Department of Environmental Conservation

Division of Hazardous Waste Remediation

Record of Decision

Accurate Die Casting Corporation Site
Village of Fayetteville, Onondaga County
Site Number 7-34-052

December 1994

New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* LANGDON MARSH, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Accurate Die Casting Site
Village of Fayetteville, Onondaga County, New York
Site No. 7-34-052

Statement of Purpose and Basis

This Record of Decision (ROD) presents the selected remedial action for the **Accurate Die Casting** inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40 CFR Part 300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the **Accurate Die Casting** Inactive Hazardous Waste Site and the Proposed Remedial Action Plan (PRAP) presented to the public by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the **Accurate Die Casting** site and the criteria identified for the evaluation of alternatives, the NYSDEC has selected 1) excavation and off-site disposal for the contaminated soil and sludge, and 2) extraction and on-site treatment for the contaminated groundwater. The components of the remedy are as follows:

* The contaminated soil from the oil spill area located on the north-west portion of the site will be excavated and disposed of in a permitted landfill. The excavated area will be backfilled with clean soil. This will eliminate the potential for exposure to contaminated soil.

* The contaminated sludge from the septic tank located on the north-east portion of the site will be excavated and disposed of in a permitted landfill.

* The contaminated bedrock groundwater will be extracted and treated on-site. The treated groundwater will be discharged to Bishop Brook. This will control the migration of contaminated groundwater.

* The remediation of soil contaminated with TCE located in the north-east corner of the building which is identified as area 2 in Figure 2, page 3 has essentially been completed as an IRM. Confirmatory soil samples in this area needs to be taken. The IRM also includes the remediation of shallow groundwater remediation which is in progress. Upon completion, the IRM will have controlled the groundwater migration to Brook and eliminated the potential exposure to contaminated soil.

* A long-term groundwater monitoring program will be implemented to monitor the effectiveness of the groundwater (shallow and bedrock) and soil remediation program.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

December 5, 1994
Date

Ann Hill DeBarbieri
Deputy Commissioner

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SECTION 1: SITE LOCATION AND DESCRIPTION

The Accurate Die Casting site is located on a 32-acre parcel at 547 East Genesee Street in the Village of Fayetteville, New York (Figure 1). The site includes parking areas adjacent to the main building, a wooded area to the north, scrub growth to the east, and a lawn to the south. The topography is generally flat on the south end of the site and slopes to the north on the north half of the site. At the northern edge of the site, there is a steep embankment adjacent to Bishop Brook, which flows from east to west. Figure 2 shows the details of the site, sampling locations and identifies the contaminated areas. Bordering properties include abandoned farmland to the north, residential areas to the east and west, and commercial properties to the south along East Genesee Street.

The primary use of the site has been for die casting. ITT Commercial Finance Corporation (ITT) is the current owner of the site. Accurate Die Casting Corporation and George and Theresa Slyman which were the owners of the site before ITT, together with various other owners at different times, had conducted the industrial activities at the site. The groundwater in the vicinity of the site is not used for potable purposes. Bishop Brook empties into the Limestone Creek approximately 5 miles west of the site.

The site was grouped into areas during the investigation for the purpose of characterizing the contamination at the site (Figure 2). Area 1 contains soils contaminated with polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and volatile organic compounds (VOCs). Some of the individual PAHs and VOCs found in the oil spill area exceed the guidance levels for protection of human health. The septic tank (area 5) shown in Figure 3 contains sludge contaminated with zinc. The bedrock groundwater (area 4) is contaminated with trichloroethene (TCE). The groundwater contamination would pose an unacceptable risk to human health if it were to be used as a source of potable water in the future. Additionally, contaminated groundwater threatens the water quality of Bishop Brook. In mid-1994, an Interim Remedial Measure (IRM) was implemented to remediate the TCE contaminated soils in area 2 and shallow groundwater contaminated with TCE (area 3).

