HRP Associates, Inc.
ENVIRONMENTAL/CIVIL ENGINEERING & HYDROGEOLOGY

September 26, 2001

Ms. Carolyn Casey
Environmental Engineer
Office of Site Remediation and Restoration
United States Environmental Protection
New England, Region I
1 Congress Street
Suite 1100 (HBT)
Boston, Massachusetts 02114-2023

RE: **SUBMISSION OF ENVIRONMENTAL INDICATOR DETERMINATIONS, MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL AND CURRENT HUMAN EXPOSURES UNDER CONTROL, FOR METAL FINISHING TECHNOLOGY, INC. FACILITY, 60 WOOSTER COURT, BRISTOL, CONNECTICUT (HRP #MET-0092.RA)**

Dear Ms. Casey:

HRP is please to submit, on behalf of Metal Finishing Technology, Inc., the Environmental Indicator (EI) Determination forms for Contaminated Groundwater Under Control and Current Human Exposures Under Control for the site referenced above. Pertinent ground water, surface water, soil, soil gas, and sediment data is attached in table format. HRP has determined that the facility has YE status in regards to both the control of contaminated groundwater and current human exposures.

Please do not hesitate to contact us at (860) 793-6899 with any comments or questions regarding this EI.

Sincerely,

HRP ASSOCIATES, INC.

Melody Bova
Senior Project Geologist

Daniel D. Titus
Project Manager

mb/mb
Enclosure (1)

cc: Mr. Robert Genereau, Metal Finishing Technology, Inc.

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DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:	Metal Finishing Technology, Inc. Facility
Facility Address:	60 Wooster Court, Bristol, CT 06010
Facility EPA ID #:	CTD001154558

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g. from Solid Waste Management Units (SWMU). Regulated Units (RU), and Areas of Concern (AOC), been considered in this EI determination?

   __X__ If yes – check here and continue with #2 below.

   _____ If no –re-evaluate existing data, or

   _____ If data are no available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA. The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration/Applicability of EI Determinations

EI determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Migration of Contaminated Groundwater Under Control
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(EPA inserts)

Question 2, Page 2
Rationale and References

1. The second paragraph should also note that turbidity for wells MW-18M and MW-19M was 12 and 25 NTU, respectively. Although elevated for these two wells, the turbidity was not that excessive as compare to wells MW-16S and MW-17M with turbidity of 120 and 350 NTU, respectively.

2. Regarding the fifth paragraph, subsequent sampling (April/May 2002) for dissolved cadmium showed an exceedance of the SWPC of 0.006 mg/l in MW-10B (0.009 mg/l), MW-12B (0.032 mg/l)and MW-16S (0.034 mg/l). Exceedances of the SWPC for (unfiltered/total) cadmium were noted in MW-16S (0.35 mg/l), MW-17S (0.006 mg/l) and MW-17M (0.025 mg/l). At MW-17S and MW-17M dissolved cadmium was not detected above the quantitation limit of 0.005 mg/l. All of the above listed wells are located on-site.

3. The seventh paragraph should be clarified by noting that only for the sampling that took place in October/November of 2000 were the hexavalent chromium results significantly higher than the total chromium results. There were many previous sampling rounds and a subsequent round where this was not a problem.

   Regarding the seventh paragraph, subsequent sampling (April/May 2002) for total unfiltered chromium samples did show exceedances of the SWPC of 0.11 mg/l in monitoring wells MW- 17M (0.34 mg/l) and MW-19-M (0.24 mg/l). Unfiltered hexavalent chromium was not detected above the quantitation limit of 0.05 mg/l. In the filtered samples for these same wells, no total or hexavalent chromium was detected above the quantitation limit of 0.05 mg/l. Turbidity was not measured in these samples; therefore, the elevated cadmium and chromium levels cannot be conclusively attributed to excessive turbidity at this time. Based on the monitoring well filed data sheets, it also appears that some wells were not allowed to reach equilibrium prior to sample collection.

   Low-flow purging and sampling is needed to reduce turbidity levels and eliminate the need for filtering samples.

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4. Regarding the last paragraph, well survey documentation has been inserted in the back of the document.

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2. Is groundwater known or reasonably suspected to be "contaminated"[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   _X_ If yes – continue after identifying key contaminants, citing appropriate "levels" and referencing supporting documentation.

   ____ If no – skip to #8 and enter "YE" status code, after citing appropriate "levels" and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

   ____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

A synoptic, low-flow ground water sampling event was conducted at Metal Finishing Technology, Inc. (MFT) in October/November 2000. In addition to five (5) newly installed overburden wells and six (6) newly installed bedrock wells, all existing ground water monitoring wells were sampled for constituents previously identified for semi-annual RCRA monitoring. On-site and off-site ground water monitoring well locations are depicted on the attached Figure 1. Exceedences of the CTDEP Remediation Standard Regulations (RSRs) Surface Water Protection Criteria (SWPC) were detected for turbidity, fluoride, cadmium, and cyanide. Additionally, pH was found to be outside of the SWPC (6.5-8.5) in multiple wells. Laboratory data from the synoptic sampling event is presented in the attached tables, as well as the 2000 Annual Ground Water Monitoring Report , issued February 27, 2001. Well construction details for previously existing and newly installed wells (MW-16S, MW-16M, MW-17S, MW-17M, MW-18S, MW-18M, MW-19S, MW-19M, MW-20S, MW-20M, and MW-21M) are provided in the attached Evaluation of Monitor Wells and Piezometers Table.

Despite the employment of low-flow sampling techniques, the turbidity of ground water samples collected from MW-10B (bedrock), MW-18M (bedrock). MW-19M(bedrock), MW-16S(overburden), MW-17M(bedrock), and MW-21M (bedrock) was found to exceed the SWPC (5 NTU). With the exception of MW-10B, these are all newly installed monitoring wells.

Flouride was detected at 2.5 mg/L, just above the SWPC (2 mg/L) in MW-12B. Cadmium exceeded the SWPC (6 ug/L) in MW-2, MW-12B, and MW-16S. These are located in the vicinity of the equalization tanks and down-gradient of the former SWMUs.

pH was detected at levels just below the SWPC in MW-1S, MW-7, MW-9B, MW-18S, MW-19S, MW-20, MW-6S, and MW-6B. pH was detected at levels just above SWPC in MW-14, MW-16S, and MW-17M. pH values in monitoring wells were found to range from 5.8 – 9.3.

Cadmium exceeded SWPC (6 ppb) in MW-2 (19.8 ppb), MW-12B (55.7 ppb, 54.6 ppb), and MW-16S (297 ppb). MW-16S also had a high turbidity (120 NTU), which may at least partially account for the elevated cadmium levels. MW-2 and MW-16S are overburden wells. MW-12B is a shallow bedrock well. These three wells are located in the vicinity of the equalization tanks and down-gradient of the former SWMUs.

Cyanide exceeded the SWPC (52 ppb) in MW-6M (73.2 ppb), MW-20S (80.1 ppb), MW-6B (64.4), and MW-17M (79.8 ppb). These wells are located southeast of the facility building. With the exception of MW-17M, they are overburden wells.

Hexavalent chromium results, although reported at or above the SWPC in several wells, are not believed to be accurate. In multiple samples, the hexavalent chromium results were reported to be moderately to significantly higher than the total chromium results. The hexavalent chromium analytical method is sensitive to interference from the presence of other metals, including the presence of iron > 1000 ppb. The samples having the highest hexavalent chromium numbers reported also had elevated iron concentrations (e.g. MW-17M was reported to have 9320 ppb of total Fe, 107 ppb of total Cr, and 500 ppb hexavalent Cr). Total chromium values were compared to the SWPC. No exceedences of the SWPC were found.

It should be noted that the facility exists in a ground water use area designated as GB (i.e. not intended for consumption). In addition, a receptor survey has revealed that all properties within 0.5 miles of the site are connected to the municipal water supply system. No consumption of contaminated ground water at, or in the vicinity of, this site can reasonably be expected.

Footnotes:

[1]"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

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(EPA inserts)

Question 3, Page 4

Rationale and References

1. Low-flow purging and sampling is needed to reduce turbidity levels and eliminate the need for filtering samples. Unfiltered samples collected using low-flow procedures will more accurately indicate the concentrations of the dissolved/mobile portion of the metals. This is of particularly importance for cadmium and chromium that will likely only exceed relevant criteria when sampling is conducted using a more aggressive method such as a bailer. Subsequent sampling using low-stress/flow purging and sampling procedures is needed to maintain a "YE" designation for this GWRC EI.

2. Paragraph 1: Groundwater contour maps for October/November 2000 are inserted behind Figure 1.

   This paragraph states that concentrations of "**total** cadmium" have remained consistent or decreased, but all samples were filtered except when low-flow sampling was conducted in October 2000.

3. Paragraph 3: The paragraph should start off with "Filtered/dissolved total and hexavalent chromium concentrations...." since generally all samples except for the October 2000 event were filtered.

cjc 8/27/02

3. Has the **migration** of contaminated ground water stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

X If yes – continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of ground water contamination"[2]).

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2] – skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Ground water flow direction, as confirmed during quarterly and semi-annual measurement events conducted over the past thirteen (13) years, is to the southeast, away from residential areas. Contaminant trend graphs are attached to the 2000 Annual Ground Water Monitoring Report, issued February 2001.

No clear cadmium or chromium (total or hexavalent) plumes appear to be present despite the addition of eleven (11) new monitoring wells (31 wells and 5 piezometers on and adjacent down-gradient to the site). Concentrations of total cadmium down-gradient from the former SWMUs and current equalization tanks have remained consistent or decreased since 1995, suggesting a historical release. During the 2000 synoptic ground water sampling event, cadmium concentrations in the shallow overburden aquifer were found to be the highest at MW-16S. Cadmium concentrations in shallow ground water appear to attenuate with distance and are significantly lower in all directions from MW-16S. This is consistent with a historical release from the SWMUs. Cadmium was found to be below SWPC in down-gradient off-site wells.

Total and hexavalent chromium concentrations, excluding the anomalous October/November 2000 hexavalent chromium data previously noted as inaccurate, have remained relatively constant since 1990, after decreasing relative to 1988 concentrations. No exceedences of SWPC for hexavalent chromium were detected in on or off-site ground water monitoring wells. The highest concentrations of chromium were detected in bedrock wells down-gradient of the closed SWMUs, most notably in MW-18M and MW-17M. Given the steep slope of the bedrock surface (discussed below), it is highly unlikely that chromium contaminated ground water in the bedrock aquifer is discharging to the nearest receptor, the Pequabuck River. Surface water samples from the Pequabuck River were not found to contain hexavalent or total chromium concentrations in excess of applicable numeric standards.

Ground water quality results from the 2000 synoptic sampling event indicate that total cyanide is present in both the overburden and bedrock aquifer. Concentrations in the bedrock aquifer are highest in the vicinity of MW-17, located south of the facility building and down-gradient of the former SWMUs. Total cyanide concentrations attenuate in all directions, suggesting a historical release/slug of residual contamination eminating from the SWMUs. This is consistent with semi-annual sampling data from 1991-1994 indicated increased total cyanide concentrations which have since decreased again (2000 Annual Ground Water Monitoring Report). Down-gradient, off-site bedrock wells (MW-18M and MW-19M) are below SWPC for total cyanide. Additionally, the bedrock slopes steeply to the east/southeast, such that bedrock ground water contamination is highly unlikely to discharge to the down-gradient Pequabuck River (see attached Evaluation of Monitor Wells and Peizometers Table). In the rear of the facility, by the closed SWMUs and MW-21M, bedrock was encountered as approximately 9 feet below grade. In the front of the facility, bedrock was encountered at 50 feet below grade at MW-20M, 71 feet below grade at MW-19M, and 78 feet below grade at MW-18M.

The highest concentrations of total cyanide in the shallow overburden aquifer were detected in MW-20S, MW-6M, and MW-15, respectively. This heterogeneous geographic contaminant distribution indicates that the source of the total cyanide is a historical release from the former SWMUs. Cyanide was not detected in down-gradient, off-site, wells MW-19S and MW-18S, which are located approximately 135-190 feet down-gradient from MW-20S and 180-210 feet down-gradient of the SWMUs. Total cyanide was also not detected in the surface water samples collected from the Pequabuck River (AOC1-SW1, AOC1-SW2, AOC1-SW3, AOC1-SWD), located 1000 feet down-gradient of the SWMUs.

The sum total of the available data, including 13 years of RCRA monitoring, indicates that detected contamination on-site has been decreasing over time. In addition, the heterogeneous distribution of the contaminants suggests a discontinued, historical source (e.g. SWMUs). As such, contamination should continue to attenuate and preclude significant offsite migration.

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA 750)
(EPA inserts)

Question 4, Page 6

Rationale and References

4. Even if contaminated groundwater ultimately discharges to the Pequabuck River downstream of the site, question 4 would be answered "Yes" and question 5 would also be answered "Yes" since, with a few exceptions, there were no exceedances of the SWPC (generally 10 times the CTDEP Water Quality Criteria) in the most downgradient wells. The exceptions occurred with the latest sampling event where bailers were used to collect samples that were analyzed for both total and dissolved metals. As previous sampling has indicated, samples were likely turbid. Turbidity measurements were not made, but filtered sample concentrations were below the SWPC. The results of this sampling (conducted April/May 2002) are inserted behind the groundwater summary tables. The complete data set can be found in the June 14, 2002 Semi-Annual Groundwater Monitoring Report in the Facility file.

   Groundwater monitoring wells MW-18S, MW-18M, MW-19S, MW-19M, MW-20S and MW-20M will be sampled on a semi-annual basis using low-flow/purging sampling procedures. Turbidity measurements will be made to verify that it is the likely cause of the elevated cadmium and chromium concentrations. Sampling is expected to take place at the same time the semi-annual RCRA Groundwater Monitoring occurs. Groundwater elevations will be collected at all wells that are sampled and groundwater contour maps contained in the semi-annual Groundwater Monitoring Reports will be prepared using all groundwater elevation data. Groundwater monitoring data for all wells (including those that are being sampled using low-flow sampling procedures) will be submitted in the semi-annual reports. Summary tables will clearly identify sampling methods used to collect the data (e.g., bailer or low flow, filtered sample or not).

cjc 8/27/02

4. Does "contaminated" groundwater discharge into surface water bodies?

____ If yes – continue after identifying potentially affected surface water bodies.

_X_ If no – skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Ground water in the site vicinity may eventually discharge to the down-gradient Pequabuck River. However, there is no indication that any contamination originating at MFT discharges to the river. Although exceedences of the SWPC were detected in site ground water, no exceedences of appropriate Surface Water Standards were detected in actual surface water samples collected from the river, which is 500 feet from the nearest down-gradient wells. Any potentially migrating ground water contamination appears to attenuate prior to reaching the river.

