

Five Year Review

Pursuant to CERCLA

Better Brite Superfund Site
De Pere,
Brown County, Wisconsin

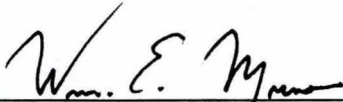
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Prepared By:

Wisconsin Department of Natural Resources
Northeast Region
Green Bay, Wisconsin

In conjunction with:

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois



William E. Muno, Director
Superfund Division

11/23/99

Date

I. INTRODUCTION

A. Authority and Purpose

Section 121 (C) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by SARA and Section 300.430 (f) (4) (ii) of the National Contingency Plan (NCP), require that periodic (no less often than five years) reviews are to be conducted for sites where hazardous substances, pollutants or contaminants remain at the site at levels that do not allow for unlimited use and unrestricted exposure following the completion of all remedial actions for the site. The purpose of this five-year review is to evaluate whether the remedial actions implemented continue to be protective of human health and the environment. This review focuses on the protectiveness of the Better Brite Superfund Site, De Pere, Wisconsin. This review will be placed in the Site files and at the local repository for the Better Brite Superfund Site at the Brown County Public Library, De Pere branch, 380 Main Avenue, DePere, Wisconsin.

The United States Environmental Protection Agency (EPA) has established a three-tier approach to conducting Five-Year Reviews, the most basic of which provides a minimum protectiveness evaluation for sites with on-going response actions (level Ia review). EPA contemplates that a level I review will be appropriate in all but relatively few cases where site specific considerations suggest otherwise. The second and third level reviews are intended to provide the flexibility to respond to varying site-specific considerations employing further analysis. Site-specific considerations, including the nature of the response action, the status of the on-site response activities, and the proximity to populated areas and sensitive environmental areas determine the level of review for a given site. The type Ia review conducted for this site is applicable to a site where a response is ongoing.

B. Site Characteristics And History

This National Priority List (NPL) site consists of two separate properties where Better Brite formerly operated a metal plating business. The properties are known as the Chrome Shop and Zinc Shop. The Better Brite Chrome and Zinc Shops are located at 519 Lande Street and 315 South Sixth Street, respectively, in the City of De Pere, Brown County, Wisconsin. The sites are approximately 2,000 feet apart in Sections 21 and 28 De Pere Township (T23N, R20E).

The Chrome Shop property comprises 3.7 acres and the Zinc Shop property comprises 0.61 acres. Both sites are approximately ¼ mile west of the Fox River, and are in primarily residential areas.

Better Brite began operations at the Zinc Shop in the late 1960's. Vertical in-ground dip tanks were used for chromium plating operations. By 1978, chrome plating operations began at the Chrome Shop site, and operations at the Zinc Shop had been converted to

zinc plating only. The Chrome Shop engaged in plating of 15 to 20-foot rollers for paper mills in the area.

Numerous complaints of spills and dumping from neighbors and employees prompted the initial investigations of the site by the Wisconsin Department of Natural Resources (WDNR) in 1979. Limited site investigation and remedial efforts were conducted throughout the 1980s. Better Brite filed for bankruptcy protection in 1985. After exhaustive action to identify responsibility for releases at the site, it was determined that there was no viable responsible party. Therefore, the WDNR and EPA assumed responsibility for funding the remedial action (RA) to alleviate the threat to public health.

The Better Brite sites were nominated for inclusion on the NPL in October 1989, and added to the list on August 28, 1990. The Chrome and Zinc Shops were combined as one site for joint nomination to the NPL due to their proximity to one another and their related background. The WDNR and EPA conducted a Remedial Investigation and Feasibility Study (RIFS) from 1990 to 1995. The selected remedial options are consistent with the Record of Decision declaration (ROD) prepared by the WDNR and EPA issued September 24, 1996.

II. DISCUSSION

A. Chrome Shop

Historical Actions

Initial investigation work at the Better Brite Chrome Shop site was conducted in September and October 1979. Soil samples indicated the area of contamination was south and west of the plating building extending to a surface drainage ditch. The depth of contaminated soil was estimated at 6.5 to 9 feet below ground surface (bgs). Total chromium was detected in groundwater samples ranging from 62 to 429 milligrams per liter (mg/L). Hexavalent chromium was detected in the groundwater samples at levels ranging from 60 to 280 mg/L. Surface water concentrations of total chromium and hexavalent chromium were 1,511mg/L and 1,440mg/L, respectively.

A Remedial Action Plan (RAP) was prepared for the site in April 1980. The proposal included a drainage trench, a surface water control system, and limited contaminated soil excavation. Plans were made to discharge groundwater with concentrations of chromium greater than 0.5 mg/l to the De Pere sanitary sewer. Groundwater containing less than 0.5 mg/L chromium would be discharged to the storm sewer. Better Brite implemented the proposals.

In May of 1984, the EPA conducted an inspection of the site. The EPA noted that groundwater collecting in the drainage trench was discharged to the storm sewer. Also noted was a black "tarry" substance leaking from the building and the ventilation system.

The black "tarry" substance was found to contain chromium at concentrations up to 550,000 mg/kg.

The EPA conducted two site inspections of the Chrome Shop in 1986. Physical observations of the property were made and soil samples were collected during the first site inspection on April 22, 1986. During the second inspection on June 20, 1986, EPA noted that four vertical underground plating tanks were removed and discolored groundwater was collecting in the voids.

