore

SAMPLE: X101

DIRECTION: SOUTH

COMMENTS: Photo taken of background soil sample location in Gouin Park.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD984837104 **COUNTY:** COOK

DATE: AUGUST 12, 1997

TIME: 14:00

PHOTO BY: Mark Densmore

SAMPLE: X102

DIRECTION: SOUTH

COMMENTS: Photo taken of soil sample location within fenced area just south of the old test area.

DATE: AUGUST 12, 1997

TIME: 14:00

PHOTO BY: Mark Densmore

SAMPLE: X102

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample location within fenced area just south of the old test area.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD984837104 **COUNTY:**COOK

DATE: AUGUST 12, 1997

TIME: 15:00

PHOTO BY: Mark Densmore

SAMPLE: X103

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample location within fenced test area just east of the old test area.

DATE: AUGUST 12, 1997

TIME: 15:00

PHOTO BY: Mark Densmore

SAMPLE: X103

DIRECTION: WEST

COMMENTS: Photo taken of soil sample location within fenced test area just east of the old test area.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD984837104 **COUNTY:** COOK

DATE: AUGUST 12, 1997

TIME: 12:30

PHOTO BY: Mark Densmore

SAMPLE: X104

DIRECTION: SOUTH

COMMENTS: Photo taken of soil sample on east side of parking lot.

DATE: April 12, 1996

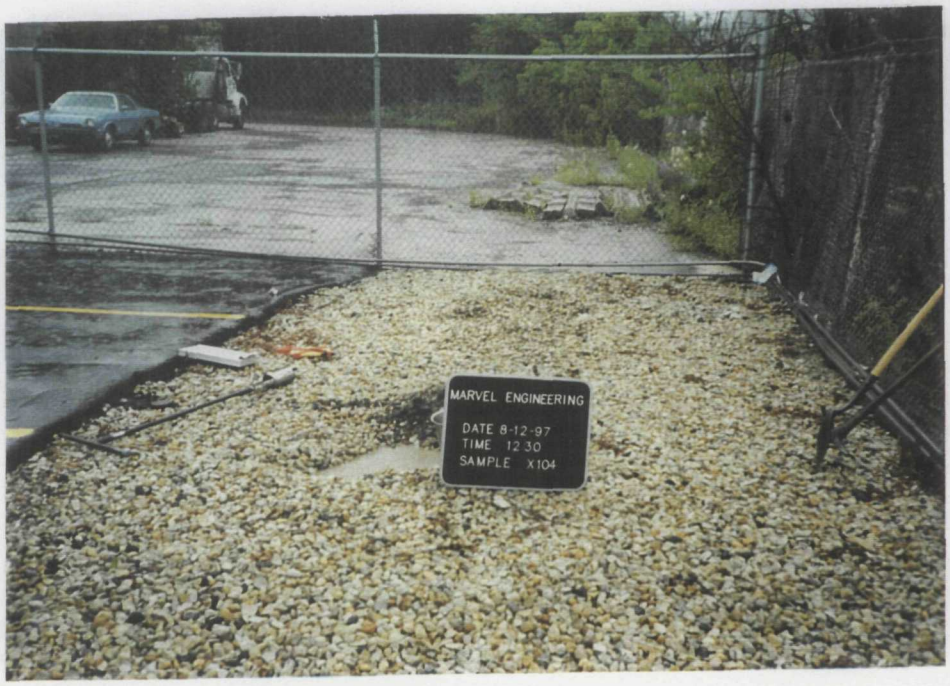
TIME: 12:30

PHOTO BY: Mark Densmore

SAMPLE: X104

DIRECTION: North

COMMENTS: Photo taken of soil sample on east side of parking lot.



SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 12, 1997

TIME: 10:30

PHOTO BY: Mark Densmore

SAMPLE: X105

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample located along the east side of Hawthorne Street.

DATE: AUGUST 12, 1997

TIME: 10:30

PHOTO BY: Mark Densmore

SAMPLE: X105

DIRECTION: SOUTH

COMMENTS: Photo taken of soil sample located along the east side of Hawthorne Street.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:**COOK

DATE: AUGUST 12, 1997

TIME: 11:00

PHOTO BY: Mark Densmore

SAMPLE: X106

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample located in southwest corner of the site, on the east side of Hawthorne Street.