As a technical matter, the CT DEP RSR defers to the CT DEP Water Quality Standards, Appendix D (Numerical Water Quality Criteria for Chemical Constituents) for the numerical criteria for surface water bodies (Surface Water Standards effective May 15, 1992). No exceedences of Numerical Water Quality Criteria for Chemical Constituents (MWQC) were detected in four (4) surface water samples collected from the Pequabuck River (AOC1-SW1, AOC1-SWD (duplicate of AOC1-SW1), AOC1-SW-2, and AOC1-SW-3). Surface water samples collected at the storm water/swale outfall (AOC5-SW1) and storm water catch basin (AOC5-SW2) were found to exceed the arsenic standards for human consumption, as published in the CTDEP MWQC. There is no known arsenic source identified at MFT and arsenic has not been a historical constituent of concern at the site. The arsenic more likely eminates from one of the other industrial operations in the immediate vicinity of MFT. No other exceedences were identified. Surface water quality data is presented in attached tables.

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level" and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

____ If yes – skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no – (the discharge of "contaminated" groundwater into surface water is potentially significant) – continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown – enter "IN" status code in #8.

Rationale and Reference(s): ____________________

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impact to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

____ If yes – continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater, OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

____ If no – (the discharge of "contaminated" groundwater cannot be shown to be "currently acceptable") –skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

____ If unknown – skip to 8 and enter "IN" status code.

Rationale and Reference(s): ____

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA 750)
(EPA inserts)

Question 7, Page 9

Rationale and References

Semi annual groundwater monitoring will take place in April and October for the parameters/constituents of concern listed by MFTI/HRP with the exception of the following (justification for deleting the following from the parameter list is also included):

- *barium* - never detected above the MCL or the CTDEP Remediation Standard Regulation (RSR) GA/GAA Groundwater Protection Criteria (GWPC;
- *chloride* - never detected above the National Secondary Drinking Water Standard (NSDWS) and generally an order of magnitude below with the exception of one event in one well (detected below the NSDWS - turbidity is not at issue) and three exceptions in one well (detected at less than one-half of the NSDWS - turbidity ranges from 149 - 161 ntu);
- *copper* - never detected above the CTDEP RSR Surface Water Protection Criteria (SWPC) with the exception of one event in one well (less than 2 times the SWPC - turbidity of 850 ntu) and one event in one well (just over a factor of two times the SWPC- turbidity of 125 ntu);
- *lead* - detected rarely and inconsistently, never at levels greater than two times the SWPC;
- *tin* - has never been detected above the EPA Region 9 Preliminary Remediation Goal (PRG) for tap water;
- *TOC and TOX*- groundwater quality indicator parameters that are not necessary for determination of the EIs
- *phenols* - detected infrequently at levels at one to two orders of magnitude less than the CTDEP RSR GA/GAA GWPC;
- *silver* - has rarely been detected above the quantitation limit (quantitation limit has nearly always been below the MCL);
- *sulfate* - never detected above the NSDWS and generally an order of magnitude below it, with the exception of one event (detected at less than one-half of the NSDWS - turbidity > 400 ntu)
- *volatile organics* - 1,1,1-TCA and 1,1-DCA (a reductive dechlorination product of 1,1,1-TCA) detected for brief periods, not more than 5 years in a row, in approximately half of the wells on site (MW-2, MW-3, MW-3B, MW-4, MW-5, MW-5B, MW-6B, MW-6D, MW-6M, MW-6S, MW-7, MW-8, MW-12B, MW-15, and MW-15B) and never in excess of the SWPC, GA/GAA GWPC or the Industrial or Residential Volatilization Criteria. Levels of 1,1,1-TCA have always been an order of magnitude less than the GA/GAA GWPC and more typically two orders of magnitude less. Except for one event in one well, levels of 1,1,-DCA have always been an order of magnitude less than the GA/GAA GWPC.

Notes: (1) Generally 14 years of data was used to screen out the above criteria from the sampling parameter list.
(2) The lowest of the available human health or ecological screening criteria was used in this screening process. This area is classified as GB; groundwater is not suitable for direct consumption without treatment.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

X If yes – continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

____ If no – enter "NO" status code in #8.

____ If unknown – enter "IN" status code in #8.

Rationale and Reference(s):

Semi-annual ground water monitoring will continue in association with the closed SWMUs until such time as the EPA deems a reduction in sampling frequency appropriate. Shallow overburden wells and bedrock wells will continue to be monitored for pH, specific conductivity, aluminum, barium, cadmium, chloride, chromium (total), copper, cyanide, fluoride, dissolved iron, lead, manganese (dissolved), nickel, phenols, silver, sodium, sulfate, tin, turbidity, zinc, total organic carbon, total organic halogens, and volatile organic compounds.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_X_ YE – Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Metal Finishing Technology, Inc. facility, EPA ID # CTD001154558, located at 60 Wooster Court, Bristol, Connecticut 06010. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

___ NO – Unacceptable migration of contaminated groundwater is observed or expected.

___ IN – More information is needed to make a determination.

Completed by (signature) Melody Bova Date 9/26/01
(print) Melody Bova
(title) Senior Project Geologist

Supervisor (signature) [signature] Date 9/26/01
(print) Daniel D. Titus
(title) Project Manager
(EPA Region or State)

Carolyn J. Casey
CAROLYN J. CASEY
RCRA FACILITY MGR
8/27/02

Matthew R. Hoagland
Matthew R. Hoagland
Section Chief
EPA - Reg. I
9/4/02

Locations where References may be found:

Attached Ground Water Analytical Results Tables, Surface Water Analytical Results Tables, Figure 1, and Figure AOC #1 (Sediment and Surface Water Sampling Locations)

2000 Annual Ground Water Monitoring Report, issued February 2001.

Contact telephone and e-mail numbers

(name) Daniel D. Titus
(phone #) (860) 793-6899
(e-mail) dan.titus@hrpassociates.com

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Metal Finishing Technology, Inc. Facility
Facility Address: 60 Wooster Court, Bristol , CT 06856
Facility EPA ID #: CTD001154558

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g. from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC), been considered in this EI determination?

   _X__ If yes – check here and continue with #2 below.

   ____ If no –re-evaluate existing data, or

   ____ If data are no available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA. The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration/Applicability of EI Determinations

EI determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated" above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X			pH, turbidity, Cd, CN exceed SWPC
Air (indoors)[2]		X		No exceedences of Res VC or IC VC
Surface Soil (e.g., <2 ft)	X			benzene, cadmium
Surface Water	X			As, dissolved
Sediment	X			Pb and TPH exceeded IC DEC
Subsurf. Soil (e.g., >2 ft)	X			Cd, Ni, Pb (one-sample), Cr see rationale /references
Air (outdoors)		X		

____ If no (for all media) – skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

_X_ If yes (for any media) – continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

____ If unknown (for any media) skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Ground Water: The only RSR standard for GB area water is Surface Water Protection Criteria (SWPC), which is generally designed more as an ecological standard than as a human health standard. The CT DEP RSR Ground Water Protection Criteria (GWPC) does not apply in GB areas that are supplied with public water, such as the site and surrounding area. Exceedences of the CTDEP Surface Water Protection Criteria (SWPC) were detected for pH, turbidity, cadmium, and cyanide. However, there are no known receptors of ground water in the site vicinity, which has been verified by the conduct of a receptor survey within 0.5 miles of the site. In addition, contaminated ground water does not discharge to the nearest surface water body (see appropriate section for discussion). Ground water laboratory results are presented in the attached tables.

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

2. (continued) Rationale and Reference(s):

Air (indoors): An indoor soil gas survey was conducted at the facility in January 2000 (results attached). Trace levels of tetrachloroethylene and ethyl benzene were detected in three (3) of thirty-one (31) sampling points. No exceedences of CT DEP Residential Volatilization Criteria (Res VC) or Industrial/Commercial Volatilization Criteria (IC VC) were detected.

Surface Soil: No exceedences of the CTDEP Residential Direct Exposure Criteria (Res DEC) or Industrial/ Commercial Direct Exposure Criteria (IC DEC) were detected for any volatile substance. Cadmium was detected at levels above the Res DEC, but below the IC DEC in three (3) samples. The site is strictly industrial and the exceedences occur under site asphalt or in areas where access is restricted by fencing. Benzene exceeded the CT DEP Pollutant Mobility Criteria for soil in a GB Ground Water area (GB PMC) in one surficial soil sample. Soil sampling results are presented in Soil Sample Laboratory Analysis tables, attached.

Surface Water: The CT DEP RSR defers to the CT DEP Water Quality Standards, Appendix D (Numerical Water Quality Criteria for Chemical Constituents) for the numerical criteria for surface water bodies (Surface Water Standards effective May 15, 1992). No exceedences of Numerical Water Quality Criteria for Chemical Constituents (MWQC) were detected in four (4) surface water samples collected from the Pequabuck River (AOC1-SW1, AOC1-SWD (duplicate of AOC1-SW1), AOC1-SW-2, and AOC1-SW-3). Surface water samples collected at the storm water/swale outfall (AOC5-SW1) and storm water catch basin (AOC5-SW2) were found to exceed the arsenic standards for human consumption, as published in the CTDEP MWQC. There is no known arsenic source identified at MFT and arsenic has not been a historical constituent of concern. It is more likely that the arsenic emanates from one of the other industrial concerns in the immediate area. No other exceedences were identified. Surface water quality data is presented in attached tables.

Sediment: No exceedences of the GB PMC, Res DEC, or IC DEC were detected in the sediment samples collected from the bottom of the down-gradient Pequabuck River. Five (5) additional sediment samples were collected from the former drainage swale. Benzo(b)flourantehene barely exceeded the Res DEC and GB PMC in one sample (AOC5-SD1). Chrysene also barely exceeded the GB PMC in AOC5-SD1, but did not exceed either human exposure criterion (Res DEC or IC DEC). Cadmium, Zinc, and Ni were detected at levels that exceeded the Res DEC, but not the IC DEC. Both the Res DEC and IC DEC were exceeded for TPH (AOC5-SD3 only) and lead (AOC5-SD5 only).

Subsurface Soil: Cadmium and nickel were detected at levels exceeding the Res DEC, but not the IC DEC in multiple samples collected between 2-10 feet below grade. The IC DEC for cadmium was exceeded in only two (2) soil samples, collected from between 5-7.5 feet below grade. The Res DEC and IC DEC for lead were only exceeded in one sample, collected from 6.75 feet below grade. Not all soil samples were analyzed for hexavalent chromium. However, total chromium was found to exceed both Res DEC and IC DEC in samples collected from between 2-8 feet below grade. Since chromium, cadmium and lead are not volatile, potential exposure to these soils would be extremely limited and would only occur if the site was under construction.

Air (outdoors): An outdoor soil gas survey was conducted in October 1999. Trace levels of toluene, xylenes, tetrachloroethylene, and chlorobenzene were detected. However, no exceedences of Res VC or IC VC were detected. Soil gas sampling data is presented in the attached tables and figures.

3. Are there complete pathways between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Ground water	No	No	No	Yes			No
~~Air (indoors)~~	No	No	No				
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	No*	No	No
Surface Water	No	Yes			Yes	No	No
Sediment	No	Yes			Yes	No	No
Soil (subsurface e.g., >2 ft)				Yes			No
~~Air (outdoors)~~	No	No	No	No	No		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors[3] spaces for Media which are not "contaminated") as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media – Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media – Human Receptor combinations (Pathways) do not have check spaces ("   "). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination) skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

__X__ If yes (pathways are complete for any "Contaminated" Media – Human Receptor combination) – continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media – Human Receptor combination) – skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Soil (surface): *No IC DEC exceedences were detected in surface soils. Res DEC exceedences were detected in surface soils. However, the area of the samples exceeding the Res DEC is in an industrial setting that is fenced and locked. Exposure to these soils is extremely limited and is restricted to incidental occupation exposure of site employees.

[3]Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

3. (continued) Rationale and Reference(s):

Surface Water: No exceedences of applicable surface water standards were detected in actual samples collected from the down-gradient Pequabuck River. Surface water samples collected at the storm water/swale outfall (AOC5-SW1) and storm water catch basin (AOC5-SW2) were found to exceed the arsenic standards for human consumption, as published in the CTDEP MWQC. However, there is no known arsenic source identified at MFT and arsenic has not been a historical constituent of concern.

Ground Water/Subsurface Soils: Exposure to ground water and/or subsurface soils (>2 feet below grade) is extremely limited, and would occur only during future construction/maintenance projects. As previously noted, the area is not residential and surrounding properties are supplied with potable water by the City of Bristol.

Sediment: The drainage swale where exceedences of Res DEC and IC DEC is industrial property. Only two (2) exceedences of IC DEC were detected, for TPH and lead. Due to their location under heavy brush and within the drainage swale, the sediments in these samples are an unlikely source of exposure except in cases of construction or maintenance projects. Such exposures are likely to be for very short durations, not the ongoing residential and workplace exposures considered during the development of the RSR Res DEC and IC DEC.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

X If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) – skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) – continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

____ If unknown (for any complete pathway) – skip to #6 and enter "IN" status code.

Rationale and Reference(s):
No exposures are expected to be "significant".

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5. Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

__X__ If yes (all "significant" exposures have been shown to be within acceptable limits) – continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable") – continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) – continue and enter "IN" status code.

Rationale and Reference(s):

No "significant" exposure can be reasonably anticipated on this site given its commercial/industrial use, restricted access, and comparatively low contaminant concentrations.

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI (event code CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

 X YE – Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Metal Finishing Technology, Inc. facility, EPA ID # CTD001154558, located at 60 Wooster Court, Bristol, Connecticut 06010 under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO – "Current Human Exposures" are NOT "Under Control."

____ IN – More information is needed to make a determination.

Completed by (signature) Melody Bova Date 9/26/01
(print) Melody Bova
(title) Senior Project Engineer

Supervisor (signature) Date 9/26/01
(print) Daniel D. Titus
(title) Project Manager
(EPA Region or State)

Carolyn J. Casey 4/9/02
CAROLYN J. CASEY
RCRA FACILITY MANAGER

Matthew R. Hoagland
Section Chief
EPA Reg. I
5/24/02

Locations where References may be found:

Attached Ground Water, Surface Water, Soil, and Sediment Analytical Results Tables, Soil Gas Survey Results Tables, Evaluation of Facility Monitor Wells and Piezometers, Figure 1 (Site Plan and Sampling Locations) and AOC Figures.