Removal Actions

Based on the results of the inspections a Site Assessment and Emergency Action Plan was prepared in September 1986. The plan concluded that the Chrome Shop posed an immediate threat to human health. A Phase 1 removal action was conducted at the Chrome Shop between September and December 1986. Chromic acid, cyanide and other hazardous materials were removed and disposed. Additional groundwater monitoring wells and bedrock piezometers were installed in October 1987.

The EPA constructed an on-site water treatment system in September 1990. By November of 1990 the treatment facility at the Better Brite Chrome facility was functional. Treatment of recovered groundwater consists of precipitation of the chromium followed by settling and filtration. The remaining cake is hauled away for further treatment and disposal.

The EPA conducted a Phase 2 removal action at the Chrome Shop in 1993. Approximately 5,000 tons of contaminated soil was removed from the southwest corner of the property. The groundwater collection system was enlarged to include the entire excavation cavity created by the removal of contaminated soils.

B. Zinc Shop

Historical Actions

A series of site investigations were conducted at the Zinc Shop and surrounding properties. The EPA conducted a site assessment in October 1986. Chromium and zinc contamination was detected in water samples collected from the Zinc Shop sump and the sump located in the residence south of the site. The EPA also conducted an inventory of materials and storage units on site.

In June 1987 the WDNR conducted a site screening evaluation. Site activities included performing soil borings and installing groundwater monitoring wells to characterize site soils, determine the direction of groundwater flow, and analyze soil and groundwater samples for contamination. Various contaminants, primarily chromium, were detected in

soil and groundwater at the site, on properties surrounding the site, and in the sumps of adjacent homes.

Removal Actions

The EPA performed a second site assessment at the Zinc Shop in October 1989. The assessment confirmed the WDNR report of contamination and illegally stored hazardous substances. Based on the results of the site assessment, the EPA conducted a removal action consisting of sampling and sorting hazardous materials, securing and heating the building, removal of wastes, decontaminating the building and compiling the analytical results of previous investigations.

The EPA constructed a groundwater recovery sump along the east side of the building in 1990. Approximately 350 cubic yards of chromium contaminated soil was excavated and disposed of during the installation of the sump. The EPA conducted additional decontamination of the building and investigation beneath the concrete slab foundation in 1991.

The Zinc Shop burned down in September 1992. The EPA removed the building and the slab foundation in November 1992. Contaminated soil was excavated from beneath the slab and the groundwater collection sump was enlarged to include the area beneath the building. Approximately 6,032 tons of chromium contaminated soil, concrete, and building debris was removed from the site and disposed. The excavation and sump construction activities were completed in January 1993. Contaminated groundwater is extracted from a sump regularly and trucked to the Chrome Shop for treatment.

C. Effectiveness of Removal Actions

Total chrome concentrations have decreased dramatically at the Chrome Shop between 1994 and 1998. Total chromium concentrations in influent water samples collected from the Chrome Shop in 1994 were approximately 500,000 micrograms per Liter (ug/L). Concentrations of total chromium decreased to approximately 150,000 ug/L in 1999.

A similar decrease in total chrome concentration appears to be occurring at the Zinc Shop. Concentrations of total chromium in groundwater extracted from the sump at the Zinc Shop were approximately 600,000 ug/L in 1993. Total chromium concentrations decreased to around 100,000 ug/L in 1996 and to approximately 65,000 ug/L by 1999. Through August 1999, approximately 2,330,000 gallons of chromium contaminated water has been removed from the Zinc Shop and Chrome Shop sumps.

D. Remedial Investigation and Feasibility Study

The remedial investigation and feasibility study (RIFS) for the site was finalized in September 1995. The RI concluded that releases of contaminants occurred resulting in impacts to soil, groundwater, and possibly air and surface water. Contaminants relating to the plating operation, including metal plating solutions and solvents, were discharged primarily from leaking underground plating tanks, drum and roll-off box storage areas, and surface spills. As a result, both inorganic and VOC contaminants are present at the sites.

Chromium is the primary contaminant of concern in groundwater at both the Zinc Shop and the Chrome Shop. A large percentage is present in the form of hexavalent chromium, which is the most mobile and most dangerous form of chromium. Antimony, arsenic, beryllium, cadmium, cyanide, iron, lead, nickel, silver, and thallium were also detected in groundwater at one or more locations at concentrations in exceedance of Wisc. Admin. Code NR 140 regulatory limits

Contaminants at both sites are limited to the upper portion (top 25 feet) of the unconsolidated deposits. Groundwater is the primary migration pathway of concern. Contaminants are present in groundwater at levels that exceed regulatory limits for safe drinking water.

E. Remedial Objectives

On September 24, 1996 the WDNR and EPA issued a Record of Decision (ROD) for a final remedial action at the site. The major components of the remedy include:

- ◆ Extraction of groundwater at the Zinc Shop from the existing groundwater extraction sump.
- ◆ Relocation of the treatment plant, which is currently located at the Chrome Shop, to the Zinc Shop.
- ◆ Stabilization of hexavalent chromium (change to trivalent) in soil/groundwater by addition of a compound to the soil to prevent further migration of chrome contamination.
- ◆ Construction of new exterior foundation drains at two properties near the Zinc Shop site with collected water pumped to the pretreatment facility at the Zinc Shop site.
- ◆ Continued groundwater monitoring at the Chrome Shop and the Zinc Shop to evaluate the effectiveness of the remedial action. Groundwater monitoring will include the replacement of select monitoring wells at the Chrome Shop that were removed during soil stabilization activities.