DATE: AUGUST 12, 1997

TIME: 11:00

PHOTO BY: MARK DENSMORE

SAMPLE: X106

DIRECTION: SOUTH

COMMENTS: Photo taken of soil sample located in southwest corner of the site, on the east side of Hawthorne Street.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 12, 1997

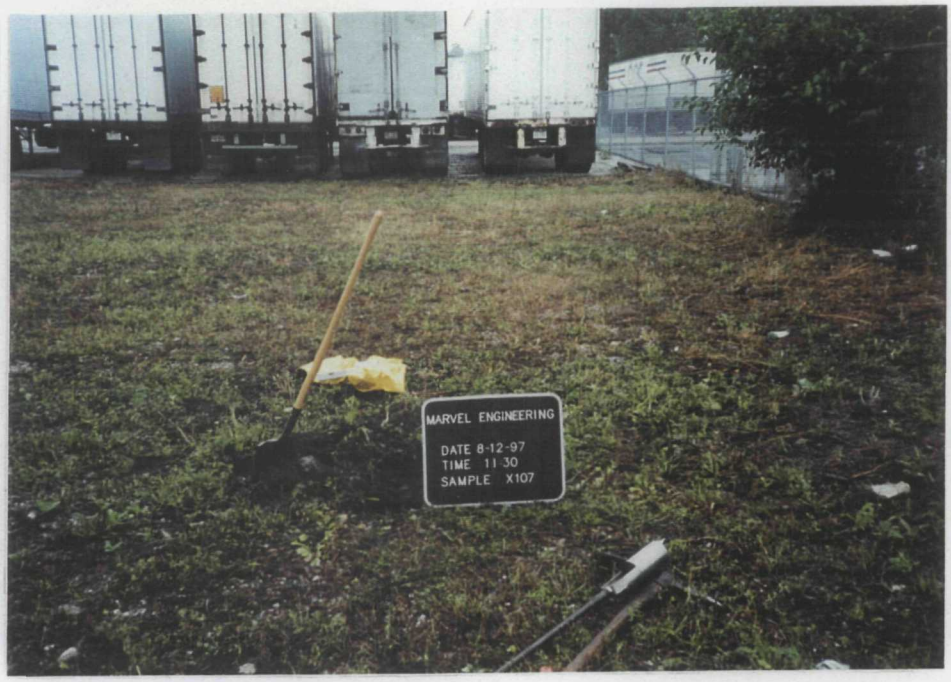
TIME: 11:30

PHOTO BY: Mark Densmore

SAMPLE: X107

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample located in the south side of the site.



DATE: AUGUST 12, 1997

TIME: 11:30

PHOTO BY: Mark Densmore

SAMPLE: X107

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample located in the south side of the site.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:**COOK

DATE: AUGUST 12, 1997

TIME: 12:00

PHOTO BY: Mark Densmore

SAMPLE: X108

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample located in the southeast side of the site.

DATE: AUGUST 12, 1997

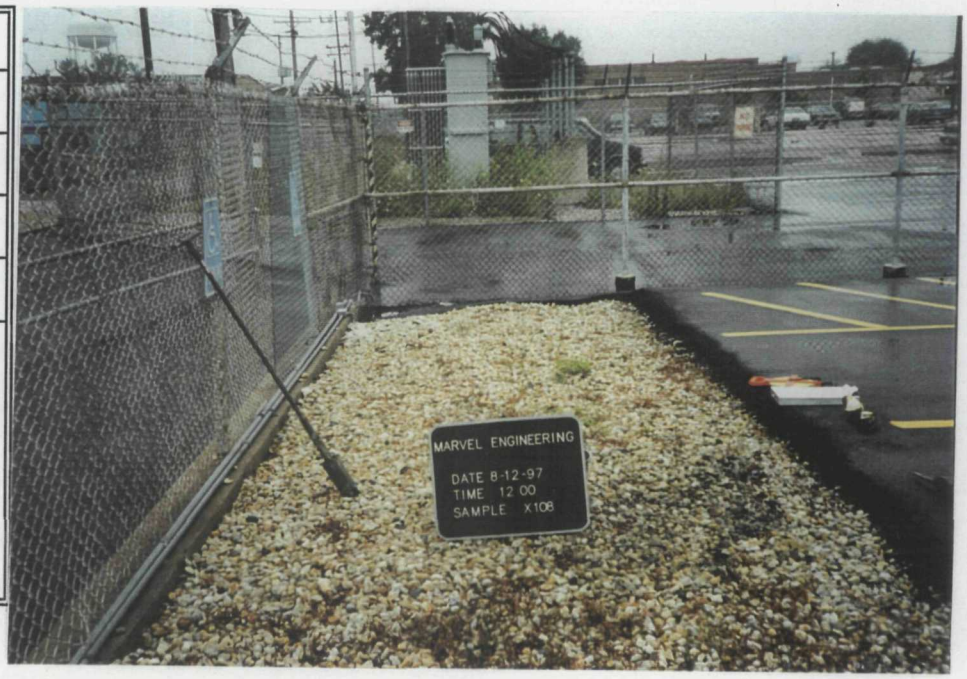
TIME: 12:00

PHOTO BY: Mark Densmore

SAMPLE: X108

DIRECTION: SOUTH

COMMENTS: Photo taken of soil sample located in the southeast side of the site.



SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 12, 1997

TIME: 12:00

PHOTO BY: Mark Densmore

SAMPLE: X109/X110

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample location in the northeast side of the site, near the train tracks.

The photo board should say 8-12-97,X109/X110.

DATE: AUGUST 12, 1997

TIME: 16:00

PHOTO BY: Mark Densmore

SAMPLE: X109/X110

DIRECTION: WEST

COMMENTS: Photo taken of soil sample location in the northeast side of the site, near the train tracks.

The photo board should say 8-12-97,X109/X110.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 12, 1997

TIME: 15:30

PHOTO BY: Mark Densmore

SAMPLE: X111

DIRECTION: NORTH

COMMENTS: Photo taken of Tarry Waste sample location within fenced test area just east of the old test area.

DATE: AUGUST 12, 1997

TIME: 15:30

PHOTO BY: Mark Densmore

SAMPLE: X111

DIRECTION: WEST

COMMENTS: Photo taken of Tarry Waste sample location within fenced test area just east of the old test area.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 13, 1997

TIME: 9:30

PHOTO BY: Mark Densmore

SAMPLE: X112

DIRECTION: NORTHWEST

COMMENTS: Photo taken of sediment sample location near the confluence of the outfall and Silver Creek.

DATE: AUGUST 13, 1997

TIME: 9:30

PHOTO BY: Mark Densmore

SAMPLE: X112

DIRECTION: EAST

COMMENTS: Photo taken of sediment sample location near the confluence of the outfall and Silver Creek.

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 13, 1997

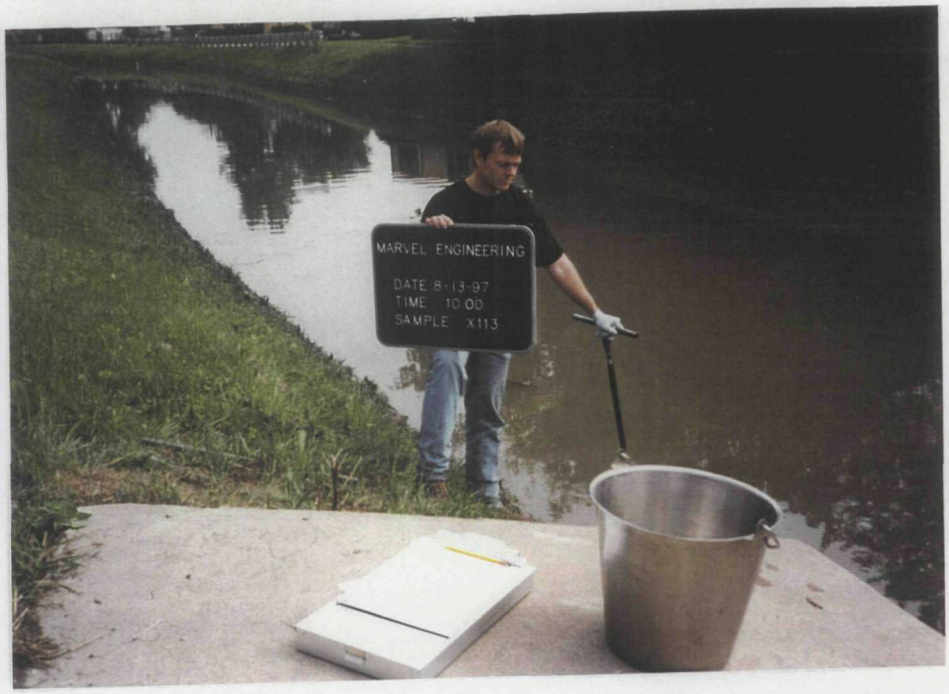
TIME: 10:00

PHOTO BY: Mark Densmore

SAMPLE: X113

DIRECTION: NORTH

COMMENTS: Photo taken of sediment sample location upstream of the confluence of the outfall and Silver Creek.



DATE: AUGUST 13, 1997

TIME: 10:00

PHOTO BY: Mark Densmore

SAMPLE: X113

DIRECTION: SOUTH

COMMENTS: Photo taken of sediment sample location upstream of the confluence of the outfall and Silver Creek. Armitage Street is in the background

SITE NAME: MARVEL ENGINEERING

CERCLIS ID: ILD 984837104 **COUNTY:** COOK

DATE: AUGUST 13, 1997

TIME: 10:30

PHOTO BY: Mark Densmore

SAMPLE: X114

DIRECTION: NORTH

COMMENTS: Photo taken of soil sample location just outside of a retaining wall with a crack in it. Within the retaining wall are transformers.