2000 Annual Ground Water Monitoring Report, issued February 2001.

Contact telephone and e-mail numbers

(name) Daniel D. Titus
(phone #) (860) 793-6899
(e-mail) dan.titus@hrpassociates.com

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMIANTIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

US EPA New England
RCRA Document Management System (RDMS)
Image Target Sheet

RDMS Document ID# 1004

Facility Name: Metal Finishing Technologies

Phase Classification: R-13

Document Title: Environmental Indicator (EI) Determination, Current Human Exposures Under Control (CA725YE) and Migration of Contaminated Groundwater Under Control (CA750YE) - Metal Finishing Technologies

Date of Document: 09-04-2002

Document Type: EI Determination

Purpose of Target Sheet:

[x] **Oversized** [ ] **Privileged**

[ ] **Page(s) Missing** [ ] **Other** (Please Provide Purpose Below)

Comments: Figure 1: Site Plan and Sampling Location

*** Please Contact the EPA New England RCRA Records Center to View This Document ***

LEGEND

-GROUND WATER FLOW DIRECTION

-GROUND WATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (DASHED WHERE INFERRED)

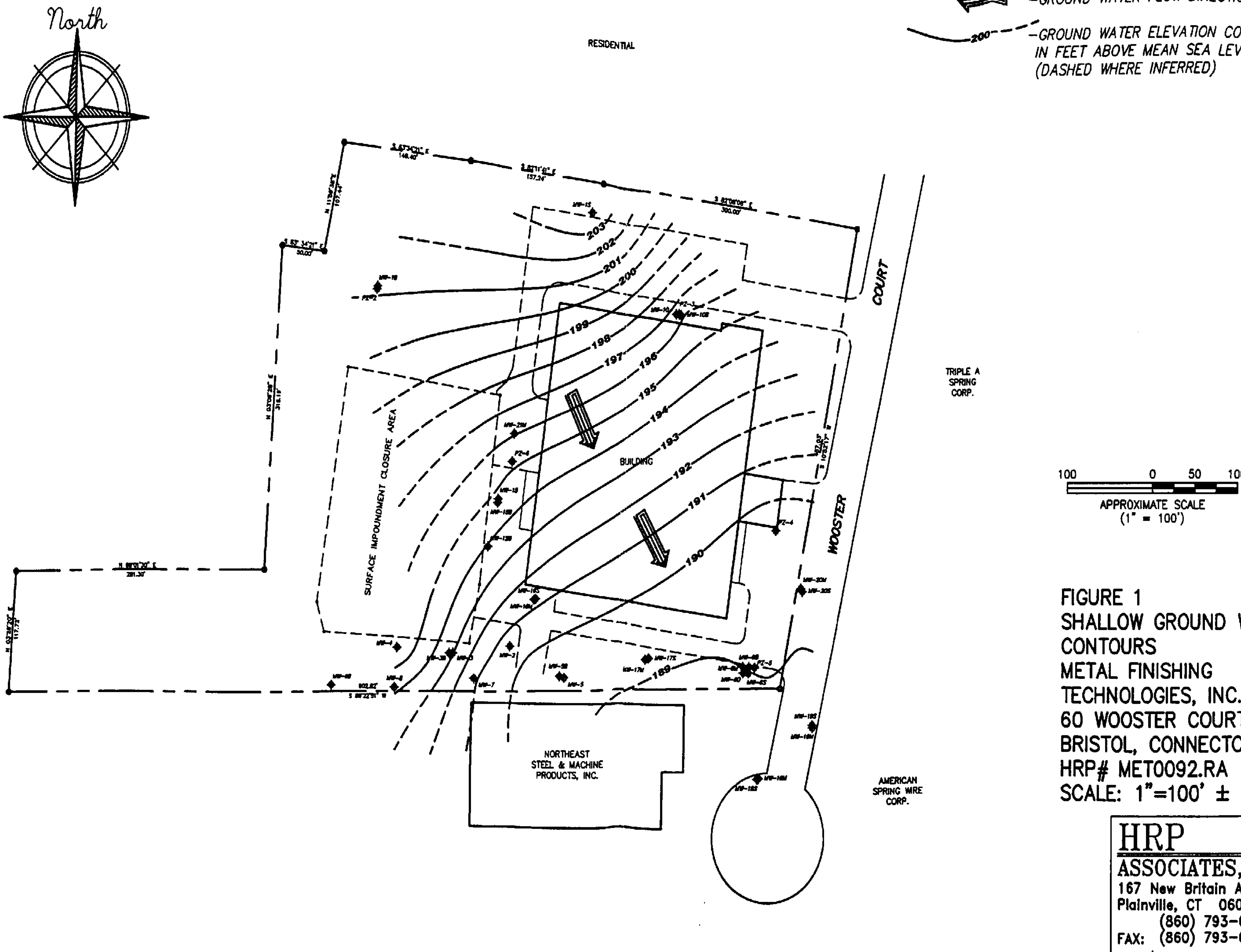

FIGURE 1
SHALLOW GROUND WATER CONTOURS
METAL FINISHING TECHNOLOGIES, INC.
60 WOOSTER COURT
BRISTOL, CONNECTCIUT
HRP# MET0092.RA
SCALE: 1"=100' ±

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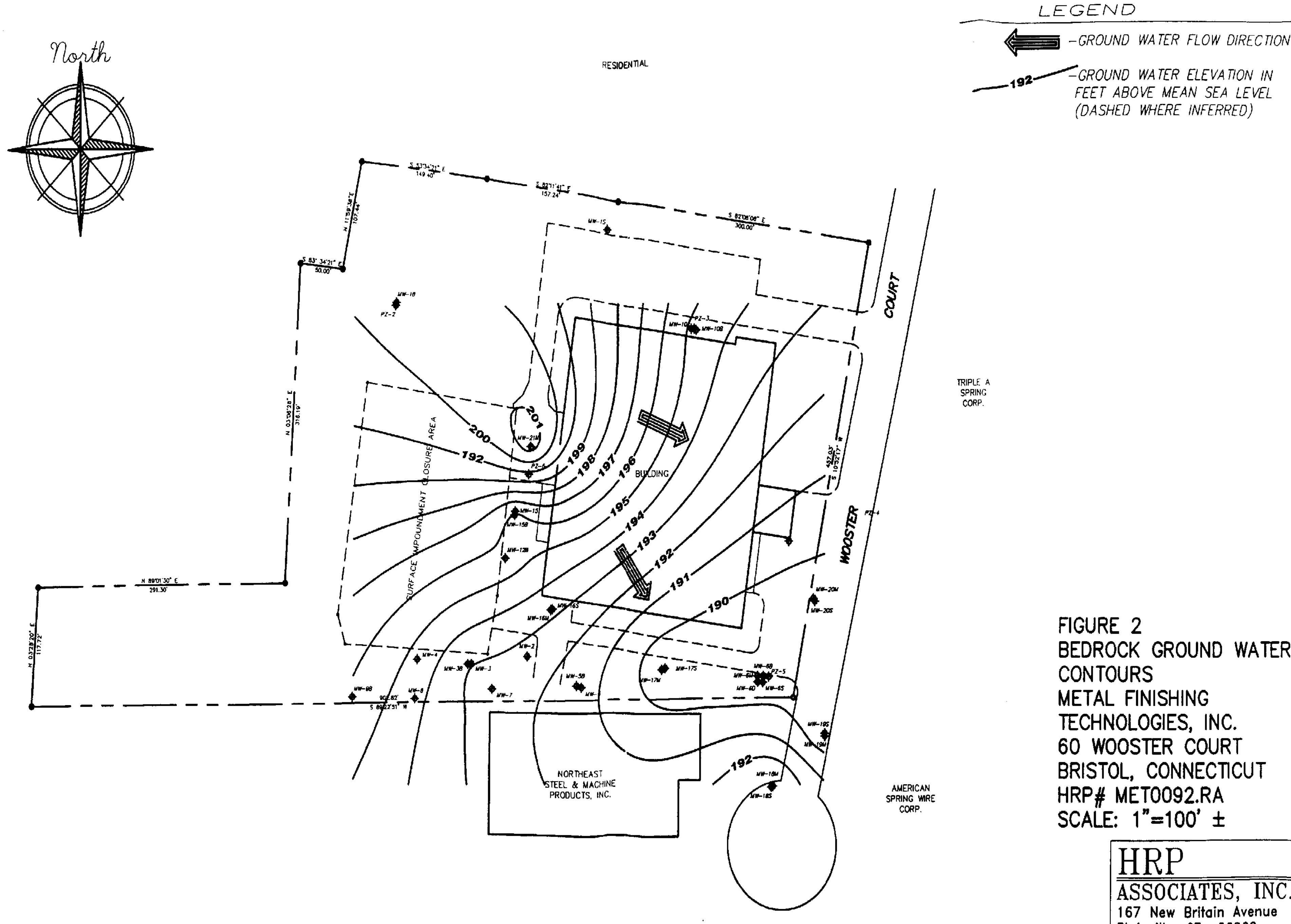

FIGURE 2
BEDROCK GROUND WATER CONTOURS
METAL FINISHING TECHNOLOGIES, INC.
60 WOOSTER COURT
BRISTOL, CONNECTICUT
HRP# MET0092.RA
SCALE: 1"=100' ±

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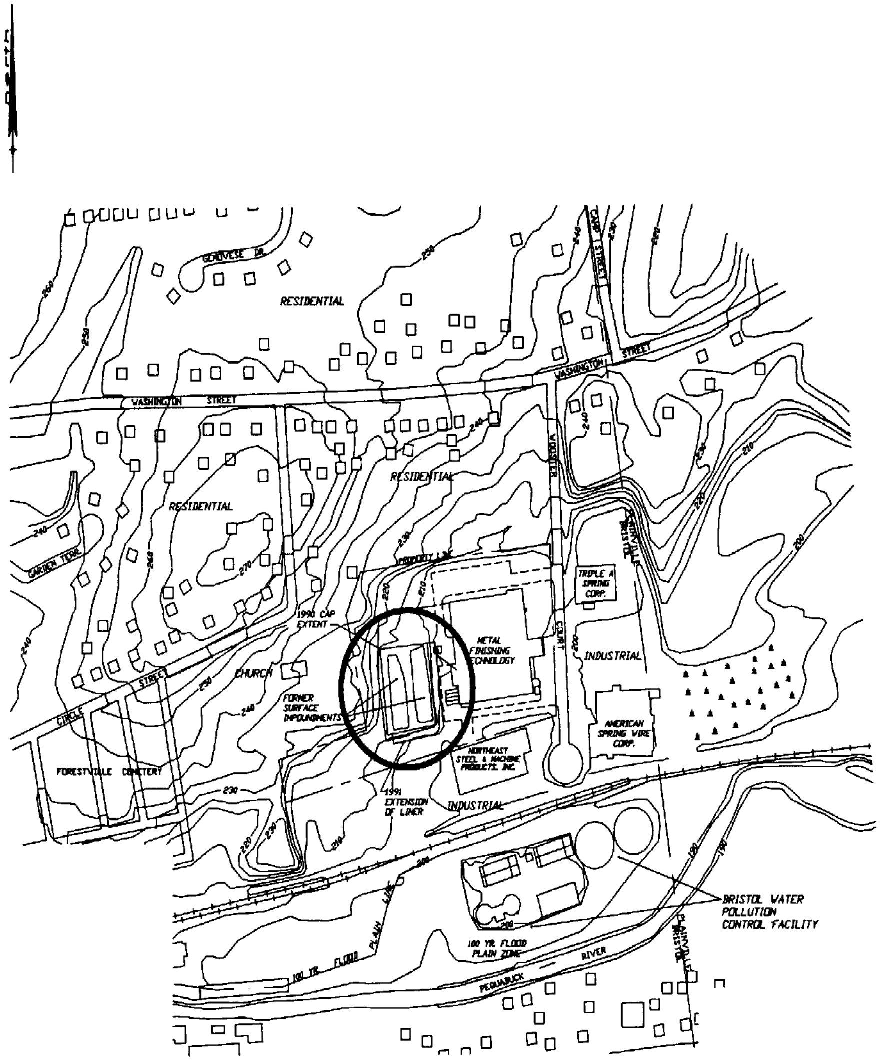
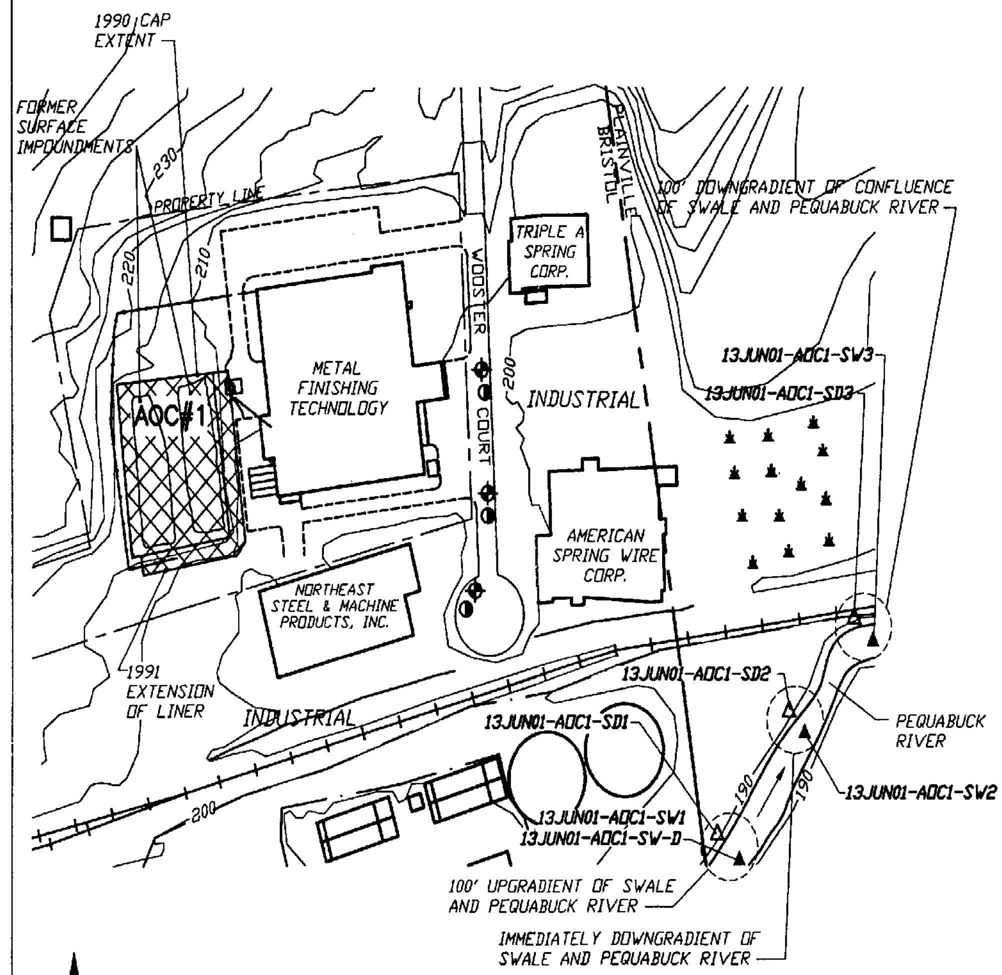


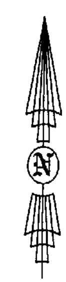
THIS MAP WAS DEVELOPED FROM THE FOLLOWING SOURCES:

1. "TOPOGRAPHIC SURVEY OF TOWN OF PLAINVILLE, HARTFORD CO., CONN.", BY ADR ASSOCIATES, INC., SCALE 1"=100', MARCH, 1974.
2. "TOPOGRAPHIC MAP OF THE CITY OF BRISTOL, CONNECTICUT", BY CAHN, INC., SCALE 1"=100', DECEMBER 16, 1983.