The Final Design Report (FDR), prepared by HSI Geotrans, was completed in January 1999. This is the final remedial design for the remedy selected in the ROD.

F. Remedial Action

Remedial action activities began at the Better Brite site on August 23, 1999. Soil stabilization at the Chrome Shop was completed on October 29, 1999. Relocation and restart of the groundwater recovery and treatment system will be completed by the end of November 1999.

The replacement monitoring wells at the Chrome Shop will be installed during the winter of 1999-2000. Sampling parameters and frequency of sampling will follow the Monitoring Program Plan prepared by HIS Geotrans, 1999.

III. RECOMMENDATIONS

The WDNR and EPA recommend continued implementation of the September 24, 1996 ROD. These activities ensure the capture and treatment of groundwater contaminants and the eventual achievement of groundwater clean-up standards for contaminants at the site.

IV. STATEMENT ON PROTECTIVENESS

The removal actions at the Chrome and Zinc Shop sites minimized the immediate threat to public health and safety. Removal of the most highly contaminated soils and the installation and operation of the groundwater pump and treat system has reduced the concentrations of contaminants at both sites. Implementation of the selected remedy will further reduce the risk to human health and the environment.

Soil stabilization activities and removal of additional contaminated soil at the Zinc Shop during foundation drain installation will address the source of contamination and reduce the potential human health risks by minimizing the direct contact and inhalation exposure threat.

The selected remedial action for the groundwater contamination is effective in the reduction of chromium in groundwater at the Chrome Shop and the Zinc Shop and reduces the risks associated with the contaminants.

The WDNR and EPA certify that the work conducted to date and the remedies selected remain protective of human health and the environment.

V. NEXT FIVE YEAR REVIEW

The next five-year review will be completed by December 2004, which is approximately five years from the date of this review.

**TABLE
BETTER BRITE ZINC SHOP
GROUNDWATER PUMPING**

Quarter	Month	Gallons Pumped
1/1992	October thru December	0
2/1992	January thru March	0
3/1992	April thru June	9,300
4/1992	July thru September	21,950
1/1993	October thru December	47,850
2/1993	January thru March	20,000
3/1993	April thru June	111,200
4/1993	July thru September	35,300
1/1994	October thru December	12,500
2/1994	January thru March	13,900
3/1994	April thru June	40,000
4/1994	July thru September	24,700
1/1995	October thru December	10,900
2/1995	January thru March	20,300
3/1995	April thru June	21,600
4/1995	July thru September	18,000
1/1996	October thru December	28,650
2/1996	January thru March	25,450
3/1996	April thru June	45,150
4/1996	July thru September	20,900
1/1997	October thru December	6,500
2/1997	January thru March	12,500
3/1997	April thru June	46,900
4/1997	July thru September	20,425
Total Gallons Pumped		613,975

**TABLE
BETTER BRITE CHROME SHOP
GROUNDWATER PUMPING**

Quarter	Month	Gallons Pumped
1/1992	October thru December	81,450
2/1992	January thru March	114,100
3/1992	April thru June	129,475
4/1992	July thru September	80,400
1/1993	October thru December	139,850
2/1993	January thru March	74,275
3/1993	April thru June	427,700
4/1993	July thru September	33,850
1/1994	October thru December	15,200
2/1994	January thru March	14,900
3/1994	April thru June	16,900
4/1994	July thru September	8,700
1/1995	October thru December	5,600
2/1995	January thru March	1,650
3/1995	April thru June	20,300
4/1995	July thru September	13,675
1/1996	October thru December	17,950
2/1996	January thru March	23,300
3/1996	April thru June	47,650
4/1996	July thru September	5,300
1/1997	October thru December	10,000
2/1997	January thru March	31,700
3/1997	April thru June	39,600
4/1997	July thru September	18,375
Total Gallons Pumped		1,371,900

TABLE
BETTER BRITE GROUNDWATER TREATMENT
AMOUNT DISCHARGED TO SANITARY SEWER

Quarter	Month	Gallons Pumped
1/1992	October thru December	81,450
2/1992	January thru March	114,100
3/1992	April thru June	138,775
4/1992	July thru September	102,350
1/1993	October thru December	187,700
2/1993	January thru March	94,275
3/1993	April thru June	538,900
4/1993	July thru September	69,150
1/1994	October thru December	27,700
2/1994	January thru March	28,800
3/1994	April thru June	56,900
4/1994	July thru September	33,400
1/1995	October thru December	16,500
2/1995	January thru March	21,950
3/1995	April thru June	41,900
4/1995	July thru September	31,675
1/1996	October thru December	46,600
2/1996	January thru March	48,750
3/1996	April thru June	92,800
4/1996	July thru September	26,200
1/1997	October thru December	16,500
2/1997	January thru March	44,200
3/1997	April thru June	86,500
4/1997	July thru September	38,800
Total Gallons Discharged		1,985,875

TABLE
Better Brite Chrome Shop
Pretreatment Sampling

Date Sampled	Total Chromium ug/L	Total Zinc ug/L	Total Cadmium ug/L
04-26-94	435,000.0	26.0	<4.0
07-14-94	624,000.0	86.0	<4.0
11-11-94	281,000.0	115.0	<4.0
02-02-95	587,000.0	236.0	<3.0
04-06-95	760,000.0	108.0	<3.0
08-14-95	295,000.0	59.0	<3.0
01-31-96	680,000.0	530.0	<3.0
05-01-96	509,000.0	27.0	6.8
08-06-96	444,000.0	630.0	<2.5
11-01-96	692,000.0	11,300.0	<2.5
01-28-97	459,000.0	40.0	<2.5
04-14-97	207,000.0	15.0	<2.5
08-13-97	364,000.0	96.0	2.8