DATE: AUGUST 13, 1997

TIME: 10:00

PHOTO BY: Mark Densmore

SAMPLE: X114

DIRECTION: WEST

COMMENTS: Photo taken of soil sample location just outside of a retaining wall with a crack in it. Within the retaining wall are transformers.

SITE NAME: MARVEL ENGINEERING	
CERCLIS ID: ILD 984837104	**COUNTY:** COOK

DATE: AUGUST 13, 1997

TIME:

PHOTO BY: Mark Densmore

SAMPLE:

DIRECTION: SOUTH

COMMENTS: Photo showing former testing area behind the fence.

DATE: AUGUST 13, 1997

TIME:

PHOTO BY: Mark Densmore

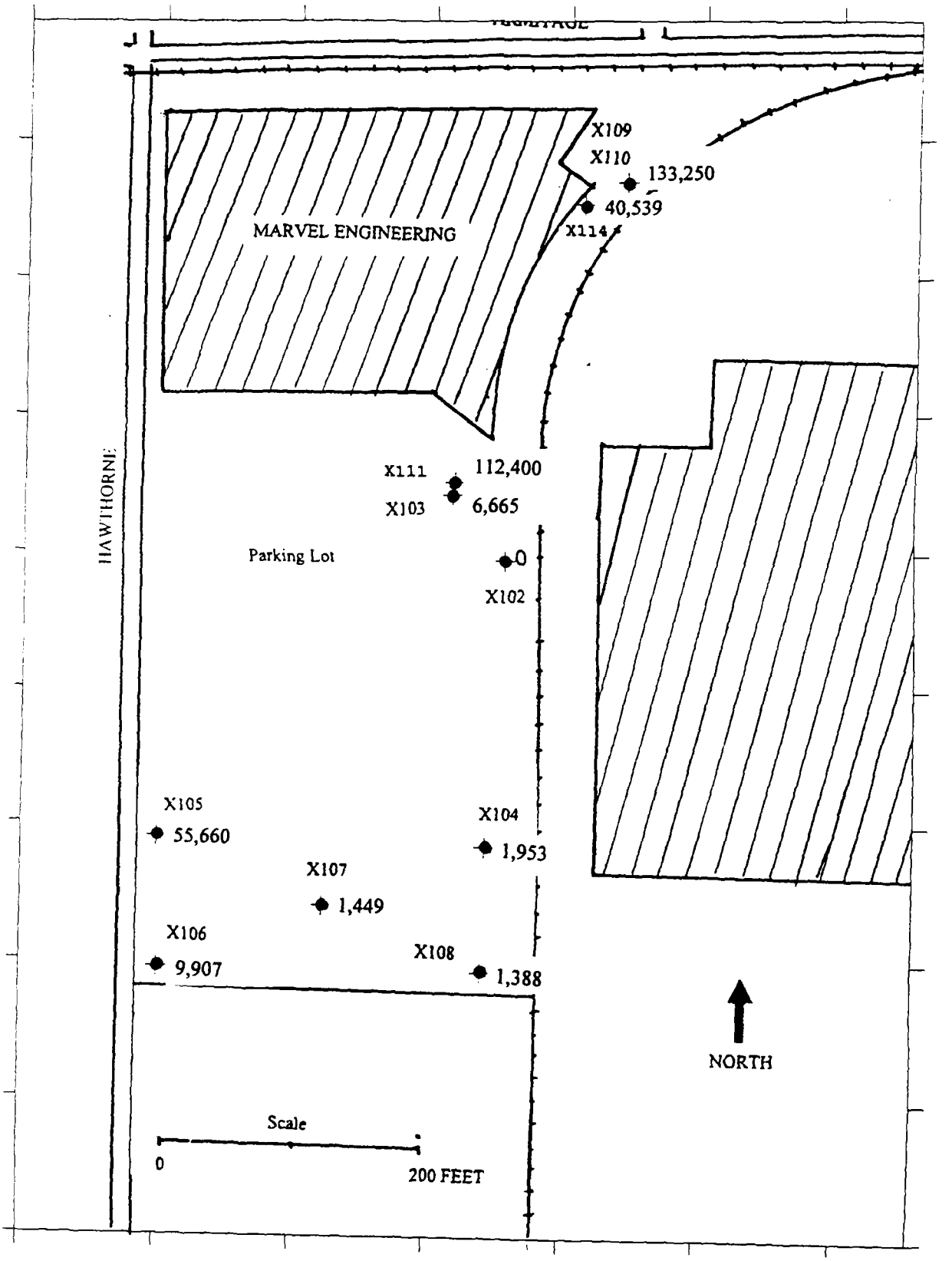
SAMPLE:

DIRECTION: NORTH

COMMENTS: Photo taken of submerged cylinders within testing area.