400 0 200 400

APPROXIMATE SCALE
(1" = 400')





LEGEND

- OVERBURDEN WELL
- BEDROCK WELL
- ▲ SURFACE WATER SAMPLE
- △ SEDIMENT SAMPLE
- AOC AREA

200 0 100 200

APPROXIMATE SCALE
(1" = 200')

FIGURE AOC #1
FORMER SURFACE IMPOUNDMENTS
SAMPLE LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
BRISTOL, CT.
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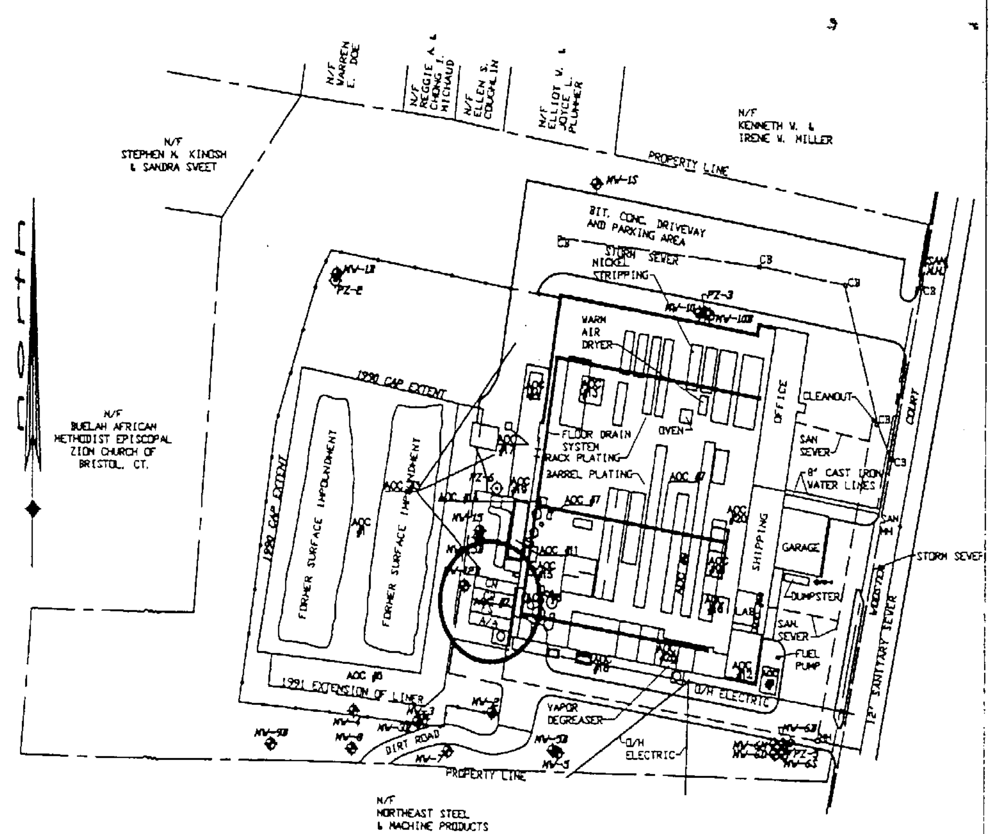


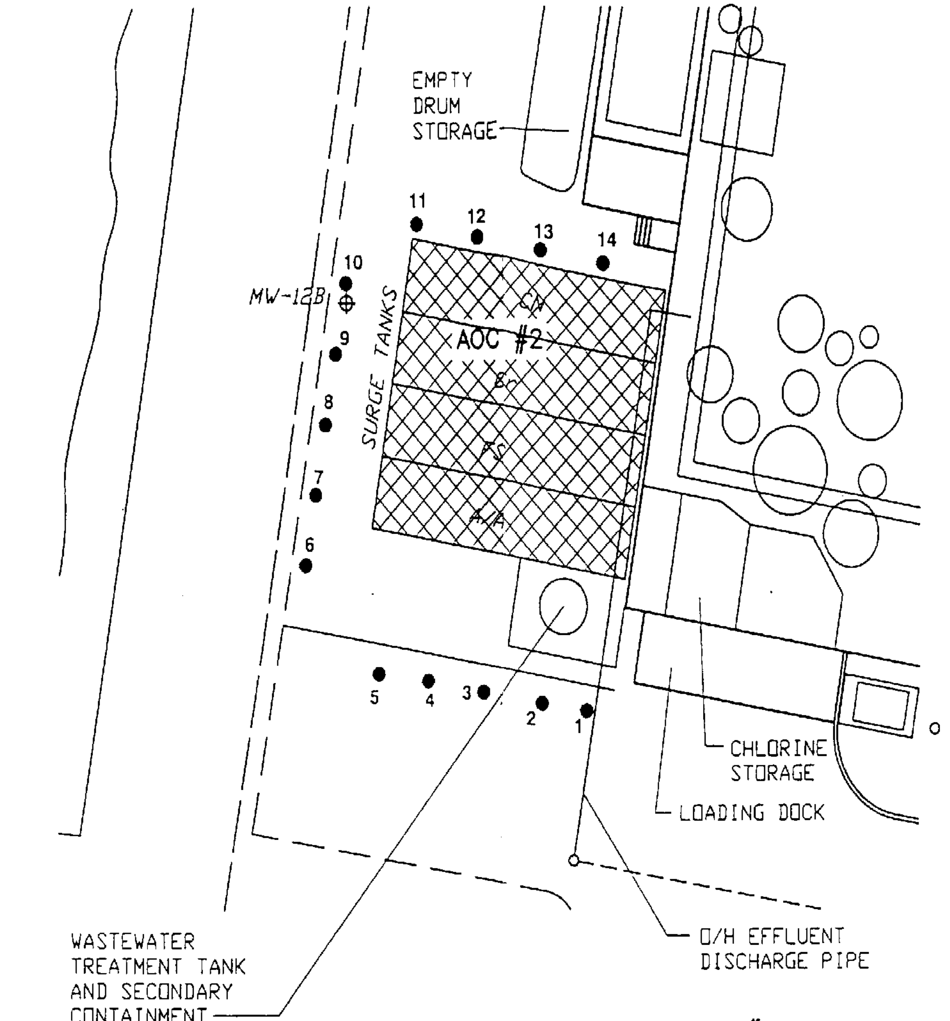
THIS MAP WAS DEVELOPED FROM A MAP ENTITLED "GROUND WATER CONTOUR MAP, STANLEY PLATING COMPANY, FORESTVILLE, CONNECTICUT" BY FUSS AND O'NEILL, NOVEMBER, 1988.

120 0 60 120

1' = 120'

LEGEND

- MW-13 GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MH MANHOLE
- CB CATCH BASIN
- PROPERTY LINE



LEGEND

- EXISTING OVERBURDEN MONITOR WELL
- EXISTING SOIL GAS POINT
- AOC AREA

20 0 5 10 15 20

APPROXIMATE SCALE
(1' = 20')

FIGURE AOC #2
EQUALIZATION TANKS
SOIL GAS SAMPLING LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
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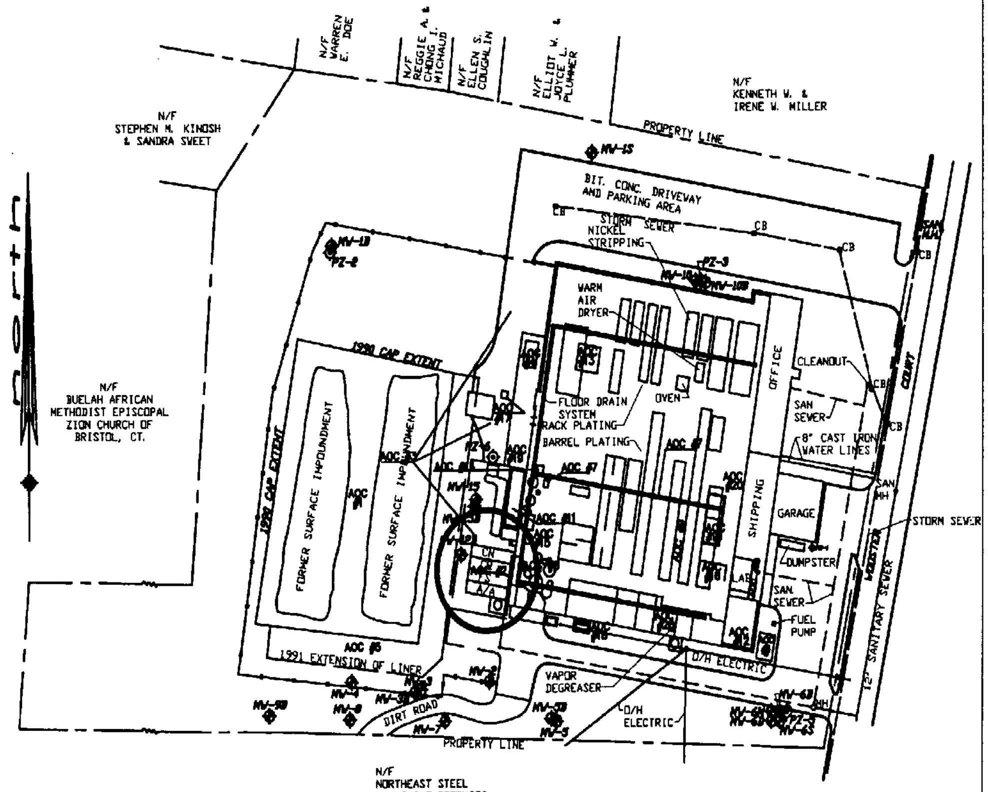

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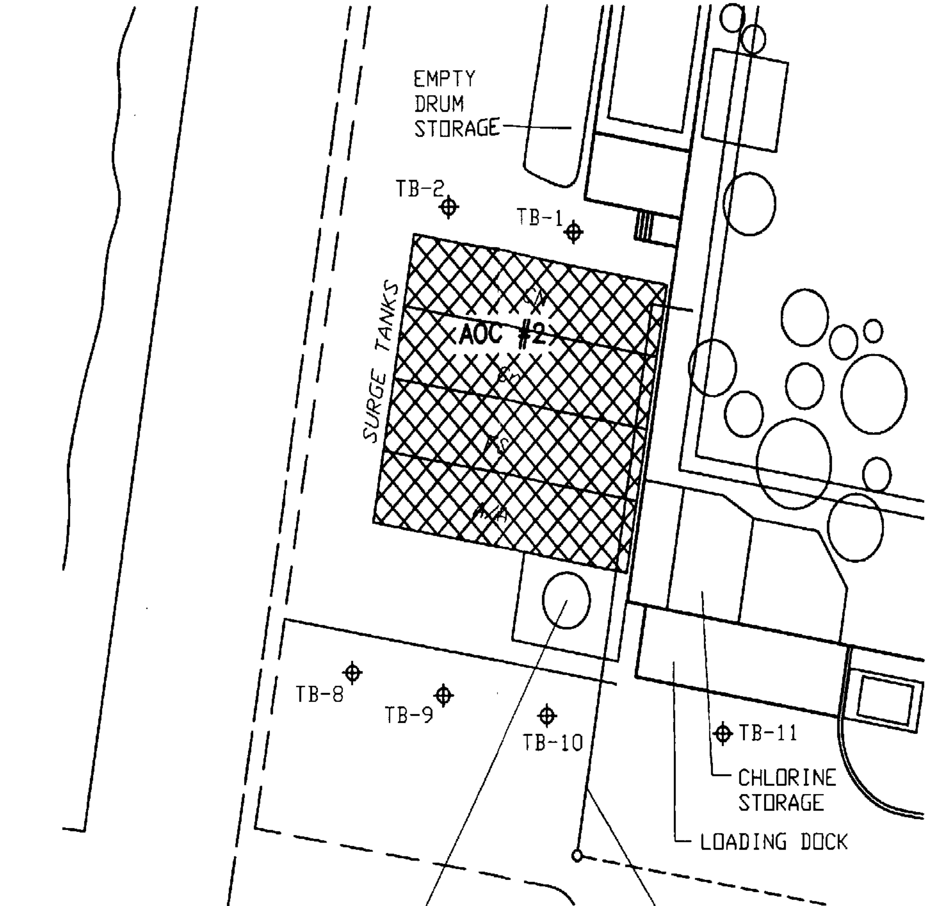
120 0 60 120

1' = 120'

LEGEND

- MW-1D GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MH MANHOLE
- CB CATCH BASIN
- PROPERTY LINE



LEGEND

- TEST BORING
- AOC AREA

20 0 5 10 15 20

APPROXIMATE SCALE
(1' = 20')