TABLE
Better Brite Zinc Shop
Pretreatment Sampling

Date Sampled	Total Chromium ug/L	Total Zinc ug/L	Total Cadmium ug/L	Amenable Cyanide ug/L	Total Cyanide mg/L
09-29-93	565,000.0	28.0	<3.0	65.0	1.821
09-29-93	704,000.0	46.0	<3.0	NA	NA
04-26-94	92,200.0	24.0	<4.0	NA	1.550
07-15-94	134,000.0	358.0	<4.0	NA	1.010
11-10-94	131,000.0	2,060.0	18.0	NA	0.488
02-02-95	147,000.0	44.0	<3.0	NA	0.634
04-06-95	70,000.0	584.0	<3.0	NA	0.719
08-14-95	91,100.0	31.0	<3.0	NA	0.820
01-31-96	76,000.0	25.0	<3.0	NA	0.495
05-01-96	114,000.0	57.0	3.6	NA	0.770
08-06-96	60,700.0	157.0	3.5	NA	0.510
11-01-96	77,700.0	54.0	<2.5	NA	0.462
01-28-97	103,000.0	28.0	<2.5	NA	0.426
04-14-97	69,900.0	32.0	<2.5	NA	1.700
08-13-97	74,500.0	166.0	<2.5	NA	0.705

TABLE
Better Brite Chrome & Zinc Shop
Pretreatment Sampling

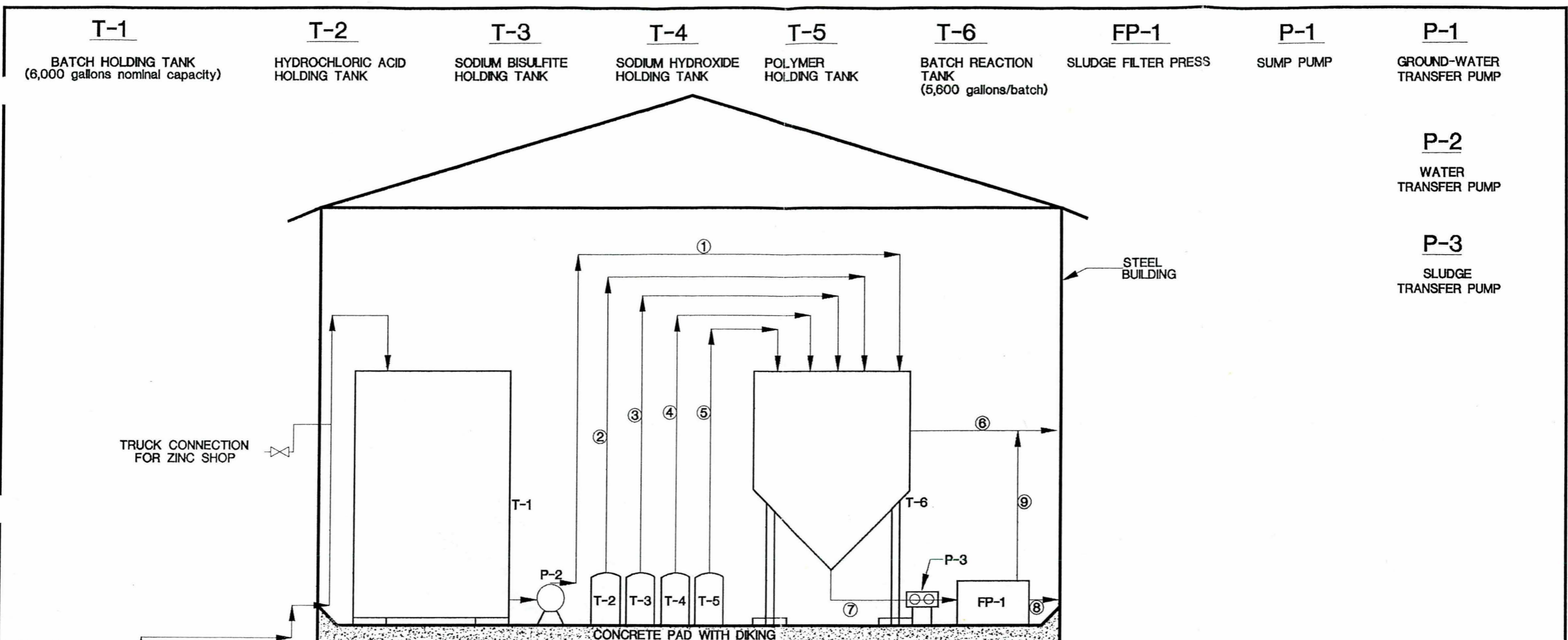
Date Sampled	Total Chromium ug/L	Total Zinc ug/L	Total Cadmium ug/L	Total Cyanide mg/L
10-01-93	234,000.0	29.0	<4.0	NA
01-04-94	394,000.0	830.0	<20.0	0.230
04-26-94	215,000.0	59.0	4.0	1.180
07-15-94	357,000.0	67.0	<4.0	0.400
11-10-94	216,000.0	125.0	<4.0	0.320
02-02-95	252,000.0	102.0	<3.0	0.420
04-06-95	220,000.0	34.0	<3.0	0.378
08-15-95	426,000.0	214.0	<3.0	0.512
01-31-96	270,000.0	82.0	<3.0	0.478
05-01-96	173,000.0	45.0	<2.5	1.000
08-06-96	82,300.0	64.0	<2.5	0.476
11-01-96	236,000.0	68.0	<2.5	0.205
01-28-97	147,000.0	73.0	<2.5	0.391
04-14-97	96,400.0	50.0	<2.5	0.914
08-13-97	110,000.0	111.0	2.9	0.385