APPENDIX B

Site map of Marvel Engineering showing total PAH concentrations (ppb) to the right of the sample points.



APPENDIX C

BSC STREAM SEGMENT RATINGS. Streams ordered alphabetical for the entire state through 1993.

STREAM	Major Basin	SAMPLING DATE	COUNTY	REACH DESCRIPTION	LOWER R. M.	UPPER R. M.	TOTAL MILES	IEPA CODE	SAMPLE IBI/AIBI	BSC Class
Sexton Creek	Mississippi	08/12/87	Alexander	Entire stream	0	12.4	12.4	IB-07	40	B
Shaw Creek	Spoon	09/04/75	Fulton	Entire stream	0	15.6	15.6	DJC-	29	D
Shoal Creek	Kaskaskia	08/17/82	Clinton	Mouth up to Beaver Cr.	0	13.3	13.3	OI-05	34	C
Shoal Creek	Kaskaskia	08/11/82	Bond	East Fork up to Dorris Cr.	49.5	58.4	8.9	OI-06	38	C
Shoal Creek	Kaskaskia	08/12/82	Montgomery	Upstream of Bearcat Cr.	74.2	81	6.8	OI-07	38	C
Shoal Creek	Kaskaskia	08/25/82	Clinton	Beaver Creek up to East Fork	13.3	49.5	36.2	OI-08	40	B
Shoal Creek	Kaskaskia	09/13/82	Clinton	Beaver Creek up to East Fork	13.3	49.5	36.2	OI-13	43	B
Shoal Creek	Kaskaskia	08/12/82	Bond	Dorris Creek up to Bearcat Creek	58.4	74 2	15.8	OI-14	43	B
Shoal Creek	Kaskaskia	08/11/82	Bond	Beaver Creek up to East Fork	13.3	49.5	36.2	OI-15	47	B
Silver Creek	Spoon	07/24/75	Stark	Entire stream	0	6	6	DJ	41	B
Silver Creek	Fox	07/10/87	McHenry	Entire stream	0	9.8	9.8	DTK	30	D
Silver Creek	Des Plaines	05/20/76	Cook	Mouth to Bensenville Ditch	0	5.7	5.7	GM-01	23	D
Silver Creek	Kaskaskia	08/02/82	St. Clair	Entire stream	0	86.3	86.3	OD-04	34	C
Silver Creek	Kaskaskia	08/03/82	St. Clair	Entire stream	0	86.3	86.3	OD-05	32	C
Silver Creek	Kaskaskia	08/03/82	Madison	Entire stream	0	86.3	86.3	OD-06	32	C
Silver Creek	Kaskaskia	08/02/82	St. Clair	Entire stream	0	86.3	86.3	OD-07	34	C
Silver Creek	Kaskaskia	08/03/82	Madison	Entire stream	0	86.3	86.3	OD-08	38	C
Silver Creek	Kaskaskia	08/04/82	Madison	Entire stream	0	86.3	86.3	OD-09	38	C
Silver Creek	Rock	10/03/80	Ogle	Entire stream	0	7.7	7.7	PM-	36	C
Silver Creek	Rock	08/03/89	Stephenson	Entire stream	0	5.8	5.8	PWM-		C
Sinsinawa River	Mississippi	08/26/81	Jo Daviess	Mouth to Wisconsin state line	0	10.2	10.2	MS-	38	C
Skillet Fork	Lit. Wabash	08/08/89	White	Mouth up to Horse Cr.	0	44.7	44.7	CA-02	32	C
Skillet Fork	Lit. Wabash	08/08/89	White	Mouth up to Horse Cr.	0	44.7	44.7	CA-03	32	C
Skillet Fork	Lit. Wabash	07/22/92	Wayne	Mouth up to Horse Cr.	0	44.7	44.7	CA-05	34	C
Skillet Fork	Lit. Wabash	08/08/89	Wayne	Horse Creek up to Dums Creek	44 7	83.5	38.8	CA-07	45	B
Skillet Fork	Lit. Wabash	08/09/89	Marion	Horse Creek up to Dums Creek	44.7	83.5	38.8	CA-08	40	B
Skillet Fork	Lit. Wabash	08/03/89	Marion	Upstream of Dums Cr.	83 5	101 7	18 2	CA-09	36	C
Skokie River	Des Plaines	11/18/80	Cook	Upstream of Dundee Road	5 5	23 9	18.4	HCCD-	23	D
Skokie River	Des Plaines	06/13/80	Lake	Upstream of Dundee Road	5 5	23 9	18 4	HCCD-	19	D
Skokie River	Des Plaines	10/18/84	Cook	Mouth to Dundee Road	0	5 5	5 5	HCCD-09	34	C
Sleepy Hollow Creek	Fox	07/19/84	McHenry	Entire stream	0	8	8	DT	26	D
Slough Creek	Fox	07/10/87	McHenry	Entire stream	0	8.2	8.2	DTKD-	38	C
Slug Run	Spoon	07/22/75	Warren	Entire stream	0	11	11	DJBZ-	24	D
Snakeden Hollow Creek	Spoon	07/15/75	Knox	Entire stream	0	8 4	8 4	DJZN-01	41	B
Soldier Creek	Kankakee	09/22/72	Kankakee	Entire stream	0	8 8	8 8	FI-		B
Somonauk Creek	Fox	08/11/82	LaSalle	Entire stream	0	35	35	DTB-01	45	B