FIGURE AOC #2
EQUALIZATION TANKS
TEST BORING LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
BRISTOL, CT.
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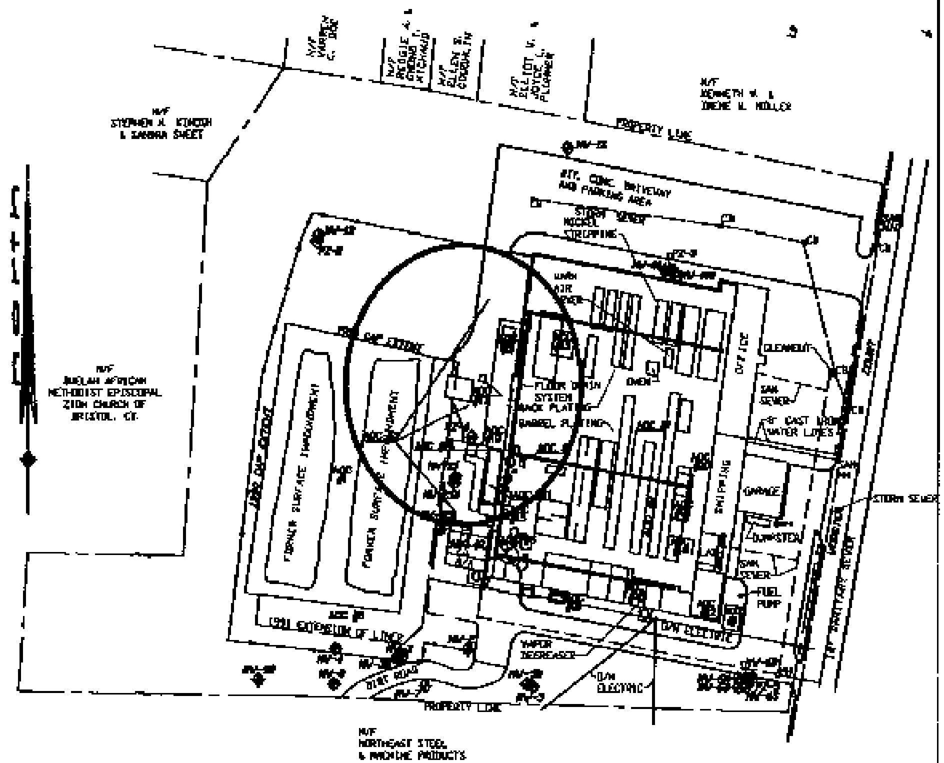
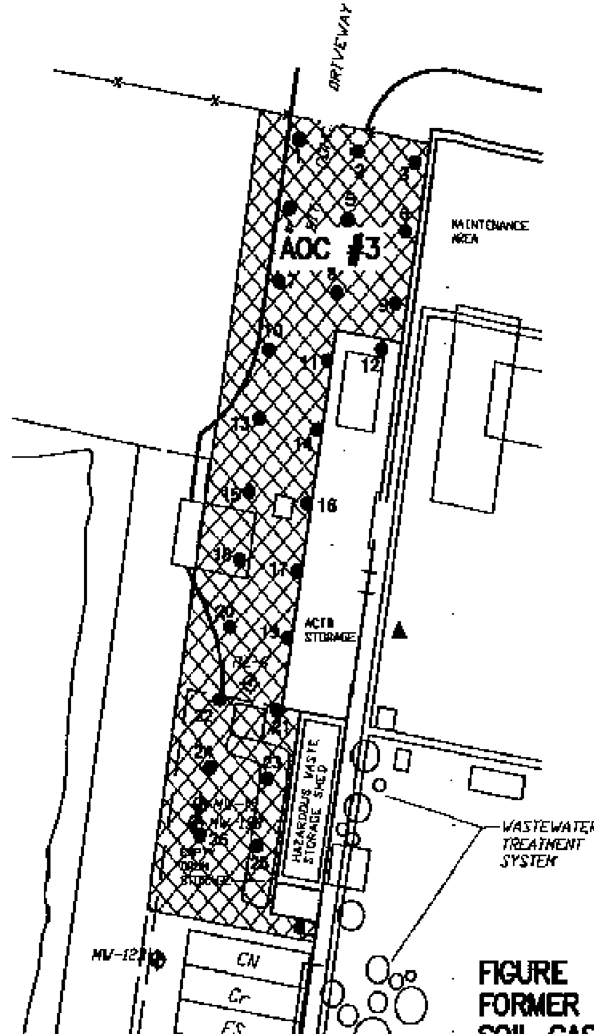


LEGEND

- MW-12 GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MANHOLE
- CATCH BASIN
- PROPERTY LINE



40 0 10 20 30 40
APPROXIMATE SCALE
(1" = 40')

LEGEND

- EXISTING OVERBURDEN MONITOR WELL (WHEN NUMBERED)
- EXISTING PIEZOMETER
- EXISTING SOIL GAS POINT
- AOC AREA

FIGURE AOC #3
FORMER EMPTY DRUM STORAGE
SOIL GAS SAMPLING LOCATIONS
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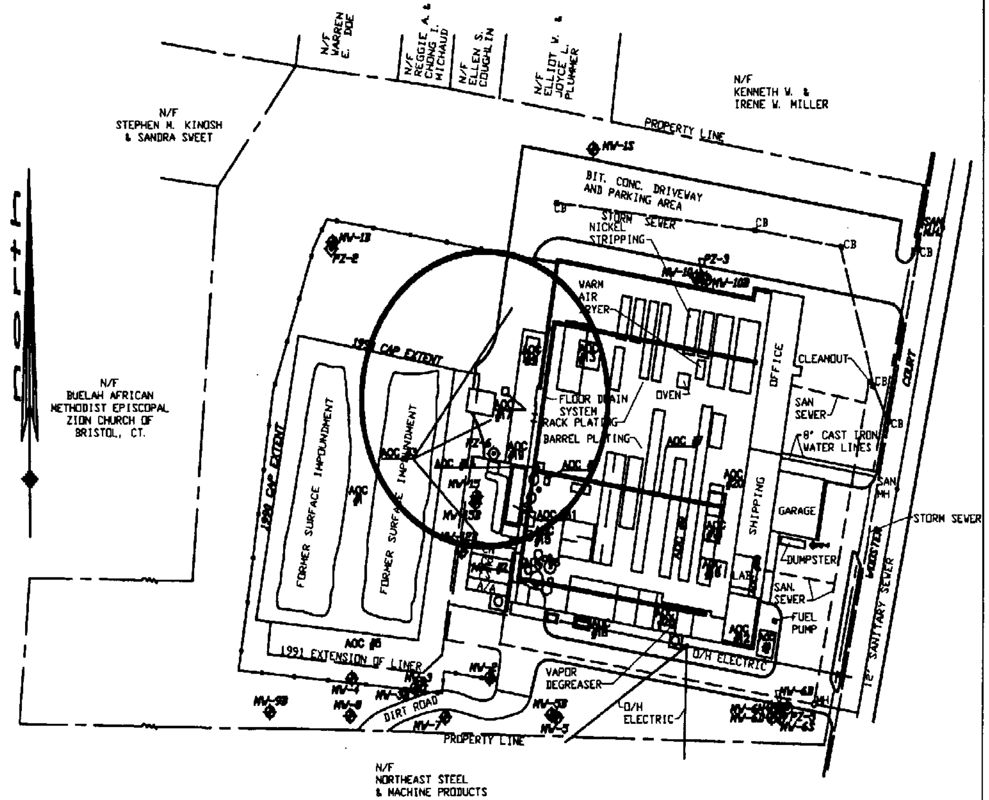

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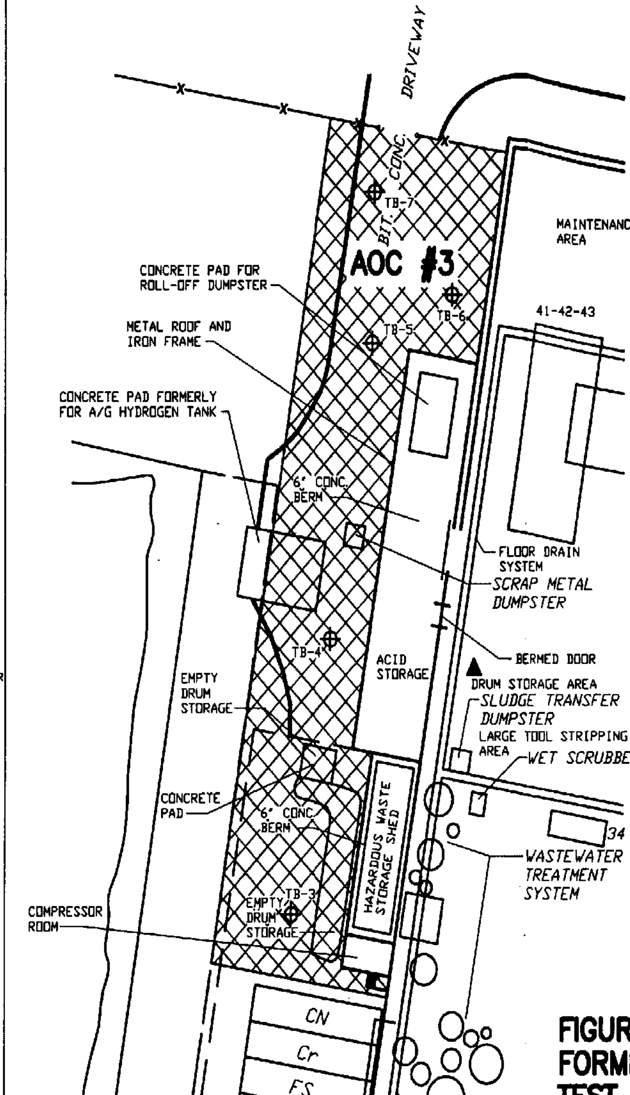
120 0 60 120
1' = 120'

LEGEND

- MW-1B GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MH MANHOLE
- CB CATCH BASIN
- PROPERTY LINE



40 0 10 20 30 40
APPROXIMATE SCALE
(1' = 40')

LEGEND

- TEST BORING
- AOC AREA

FIGURE AOC #3
FORMER EMPTY DRUM STORAGE
TEST BORING LOCATIONS
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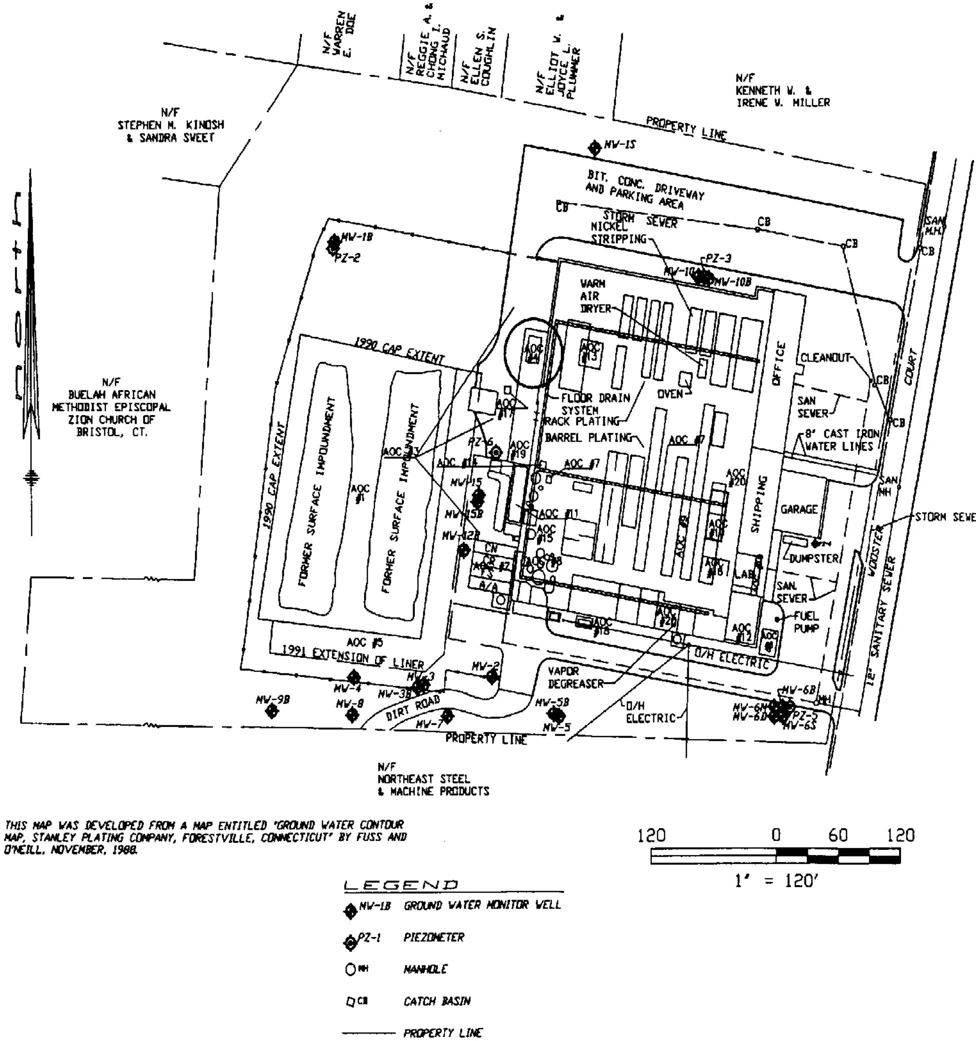