TABLE
Better Brite Chrome & Zinc Shops
Posttreatment Sampling

Date Sampled	Total Chromium ug/L	Total Zinc ug/L	Total Cadmium ug/L	Total Cyanide mg/L
01-04-94	595.0	3.0	<4.0	0.067
04-27-94	1,380.0	<3.0	<4.0	0.496
07-15-94	649.0	<3.0	<4.0	0.013
11-10-94	1,030.0	7.0	<4.0	<0.002
02-08-95	500.0	15.0	<0.1	0.079
04-07-95	2,000.0	13.0	<0.1	0.340
08-15-95	450.0	17.0	<3.0	<0.001
01-22-96	2,300.0	19.0	<3.0	0.198
05-01-96	1,690.0	16.0	<2.5	0.220
08-23-96	733.0	12.0	<2.5	0.001
10-23-96	1,670.0	15.0	<2.5	0.008
01-14-97	1,580.0	11.0	<2.5	0.070
04-14-97	3,420.0	13.0	<2.5	<0.001
08-13-97	2,590.0	43.0	<2.5	0.036

**TABLE
BETTER BRITE CHROME & ZINC SHOPS
HAZARDOUS WASTE REMOVALS**

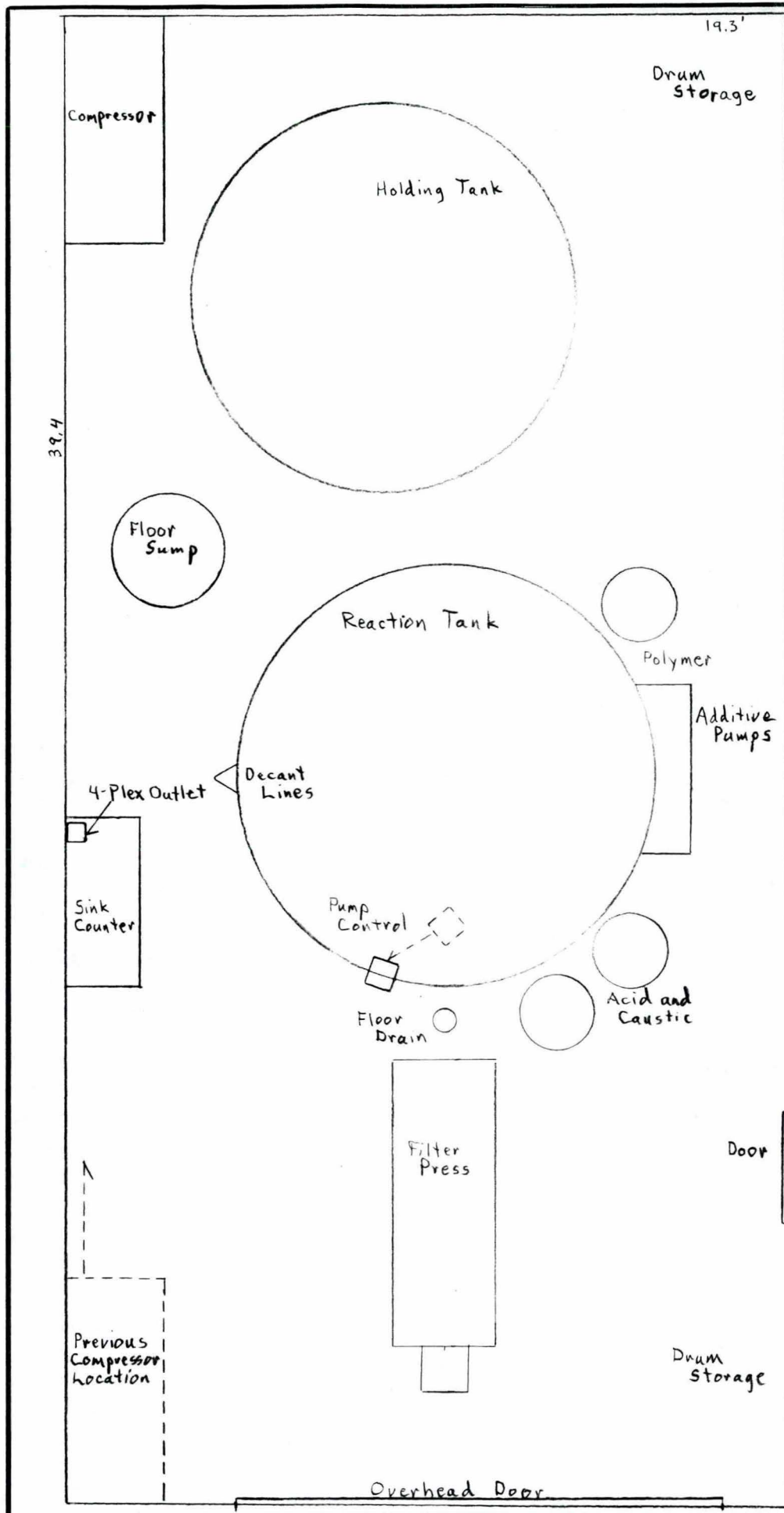
TRANSFER DATE	MANIFEST NUMBER	DRUMS REMOVED	POUNDS REMOVED
07-15-92	WI J347000	19	8,150
10-12-92	WI J373632	21	10,500
10-12-92	WI J325267	20	10,000
12-10-92	WI J335117	17	7,800
02-17-93	WI J335295	11	920
05-06-93	WI J337516	20	13,000
06-04-93	WI J337483	17	8,500
08-19-93	WI J387028	18	9,000
12-14-93	WI J442349	7	3,500
04-13-94	WI J490910	5	2,500
07-05-94	WI J491253	7	3,500
01-31-95	WI J583157	8	4,000
11-10-95	WI J516912	9	5,400
04-04-96	WI J659097	9	3,600
07-25-96	WI J659401	10	4,000
04-29-97	WI J705775	8	3,200
09-18-97	WI J800502	8	3,700
Total Pounds Removed			101,270