EXECUTIVE SUMMARY

In 1984 a Biological Stream Characterization (BSC) Work Group was convened to develop a statewide biological classification of Illinois streams. The first BSC report, published as Special Report No.13 of the State Water Plan Task Force (Hite and Bertrand 1989), provided a map of streams rated, a summary of the BSC process, the criteria for development of BSC ratings and Index of Biotic Integrity (IBI) values. A goal of the BSC Work Group was to update BSC ratings on an annual basis and publish revised BSC ratings every five years. This report provides an updated color map (in the envelope on the back page of this report) and stream segment descriptions of BSC ratings through 1993.

The BSC is a multi-tiered stream quality classification based primarily on the attributes of lotic fish communities (Table 1). The predominant stream quality indicator used in this process is the Index of Biotic Integrity (IBI), comprised of 12 metrics, which form a basis for describing the health or integrity of the fish community. When insufficient fishery data are available for calculating an IBI value, BSC criteria allow the use of sport fish information or macroinvertebrate data to rate streams.

BSC provides a uniform process of characterizing streams statewide and is used by a variety of sources for stream protection, restoration and planning efforts. It is a key component for defining Illinois stream quality and has a role in the development of subecoregions for the implementation of biocriteria by the Illinois EPA. The ongoing activities of the BSC Work Group constitute an integral element of stream assessment and protection efforts in Illinois.

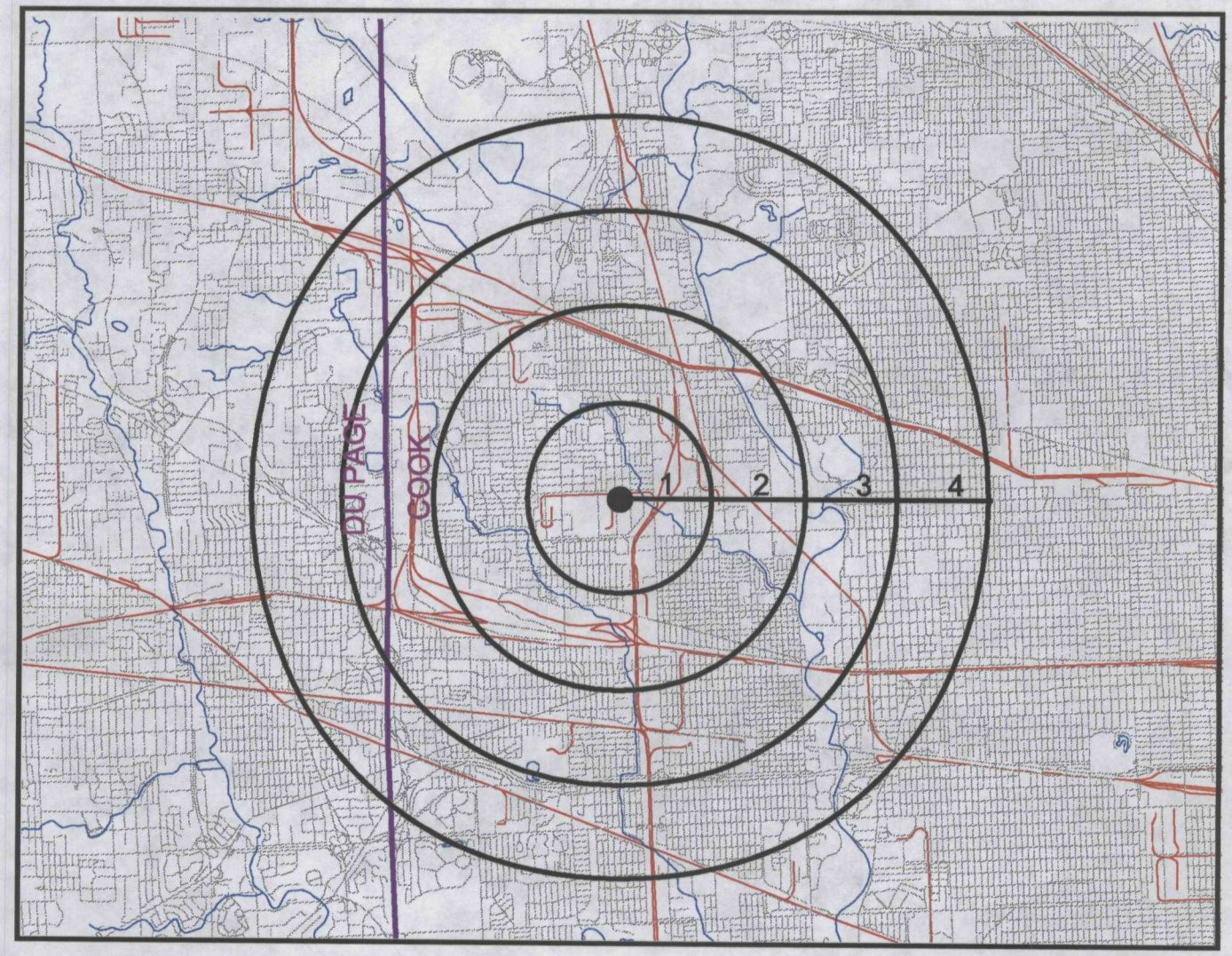
As of 1993, a total of 13,521.6 stream miles have been rated. Of these streams, 612 miles have been classified as Unique Aquatic Resource (Class A) streams (Table 2). Based upon the fish community, these streams are considered to be of exceptional quality. Highly Valued Aquatic Resource streams (Class B) streams totaled 4544.9 miles; these areas of high biodiversity typically function as sources for recolonization of lower quality areas such as Class C streams (6748.4 miles). Streams rated as Class D (1551.4 miles) or Class E (64.9 miles) are impaired by some combination of water quality or habitat degradation.