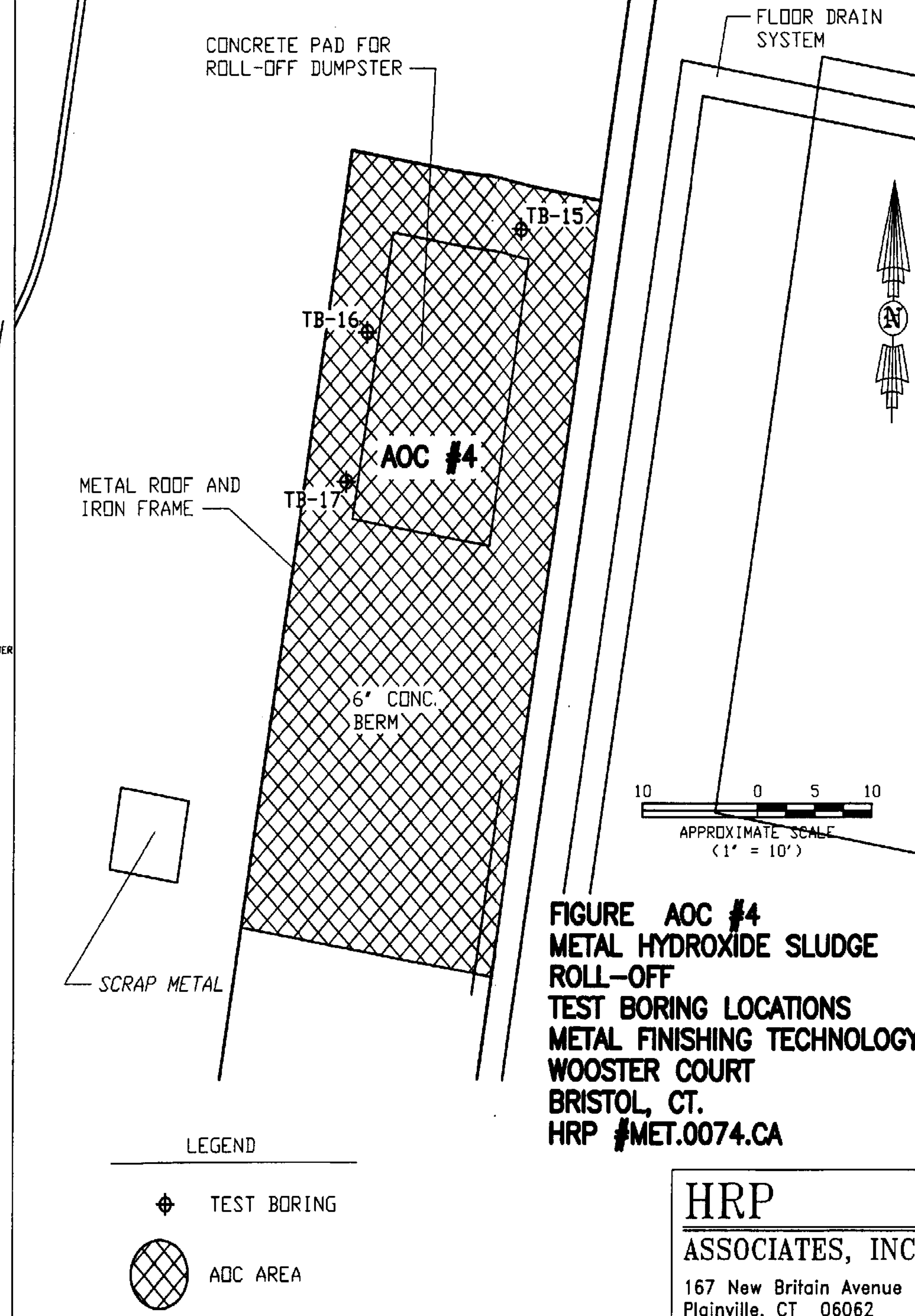

FIGURE AOC #4
METAL HYDROXIDE SLUDGE ROLL-OFF
TEST BORING LOCATIONS
METAL FINISHING TECHNOLOGY
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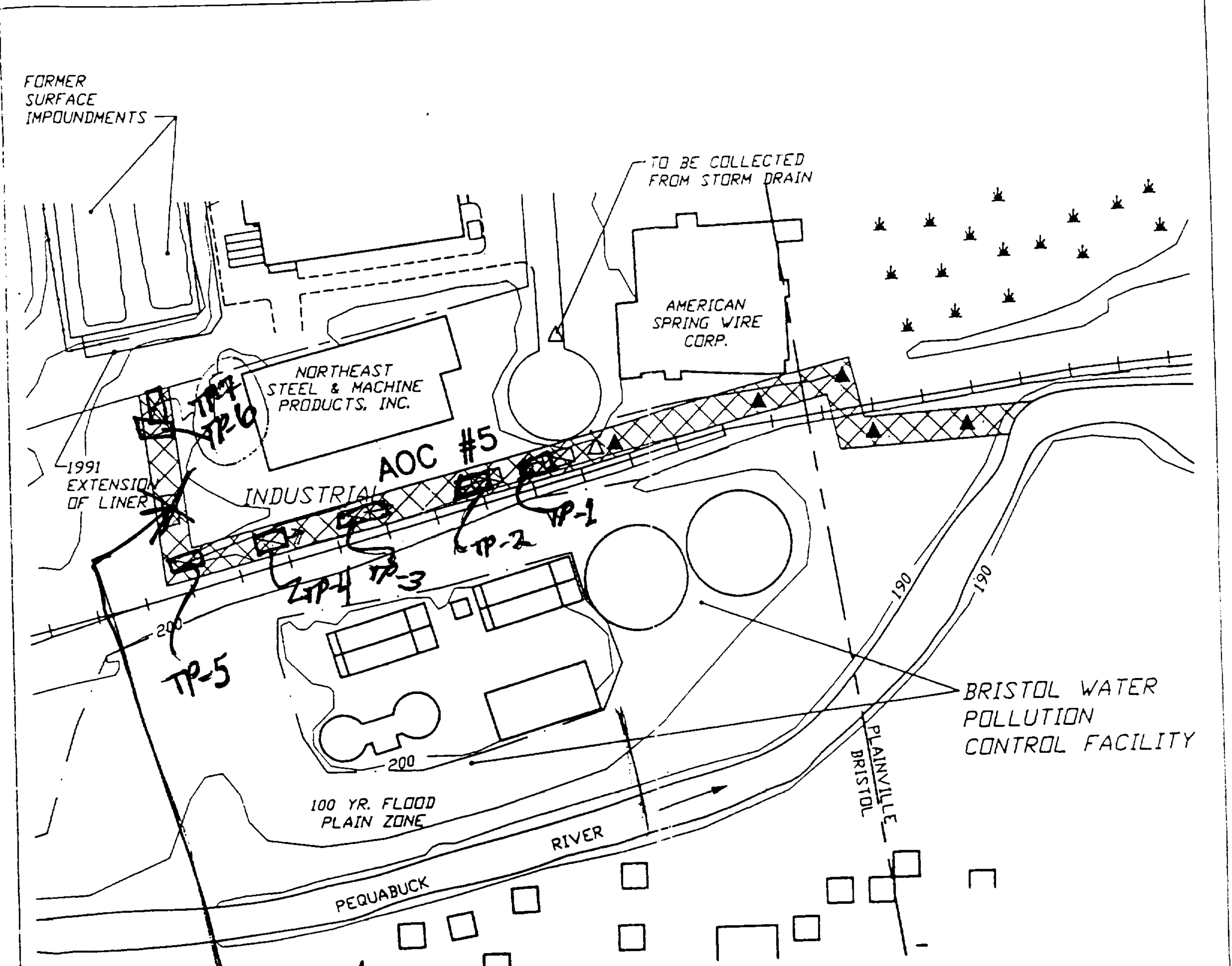

Not Installed - Ground Too Soft (Machine Stuck)

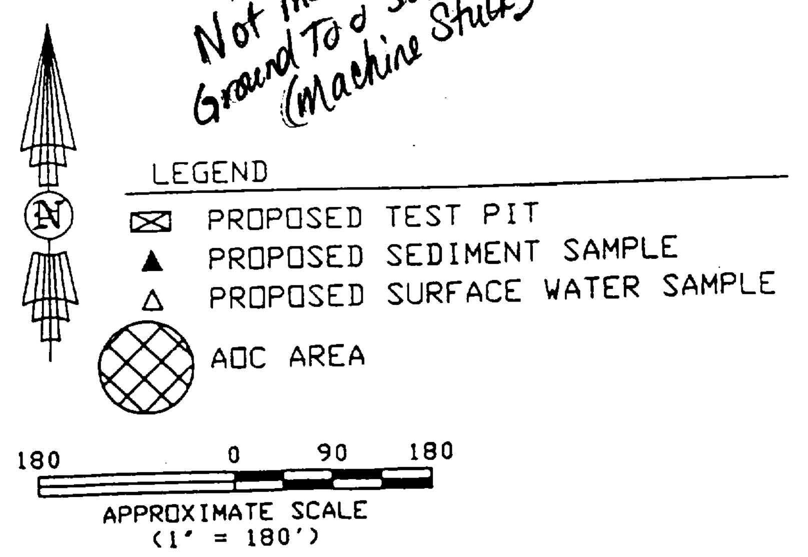

FIGURE AOC #5
FORMER IMPOUNDMENT
DISCHARGE PIPE/SWALE
SAMPLE LOCATIONS
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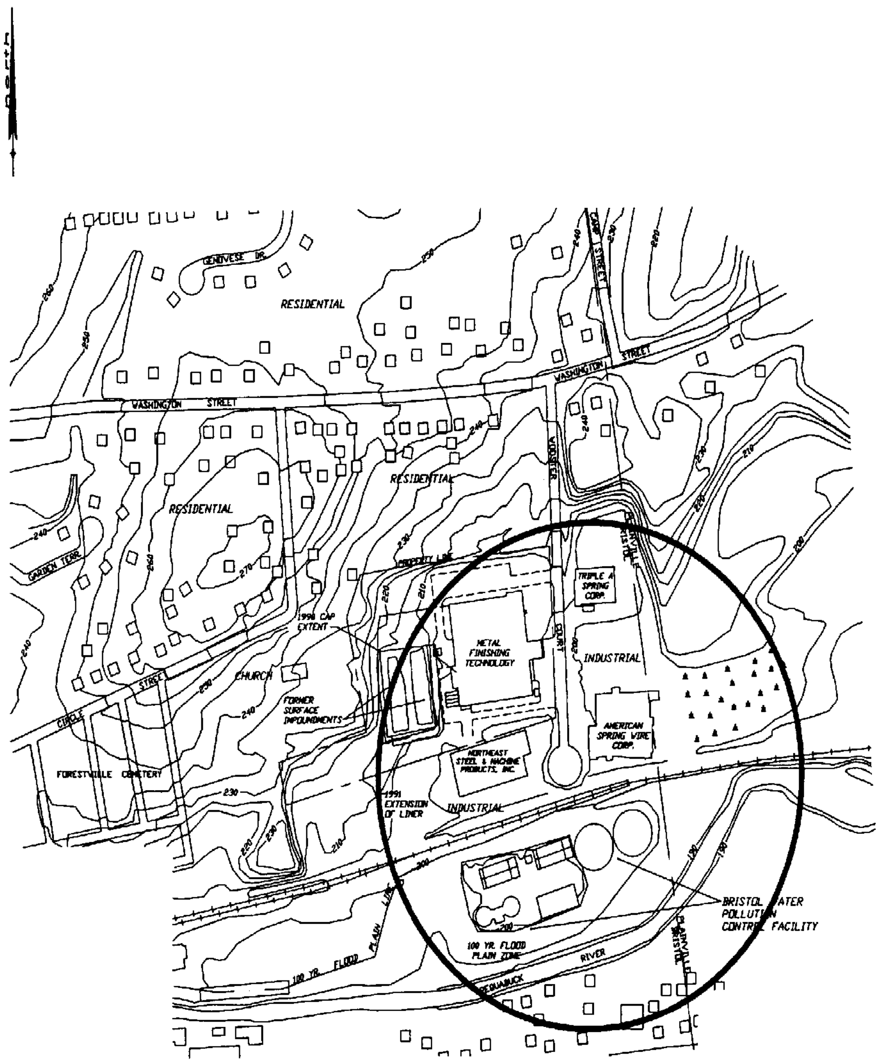
Plainville, CT 06062
(860) 793-6899
FAX: (860) 793-6871

MET074CA\AOC5 (M)

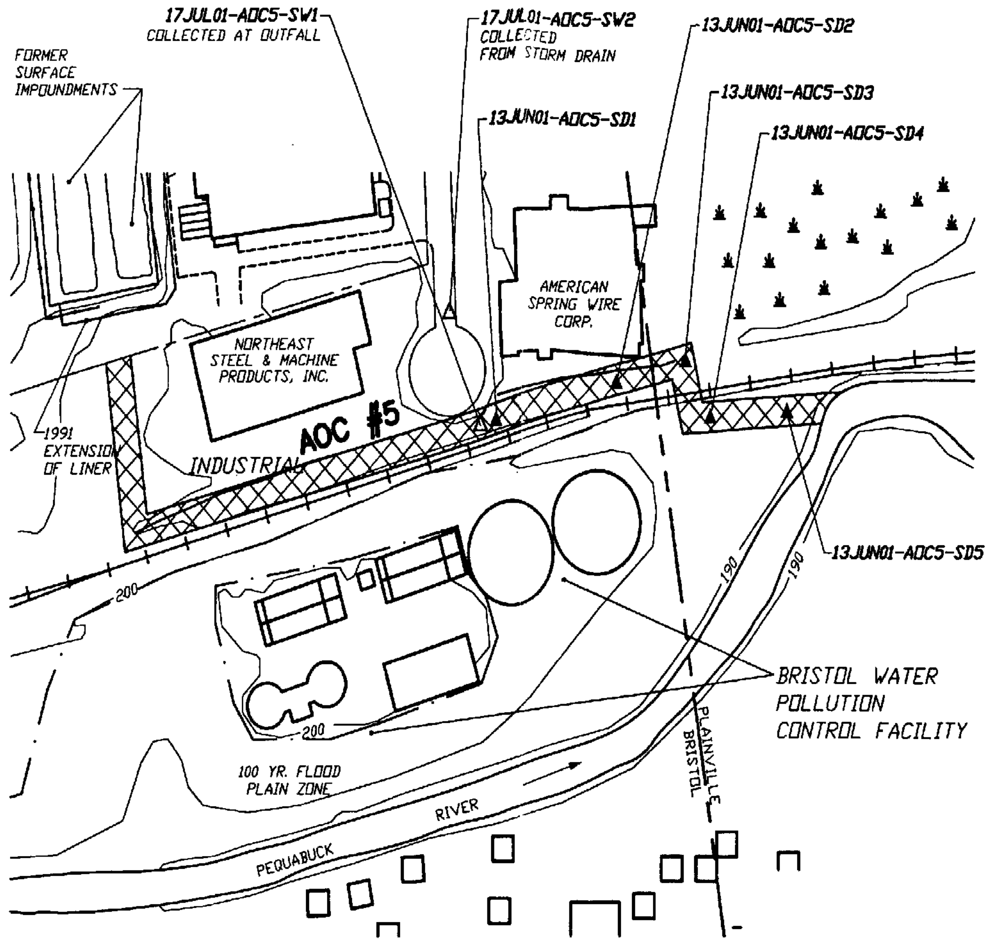


THIS MAP WAS DEVELOPED FROM THE FOLLOWING SOURCES:

1. "TOPOGRAPHIC SURVEY OF TOWN OF PLAINVILLE, HARTFORD CO., CONN.", BY ADR ASSOCIATES, INC., SCALE 1"=100', MARCH, 1974.
2. "TOPOGRAPHIC MAP OF THE CITY OF BRISTOL, CONNECTICUT", BY CAHN, INC., SCALE 1"=100', DECEMBER 16, 1983.