LEGEND

- ① IMPACTED GROUND WATER (approximately 250mg/l total chromium)
- ② SULFURIC ACID (adjust contents of T-6 to pH≈3)
- ③ SODIUM BISULFITE (adjust Oxidation-Reduction potential to 300mv)
- ④ SODIUM HYDROXIDE (adjust contents of T-6 to pH≈8)
- ⑤ POLYMER (creates flocs of Cr (OH)₃ which settle)
- ⑥ PRETREATED GROUND WATER DISCHARGE TO CITY OF DePERE SANITARY SEWER
- ⑦ CHROMIUM HYDROXIDE SLUDGE
- ⑧ DEWATERED CHROMIUM HYDROXIDE SLUDGE (D007 hazardous waste transported to Chemical Waste Management Menomonee Falls, WI.)
- ⑨ RESIDUAL WATER IS DISCHARGED TO CITY OF DePERE SANITARY SEWER

BETTER BRITE DE PERE, WISCONSIN	DATE: 10/03/95
	DESIGNED: BK
SCHEMATIC OF EXISTING PRETREATMENT SYSTEM	CHECKED: BK
	APPROVED: BK
	DRAWN: CTM
	PROJ: 301483158
HYDRO-SEARCH, INC A Tetra Tech Company	Figure 5-1



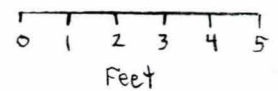
Better Brite
Pretreatment
Plant

De Pere, Wis.