Table 1. Biological Stream Characterization (BSC) summary.

STREAM CLASS	BSC CATEGORY	BIOTIC RESOURCE QUALITY DESCRIPTION
A	Unique Aquatic Resource	EXCELLENT. Comparable to the best situations without human disturbance.
B	Highly Valued Aquatic Resource	GOOD. Good fishery for important gamefish species; species richness may be somewhat below expectations for stream size or geographic region.
C	Moderate Aquatic Resource	FAIR. Fishery consists predominantly of bullheads (*Ictalurus* spp.), sunfish (*Lepomis* spp.), and carp (*Cyprinus carpio*). Species diversity and number of intolerant fish reduced. Trophic structure skewed with increased frequency of omnivores, green sunfish or tolerant species.
D	Limited Aquatic Resource	POOR. Fishery predominantly for carp; fish community dominated by omnivores and tolerant forms. Intolerant macroinvertebrates rare or absent; moderate, facultative and tolerant organisms dominate benthic community. Species richness may be notably lower than expected for geographic area, stream size or available habitat.
E	Restricted Aquatic Resource	VERY POOR. Few fish of any species present; no sport fishery exists. Intolerant macroinvertebrates absent; benthic community consists of essentially tolerant forms, or no aquatic life may be present. Species richness may be restricted to a few oligochaete or chironomid taxa.

APPENDIX D

MARVEL ENGINEERING
4 MILE RADIUS MAP



3 0 3 6 Miles

County
Streams
Roads
Rails

N
W
E
S

APPENDIX E

SDMS US EPA Region V

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Oversize 15 Mile Surface Pathway Map

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APPENDIX F

TARGET COMPOUND LIST

Volatile Target Compounds

Chloromethane
Bromomethane
Vinyl Chloride
Chloroethane
Methylene Chloride
Acetone
Carbon Disulfide
1,1-Dichloroethene
1,1-Dichloroethane
1,2-Dichloroethene (total)
Chloroform
1,2-Dichloroethane
2-Butanone
1,1,1-Trichloroethane
Carbon Tetrachloride
Bromodichloromethane
1,2-Dichloropropane
cis-1,3-Dichloropropene
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane
Benzene
trans-1,3-Dichloropropene
Bromoform
4-Methyl-2-pentanone
2-Hexanone
Tetrachloroehtene
1,1,2,2-Tetrachloroethane
Toluene
Chlorobenzene
Ethylbenzene
Styrene
Xylene (total)