400 0 200 400

APPROXIMATE SCALE
(1" = 400')



LEGEND

▲ SEDIMENT SAMPLE

△ SURFACE WATER SAMPLE

AOC AREA

180 0 90 180

APPROXIMATE SCALE
(1" = 180')

FIGURE AOC #5
FORMER IMPOUNDMENT
DISCHARGE PIPE/SWALE
SAMPLE LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
BRISTOL, CT.
HRP #MET.0074.CA

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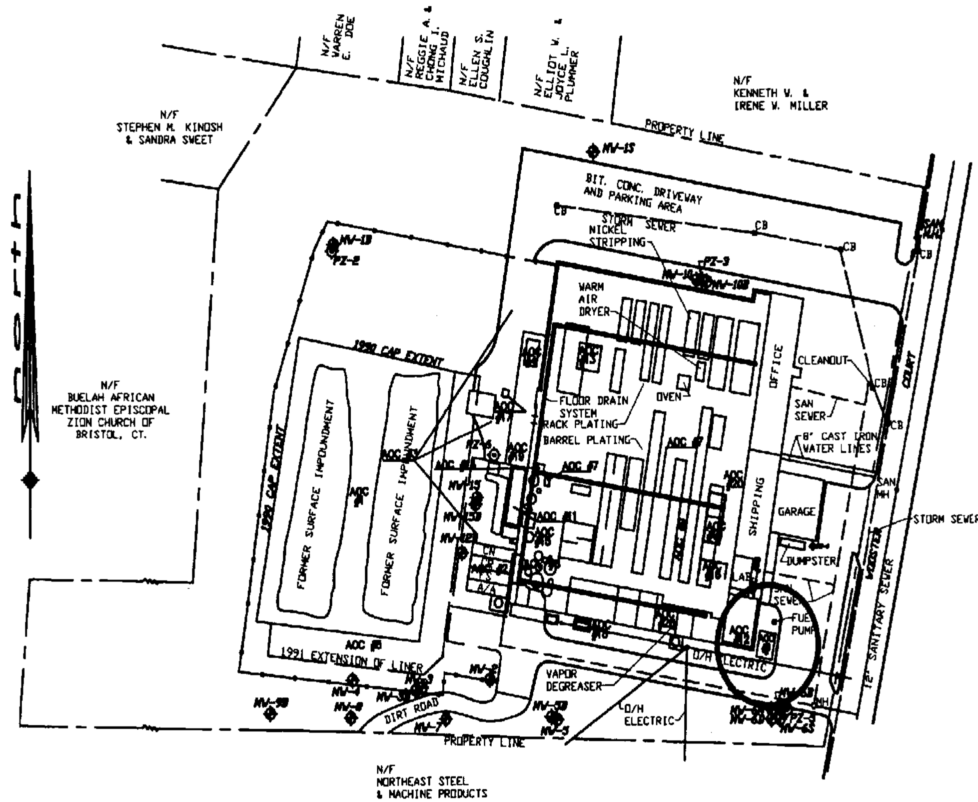


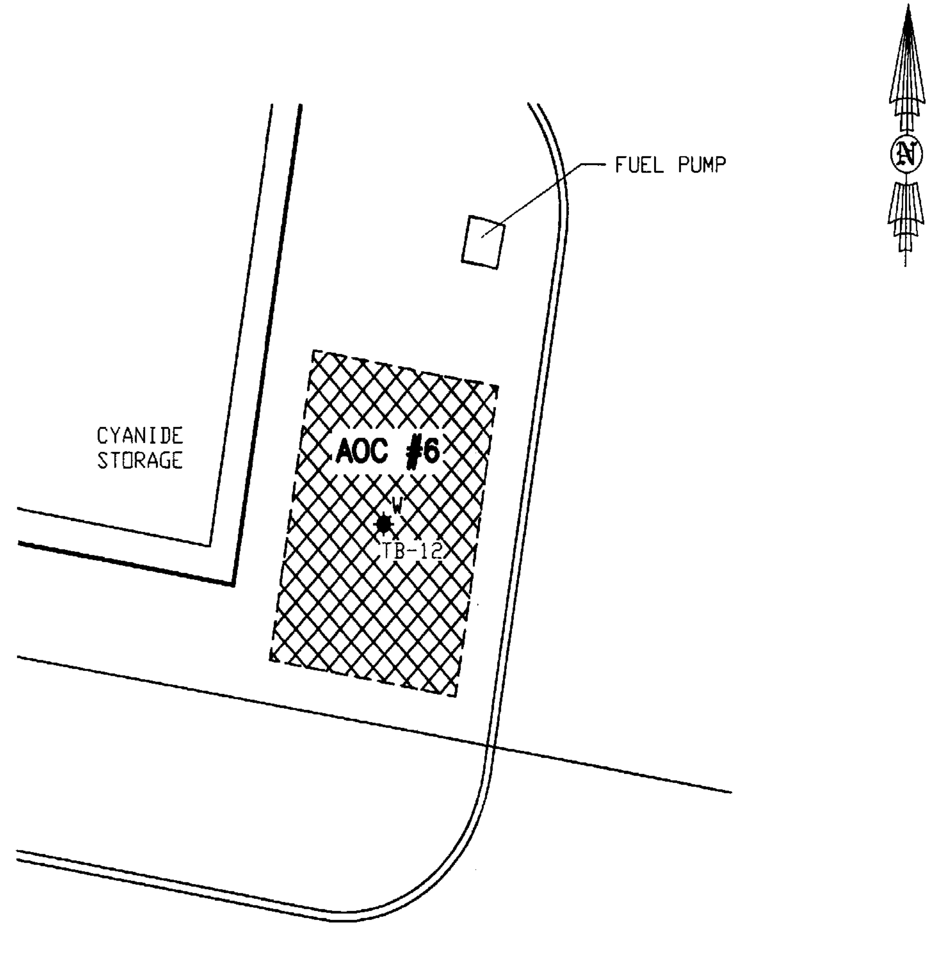
THIS MAP WAS DEVELOPED FROM A MAP ENTITLED "GROUND WATER CONTOUR MAP, STANLEY PLATING COMPANY, FORESTVILLE, CONNECTICUT" BY FUSS AND O'NEILL, NOVEMBER, 1988.

120 0 60 120

1" = 120'

LEGEND

- MW-1B GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MH MANHOLE
- CB CATCH BASIN
- PROPERTY LINE



LEGEND

W TEST BORING

AOC AREA

10 0 5 10

APPROXIMATE SCALE
(1" = 10')

FIGURE AOC #6
FORMER DIESEL UST
TEST BORING LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
BRISTOL, CT.
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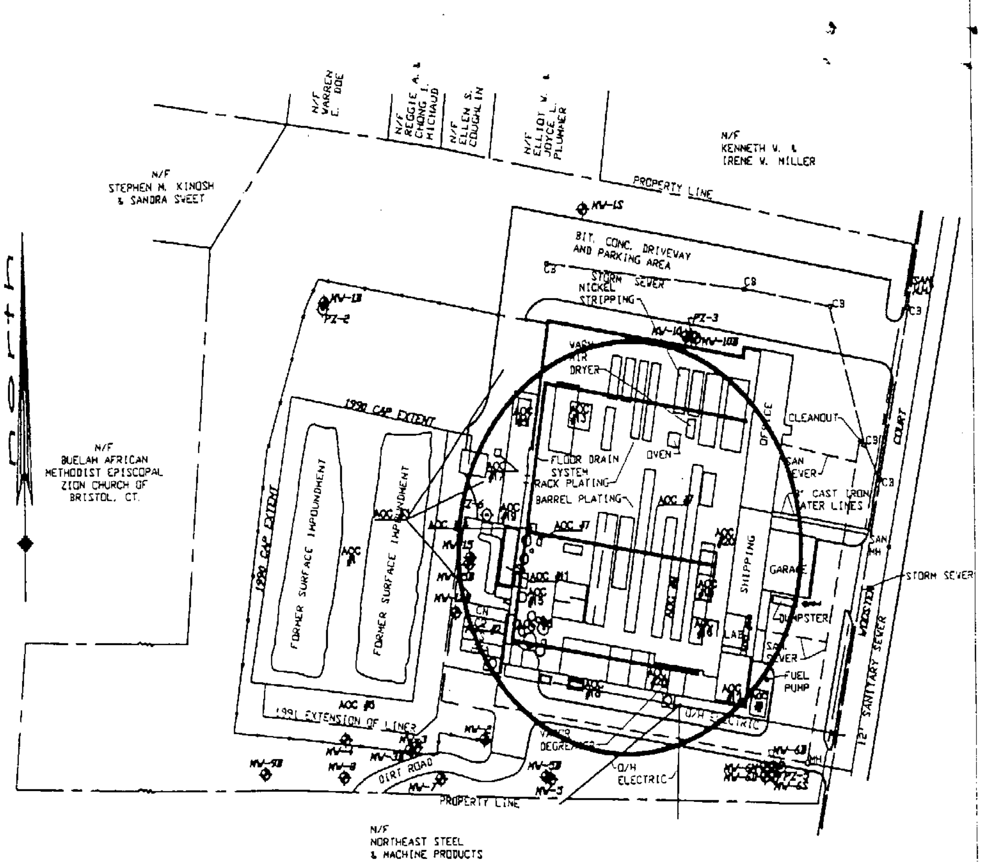

THIS MAP WAS DEVELOPED FROM A MAP ENTITLED "GROUND WATER CONTOUR MAP, STANLEY PLATING COMPANY, FORESTVILLE, CONNECTICUT" BY FUSS AND O'NEILL, NOVEMBER, 1988.

120 0 60 120

1' = 120'

LEGEND

- MW-1B GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MH MANHOLE
- CB CATCH BASIN
- PROPERTY LINE

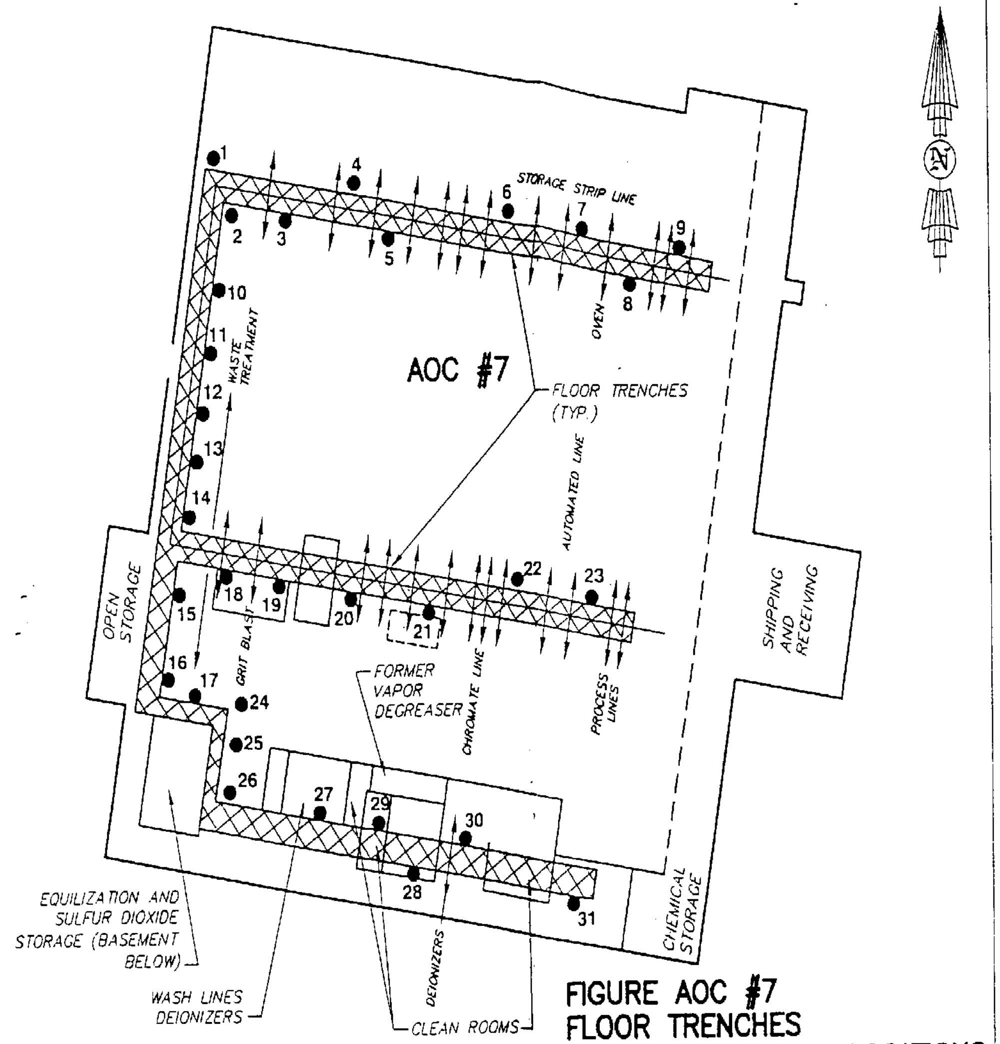

FIGURE AOC #7
FLOOR TRENCHES
SOIL GAS SAMPLING LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
BRISTOL, CT.
HRP #MET.0074.CA
SCALE 1" = 50'±

LEGEND

27● SOIL GAS SURVEY POINT WITH DESIGNATION

AOC AREA

50 0 25 50

APPROXIMATE SCALE (1' = 50')

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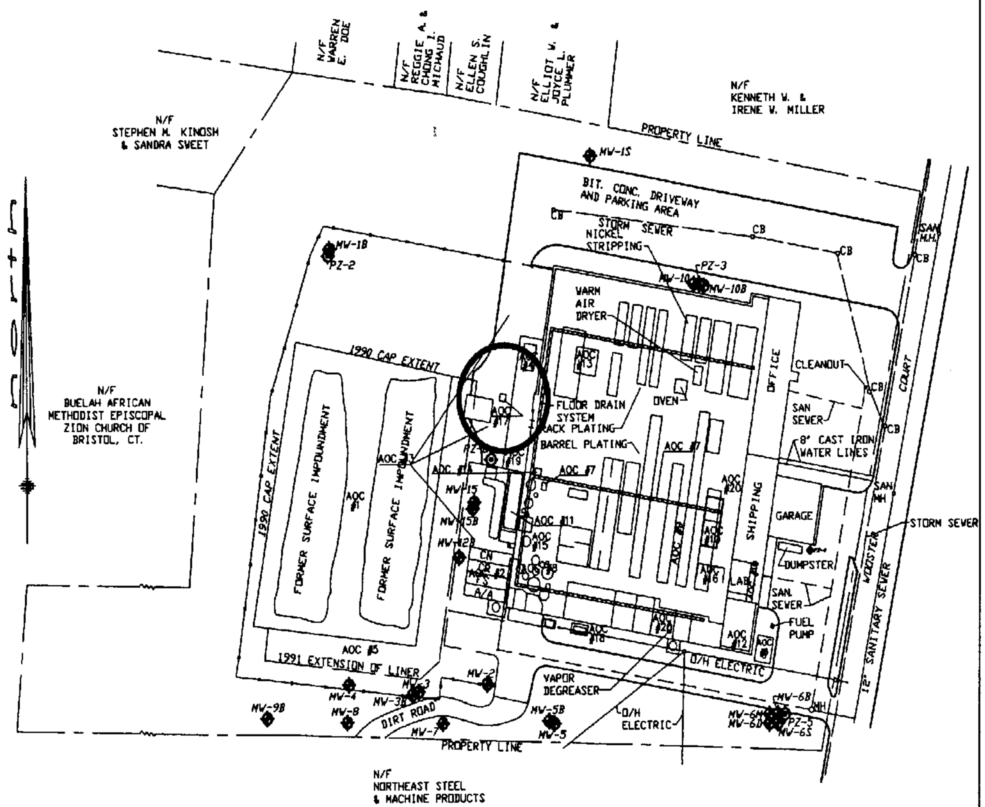