Approximate Layout
1991

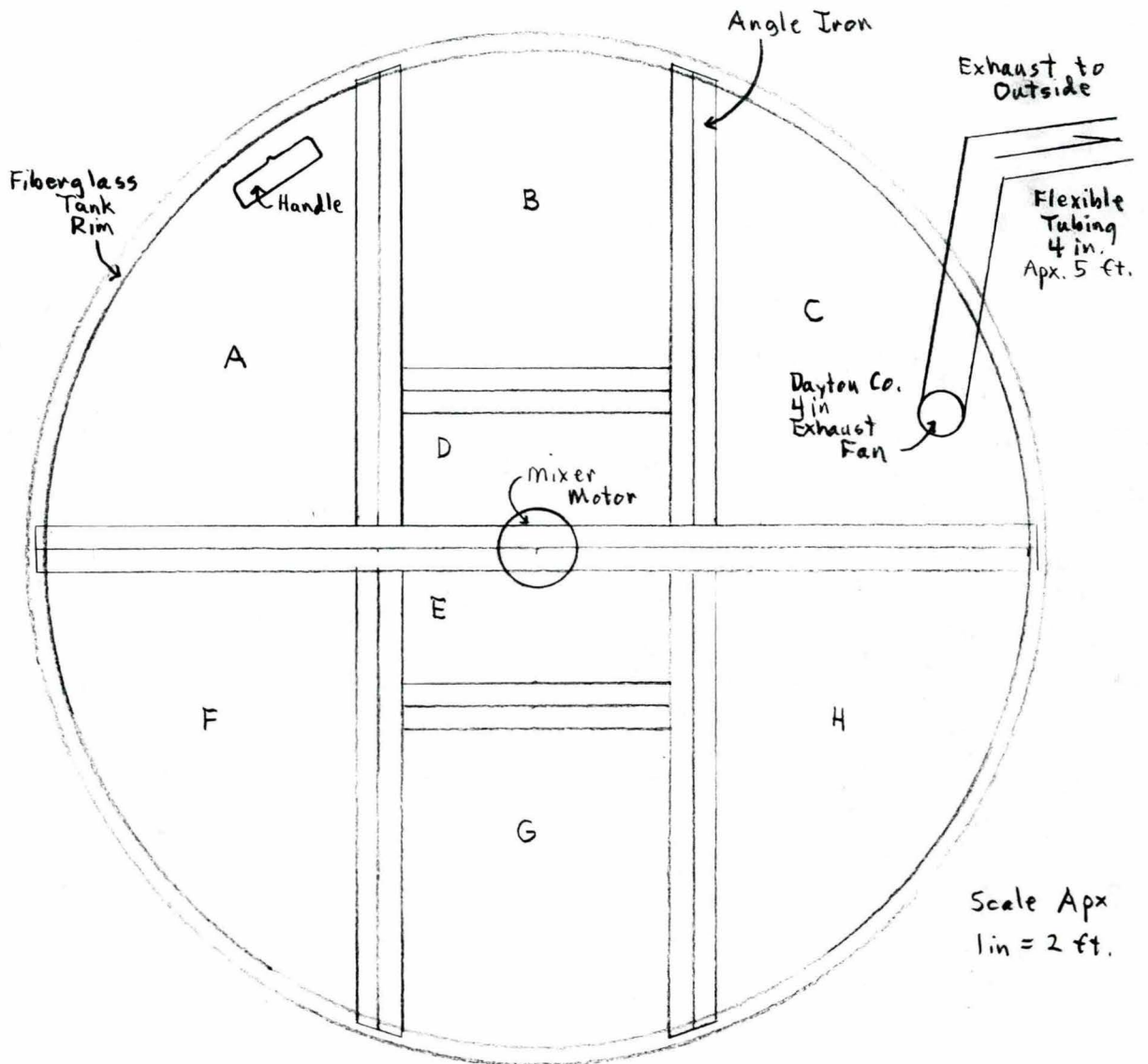
Scale

1 in = 4 ft



T. Koehn 1-92

Better Brite Pretreatment Plant - DePore, Wis.
Reaction Tank Cover



A through H - Sections of Cover Material ($\frac{1}{4}$ in. U.H.M.W.)