Base/Neutral Target Compounds

Hexachloroethane
bis(2-Chloroethyl)ether
N-Nitroso-Di-n-Propylamine
Nitrobenzene
Hexachlorobutadiene
2-Methylnaphthalene
1,2,4-Trichlorobenzene
Isophorone
Naphthalene
4-Chloroaniline
bis(2-Chloroethoxy)methane
Hexachlorocyclopentadine
2-Chloronaphthalene
2-Nitroaniline
Acenaphthylene
Dibenzofuran
Dimethylphthalate
2,6-Dintrotoluene
Fluorene
4-Nitrolaniline
4-Chlorophenyl-phenylether
2,4-Dinitrotoluene
Diethylphthalate
N-Nitrosodiphenylamine(1)
Hexachlorobenzene
Phenanthrene
4-Bromophenyl-phenylether
Anthracene
Di-n-Butylphthalate
Fluoranthene
Pyrene
Butylbenzylphthalate
bis(2-Ethylhexyl)phthalate
Chrysene
Benzo(a)anthracene
3,3'-Dichlorobenzidine
Di-n-Octylphthalate
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenz(a,h)anthracene
Benzo(g,h,i)perylene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene

Acid Target Compounds

Phenol
2-Chlorophenol
2-Nitrophenol
2-Methylphenol
2,4-Dimethylphenol
4-Methylnaphthalene
2,4-Dichlorophenol
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
4-Chloro-3-Methylphenol
2,4-Dinitrophenol
4,6-Dinitro-2-methylphenol
Pentachlorophenol
4-Nitrophenol

Pesticide/PCB Target Compounds

alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (Lindane)
Heptachlor
Aldrin
Heptachlor epoxide
Endosulfan I
Dieldrin
4,4'-DDE
Endrin
Endosulfan II
4,4'-DDD
Endosulfan Sulfate
4,4'-DDT
Methoxychlor
Endrin ketone
Endrin aldehyde
alpha-Chlrodane
gamma-Chlrodane
Toxaphene
Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260

Inorganic Target Compounds

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc
Cyanide
Sulfide
Sulfate

DATA QUALIFIERS

QUALIFIER	DEFINITION ORGANICS	DEFINITION INORGANICS
U	Compound was tested for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For soil samples subjected to GPC clean-up procedures, the CRQL is also multiplied by two, to account for the fact that only half of the extract is recovered.	Analyte was analyzed for but not detected.
J	Estimated value. Used when estimating a concentration for tentatively identified compounds (TICS) where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria and the result is less than the sample quantitation limit but greater than zero. Used in data validation when the quality control data indicate that a value may not be accurate.	Estimated value. Used in data validation when the quality control data indicate that a value may not be accurate.
C	This flag applies to pesticide results where the identification is confirmed by GC/MS.	Method qualifier indicates analysis by the Manual Spectrophotometric method.
B	Analyte was found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.	The reported value is less than the CRDL but greater than the instrument detection limit (IDL).
D	Identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor as in the "E" flag, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and <u>all</u> concentration values are flagged with the "D" flag.	Not used.
E	Identifies compounds whose concentrations exceed the calibration range for that specific analysis. All extracts containing compounds exceeding the calibration range must be diluted and analyzed again. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses must be reported on separate Forms I. The Form I for the diluted sample must have the "DL" suffix appended to the sample number.	The reported value is estimated because of the presence of interference.
A	This flag indicates that a TIC is a suspected aldol concentration product formed by the reaction of the solvents used to process the sample in the laboratory.	Method qualifier indicates analysis by Flame Atomic Absorption (AA).
M	Not used.	Duplicate injection (a QC parameter not met).

N	Not used	Spiked sample (a QC parameter not met).
S	Not used.	The reported value was determined by the Method of Standard Additions (MSA).
W	Not used.	Post digestion spike for Furnace AA analysis (a QC parameter) is out of control limits of 85% to 115% recovery, while sample absorbance is less than 50% of spike absorbance.
*	Not used.	Duplicate analysis (a QC parameter not within control limits).
+	Not used.	Correlation coefficient for MSA (a QC parameter) is less than 0.995.
P	Not used.	Method qualifier indicates analysis by ICP (Inductively Coupled Plasma) Spectroscopy.
CV	Not used.	Method qualifier indicates analysis by Cold Vapor AA.
AV	Not used.	Method qualifier indicates analysis by Automated Cold Vapor AA.
AS	Not used.	Method qualifier indicates analysis by Semi-Automated Cold Spectrophotometry.
T	Not used.	Method qualifier indicates Titrimetric analysis.
NR	The analyte was not required to be analyzed.	The analyte was not required to be analyzed.
R	Rejected data. The QC parameters indicate that the data is not usable for any purpose.	Rejected data. The QC parameters indicate that the data is not usable for any purpose.