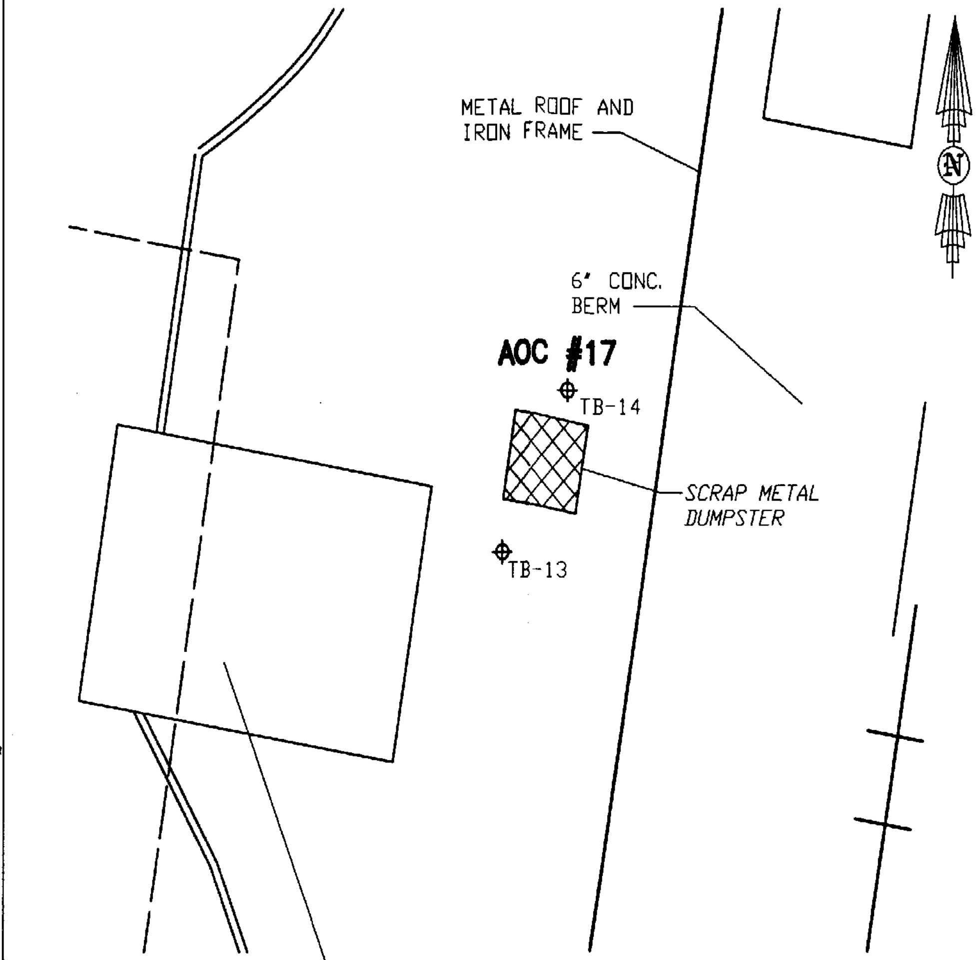
THIS MAP WAS DEVELOPED FROM A MAP ENTITLED 'GROUND WATER CONTOUR MAP, STANLEY PLATING COMPANY, FORESTVILLE, CONNECTICUT' BY FUSS AND O'NEILL, NOVEMBER, 1988.

120 0 60 120

1" = 120'

LEGEND

- MW-1B GROUND WATER MONITOR WELL
- PZ-1 PIEZOMETER
- MH MANHOLE
- CB CATCH BASIN
- PROPERTY LINE



CONCRETE PAD FORMERLY FOR A/G HYDROGEN TANK

LEGEND

- TEST BORING LOCATION (TO BE DETERMINED IN THE FIELD)
- AOC AREA

10 0 5 10

APPROXIMATE SCALE (1" = 10')

FIGURE AOC #17
SCRAP METAL DUMPSTER
TEST BORING LOCATIONS
METAL FINISHING TECHNOLOGY
WOOSTER COURT
BRISTOL, CT.
HRP #MET.0074.CA

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EVALUATION OF FACILITY MONITOR WELLS AND PIEZOMETERS

Well I.D.	Installation Date	Location/Purpose	Elevation (ft)	Well Finish	Well Condition	Well diameter & Construction	Well Seals	Sand Pack Size	Well Screen Slot Size (in)	Well Screen Length (ft)	Elevation of Screen Interval	Hi/Low/Avg Ground Water Elevation (ft)	Geological Unit Surounding Well Screen
MW-1	3/24/83	Upgradient monitoring; north side of site	208.80	Standpipe	Well screen pulled, abandoned 8/5/88 with bentonite	2 in. PVC SCH 40	None	Ottawa sand size unknown	0.010	8	196.55-185.55	---	
MW-1S	8/5/88	Replacement of MW-1; upgradient monitoring	208.8	Standpipe	Good	2 in. PVC SCH	Bentonite pellets and grout	Ottawa sand 1 mm	0.010	10	204.8-194.80	209/202/206	Kame Terrace
MW-1B	8/4/88	North of former impoundments, upgradient monitoring	216.01	Standpipe	Good	2 in. PVC SCH	Bentonite pellets (216.01-206.01 ft)	Ottawa sand 1 mm	0.010	10	190.01-180.01	206/196/200	Bedrock (elev. 212.01 ft)
MW-2	3/24/83	85 ft. southeast of former impoundments; plume detection	202.86	Standpipe	Good	2 in. PVC SCH 40	None	Ottawa sand size unknown	0.010	20	199.61-179.61	194/188/192	Kame Terrace
MW-3	3/23/83	50 ft. south-southeast of former impoundments, plume detection	203.0	Standpipe	Good, slow recovery	2 in. PVC SCH 40	None	Ottawa sand size unknown	0.010	10	197.0-187.0	198/192/196	Kame Terrace
MW-3B	8/3/88	Adjacent to MW-3; plume detection	203.0	Standpipe	Good, slow recovery	2 in. PVC SCH 40	Bentonite (201-188) Grout (203-201)	Ottawa sand 1 mm	0.010	10	181.2-171.2	198/191/196	Bedrock (elevation 189.5)
MW-4	3/23/88	60 ft. south of former impoundments; plume detection	208.76	Standpipe	Good, slow recovery	2 in. PVC SCH 40	None	Ottawa sand size unknown	0.010	10	201.26-191.26	203/195/200	Kame Terrace
MW-5	8/1/88	160 ft. southeast of impoundments; plume detection	200.60	Standpipe	Good	2 in. PVC SCH 40	Bentonite (197.6-188.6) Grout (200.6-197.6)	Ottawa sand 1 mm	0.010	10	189.9-179.9	192/189/190	Alluvium
MW-5B	8/4/88	Adjacent to MW-5; plume detection	201.3	Standpipe	Good	2 in. PVC SCH 40	Bentonite (200.3-167.3) Grout (201.3-200.3)	Ottawa sand 1 mm	0.010	10	157.3-147.3	195/191/193	Bedrock (elevation 169.8)
MW-6S	7/28/88	60 ft.-southeast of site building, plume detection	202.5	Standpipe	Good	2 in. PVC SCH 40	Bentonite (188.5-185.5) Grout (202.5-188.6)	Ottawa sand 1 mm	0.010	10	182.5-172.5	192/189/190	Alluvium
MW-6M	7/27/88	Adjacent to MW-6S; plume detection	202.25	Standpipe	Good	2 in. PVC SCH 40	Bentonite (161.25-160.25) Grout (199.25-161.25)	Ottawa sand 1 mm	0.010	10	158.25-148.25	192/188/190	Kame Plain
MW-6D	7/28/88	Adjacent to MW-6S; plume detection	202.4	Standpipe	Good	2 in. PVC SCH 40	Bentonite (140.4-138.4) Grout (199.4-140.4)	Ottawa sand 1 mm	0.010	10	135.4-125.4	192/191/192	Kame Plain
MW-6B	7/25/89	Adjacent to MW-6S; plume detection	202.29	Standpipe	Good, poor recovery	2 in. PVC SCH 40	Bentonite (120.29-114.29) Grout (199.29-120.29)	#12 Silica sand	0.010	10	112.29-102.29	192/188/191	Bedrock (elevation 121.29)
MW-7	7/29/88	90 ft. south-southeast of former impoundments; plume detection	201.3	Standpipe	Good, poor recovery	2 in. PVC SCH 40	Bentonite(201.3-196.3)	Ottawa sand 1 mm	0.010	10	193.3-183.3	196/191/193	Kame Terrace
MW-8	8/2/88	90 ft. south of former impoundments; plume detection	201.6	Standpipe	Good, poor recovery	2 in. PVC SCH 40	Bentonite (201.6-199.90)	Ottawa sand 1 mm	0.010	10	197.9-187.9	200/195/198	Kame Terrace
MW-9B	8/2/88	90 ft. south of former impoundments; plume detection	205.3	Standpipe	Good	2 in. PVC SCH 40	Bentonite (202.3-195.3) Grout (205.3-202.3)	Ottawa sand 1 mm	0.010	10	190.3-180.3	207/197/202	Bedrock (elevation 199.3)
MW-10	7/18/89	North side of building; upgradient monitoring	207.83	Standpipe	Good	2 in. PVC SCH 40	Bentonite (177.83-175.83) Grout (204.83-147.83)	#12 Silica sand	0.010	10	173.83-163.83	200/195/198	Kame Plain
MW-10B	7/18/89	Adjacent to MW-10; upgradient monitoring	207.79	Standpipe	Good	2 in. PVC SCH 40	Bentonite (163.79-157.79) Grout (204.79-163.79)	#12 Silica sand	0.010	10	152.79-142.79	198/194/196	Bedrock (elevation 163.79)
MW-11	7/28/89	Adjacent to impoundments; plume detection	207.49	Standpipe	Destroyed	2 in. PVC SCH 40	Bentonite (207.49-204.49)	#12 Silica sand	0.010	10	203.49-193.49	---	Kame Plain
MW-11B	7/27/89	Adjacent to MW-11	206.79	Standpipe	Destroyed	2 in. PVC SCH 40	Bentonite and Grout (206.79-190.79)	#12 Silica sand	0.010	10	188.79-178.79	---	Bedrock (elevation 193.29)

EVALUATION OF FACILITY MONITOR WELLS AND PIEZOMETERS

Well I.D.	Installation Date	Location/Purpose	Elevation (ft)	Well Finish	Well Condition	Well diameter & Construction	Well Seals	Sand Pack Size	Well Screen Slot Size (in)	Well Screen Length (ft)	Elevation of Screen Interval	Hi/Low/Avg Ground Water Elevation (ft)	Geological Unit Surounding Well Screen
MW-12B	8/14/90	40 ft. east of former impoundments, adjacent to equalization tanks; plume detection	204.2	Standpipe	Good	2 in. PVC SCH 40	Grout (204.2-195.2)	Ottawa sand 1 mm	0.010	10	188.7-178.7	202/196/199	Bedrock (elevation 193.0)
MW-15	10/6/92	Near MW-11; replacement of MW-11	206.02	Handway	Good	2 in. PVC SCH 40	Bentonite (204-203)	Silica sand coarse	0.010	10	202.72-192.72	200/195/198	Kame Terrace
MW-15B	10/6/92	Near MW-11; replacement of MW-11B	205.78	Handway	Good, slow recovery	2 in. PVC SCH 40	Grout (194-78-188.78)	Silica sand coarse	0.010	10	186.28-176.28	202/196/199	Bedrock (elevation 190.78)
PZ-2	Unknown	Adjacent to MW-1B; shallow ground water elevation	.216	Handway	Good	2 in. PVC SCH 40	Unknown	Unknown	Unknown	5	214 - 209	214	Kame Terrace
PZ-3	8/10/90	Adjacent to MW-10; shallow ground water elevation	207.9	Standpipe	Good	2 in. PVC SCH 40	Bentonite (205.9-203.9)	Silica sand 1 mm	0.010	10	202.9-192.9	198	Kame Plain
PZ-4	8/10/90	East of building; shallow ground water elevation	203.74	Handway	Good	2 in. PVC SCH 40	Bentonite (195.74-194.74) Bentonite (200.74-199.74)	Silica sand 1 mm	0.010	10	193.7-183.7	190	Kame Plain
PZ-5	8/13/90	Adjacent to MW-6S; shallow ground water elevation	202.2	Standpipe	Good	2 in. PVC SCH 40	Bentonite (198.2-196.2)	Silica sand 1 mm	0.010	10	194.2-184.2	190	Alluvium
PZ-6	8/13/90	60 ft. east of former impoundments; shallow ground water elevation	207.9	Handway	Good	2 in. PVC SCH 40	Bentonite (205.9-203.9)	Silica sand 1 mm	0.010	10	202.9-192.9	198	Bedrock (elevation 197.9)
16M	8/21/00	Adjacent to equalization tanks	203.3	Handway	Good	2 in. PVC Sch 40	Bentonite and grout	Silica sand 1 mm	0.010	10	173.3-163.3	193.12	Bedrock (elevation)
16S	8/22/00	Adjacent to equalization Tanks	203.3	Handway	Good	2 in. PVC Sch 40	Bentonite	Silica sand 1 mm	0.010	10	195.3-185.3	191.23	Kame Terrace
17M	8/23/00	South of Building, adjacent to MW-5	201.7	Handway	Good	2 in. PVC Sch 40	Bentonite and grout	Silica sand 1 mm	0.010	10	140.2-130.2	189.31	Bedrock
17S	8/23/00	South of Building, adjacent to MW-5	201.65	Handway	Good	2 in. PVC Sch 40	Bentonite	Silica sand 1 mm	0.010	10	192.65-182.65	189.05	Alluvium
18M	8/23/00	End of Wooster Court	201.66	Handway	Good	2 in. PVC Sch 40	Bentonite and grout	Silica sand 1 mm	0.010	10	119.16-109.16	193.47	Bedrock
18S	8/24/00	End of Wooster Court	201.47	Handway	Good	2 in. PVC Sch 40	Bentonite	Silica sand 1 mm	0.010	10	191.47-181.47	188.90	Alluvium
19M	8/28/00	North of MW-18S, MW-18M	201.15	Handway	Good	2 in. PVC Sch 40	Bentonite and grout	Silica sand 1 mm	0.010	10	140.15-130.15	189.21	Bedrock
19S	8/23/00	North of MW-18S, MW-18M	201.3	Handway	Good	2 in. PVC Sch 40	Bentonite	Silica sand 1 mm	0.010	10	190.8-180.8	188.92	Alluvium
20M	9/28/00	North of MW-19S, MW-19M	202.4	Handway	Good	2 in. PVC Sch 40	Bentonite and grout	Silica sand 1 mm	0.010	10	122.4-132.4	189.54	Bedrock
20S	8/23/00	North of MW-19S, MW-19M	202.63	Handway	Good	2 in. PVC Sch 40	Bentonite	Silica sand 1 mm	0.010	10	192-63-182.63	189.07	Alluvium
21M	9/28/00	Adjacent to PZ6	207.19	Handway	Good	2 in. PVC Sch 40	Bentonite	Silica sand 1 mm	0.010	10	191.89-181.89	202.59	Bedrock