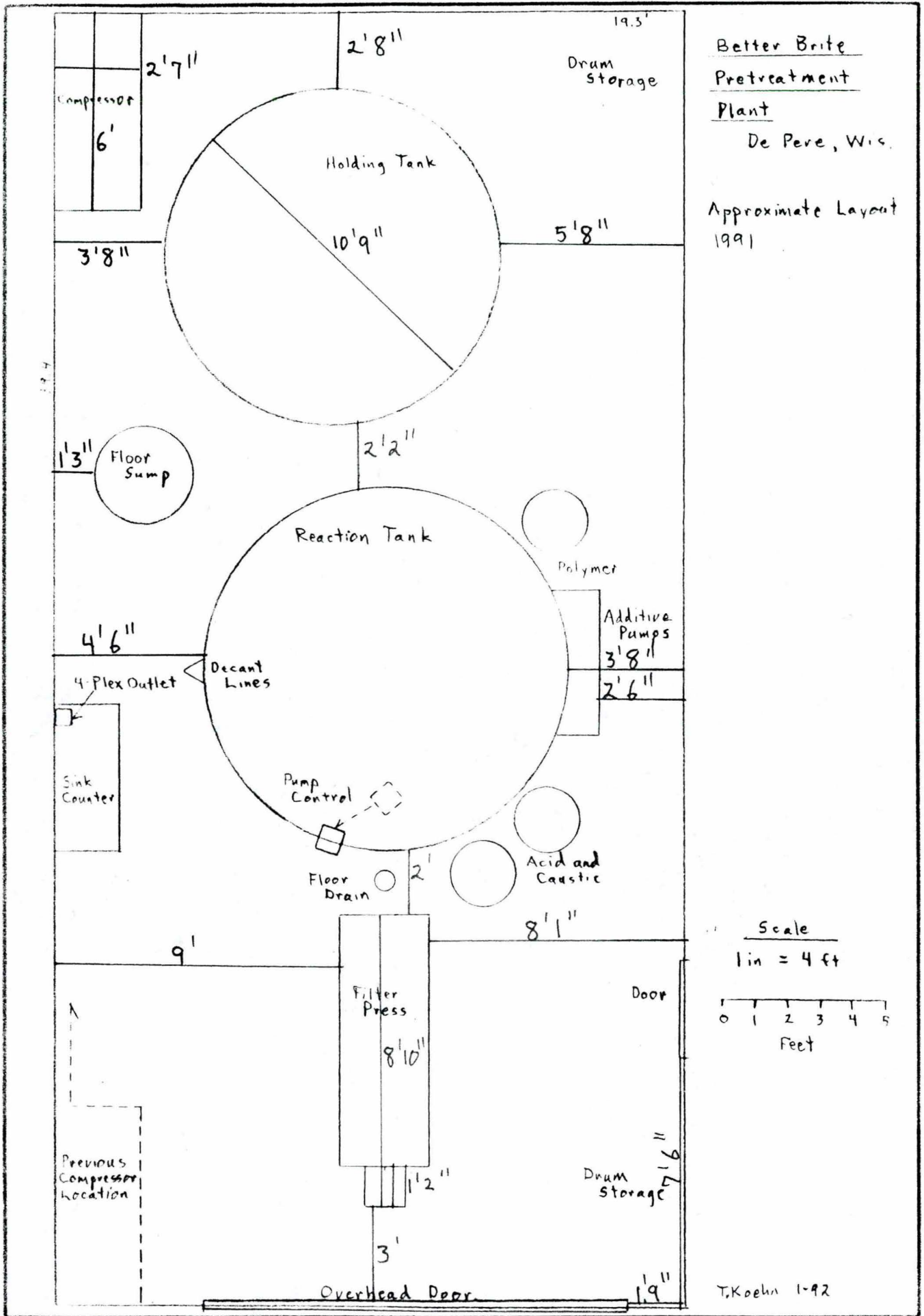
Section A - Readily Removable

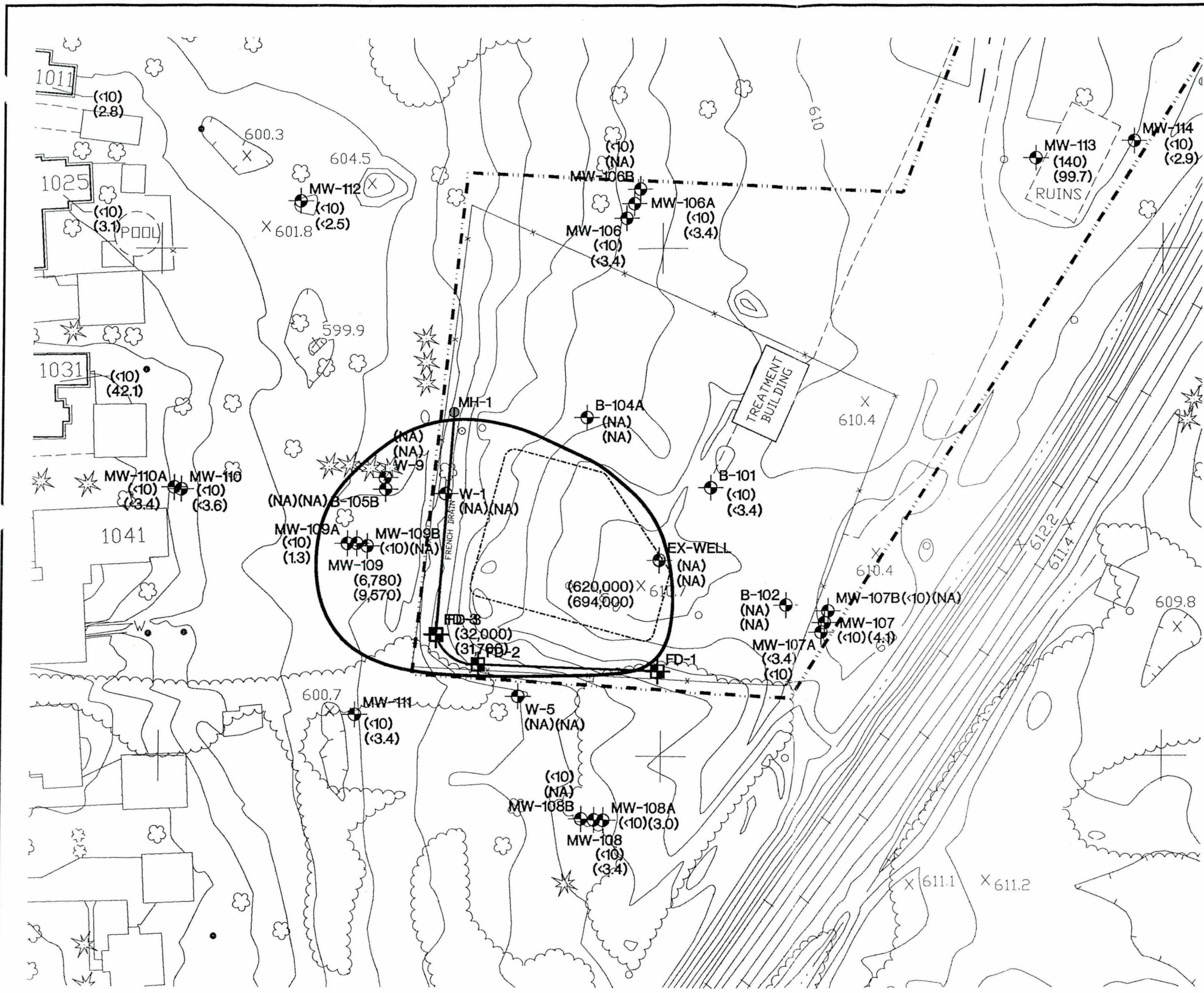
Angle Iron - $\frac{1}{4}$ in. by $2\frac{1}{2}$ in by $2\frac{1}{2}$ in.

- Cover Material to Rest on Angle Iron

- Angle Iron To Be Bolted to Tank Rim

Flexible Tubing to Exhaust to Outside of Building

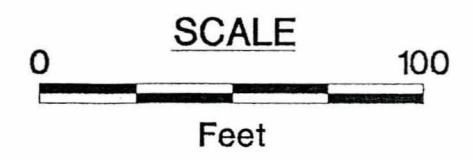




EXPLANATION

- MW-110 MONITOR WELL LOCATION AND DESIGNATION
- SUMP ACCESS LOCATION AND DESIGNATION
- <10 HEXAVALENT CHROMIUM CONCENTRATION IN GROUND WATER (ppb)
- <3.6 TOTAL CHROMIUM CONCENTRATION IN GROUND WATER (ppb)
- (NA) NOT AVAILABLE
- EXTENT OF HEXAVALENT CHROMIUM IN GROUND WATER AND EXTENT OF TOTAL CHROMIUM EXCEEDING NR 140 ENFORCEMENT STANDARDS DASHED WHEN INFERRED.
- SUMP BOUNDARY
- PROPERTY LINE
- 1011 BASEMENT SUMP SAMPLING LOCATION

Note : Listed concentrations are highest measured levels from 1994 and 1995 sampling events. Property boundary is approximate.



BETTER BRITE DePERE, WISCONSIN ESTIMATED EXTENT OF SHALLOW SOIL MIXING	DATE: 02/20/98
	DESIGNED: MCL
	CHECKED: BJK
	APPROVED: JLF
	DRAWN: MCL
	PROJ: 301483158

HYDRO-SEARCH INC
A Tetra Tech Company

Figure 6-5

Map from Aero-Metric Engineering, date of photography 11/17/91.