SECTION 2: SITE HISTORY

2.1: Operational/Disposal History

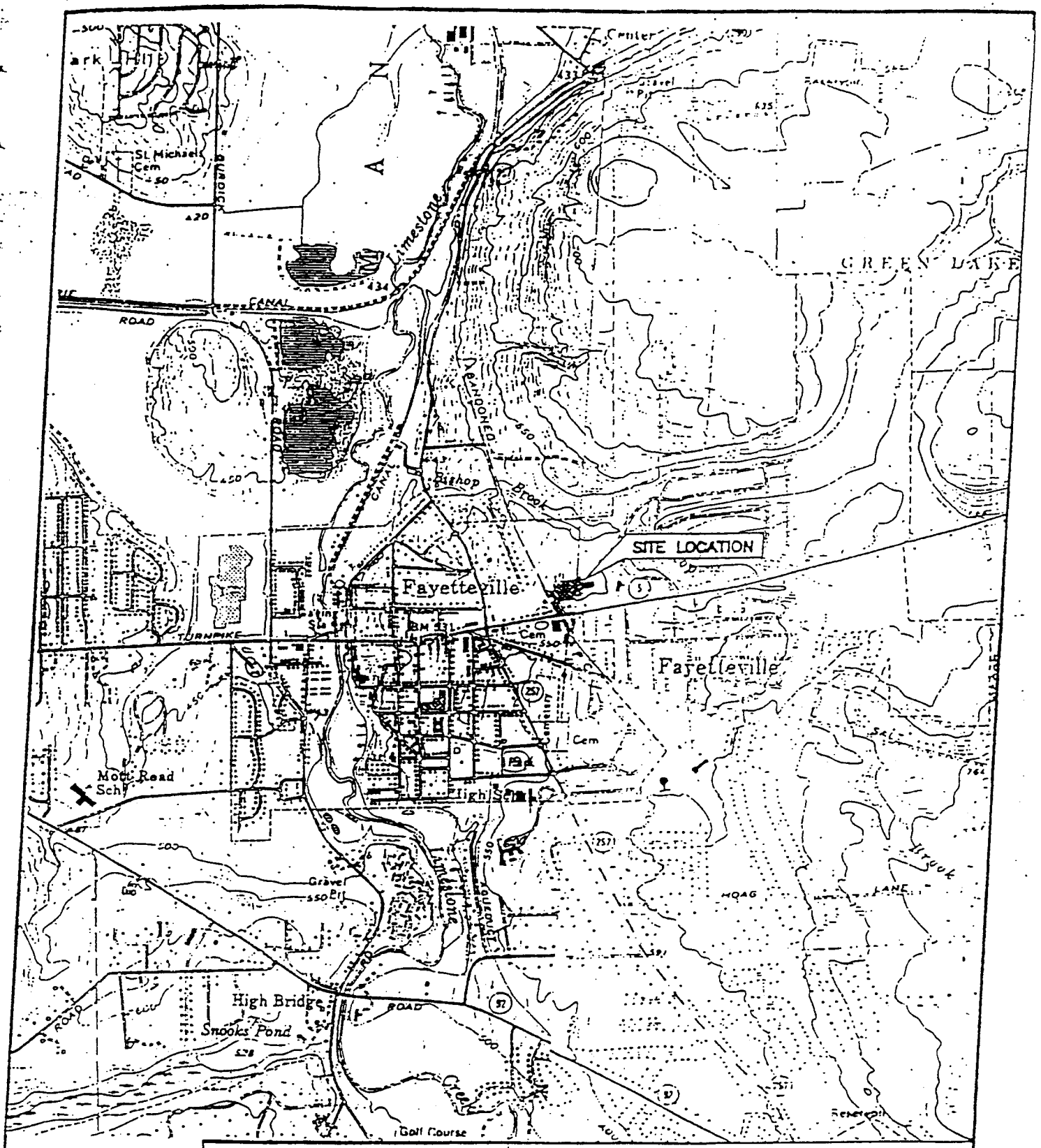
Early 1950 - The facility was constructed as a die casting industry.

Mid-1987 - A waste oil spill was discovered at the site. The release was occurring in the northwest area of the site at and near the discharge point of a cooling water outfall pipe. NYSDEC responded to the spill and approximately 120 tons of soil contaminated with waste oil was removed from the site.

Mid-1988 - Termination of activities at the site and initiation of foreclosure proceedings.

December 20, 1988 - Soil and water samples collected and analyzed by DEC indicated the presence of TCE and perchloroethene (PCE).

1989 - ITT took over the title to the property as Mortgagee-in-possession as a result of the foreclosure.



Stearns & Wheler
ENVIRONMENTAL ENGINEERS & SCIENTISTS

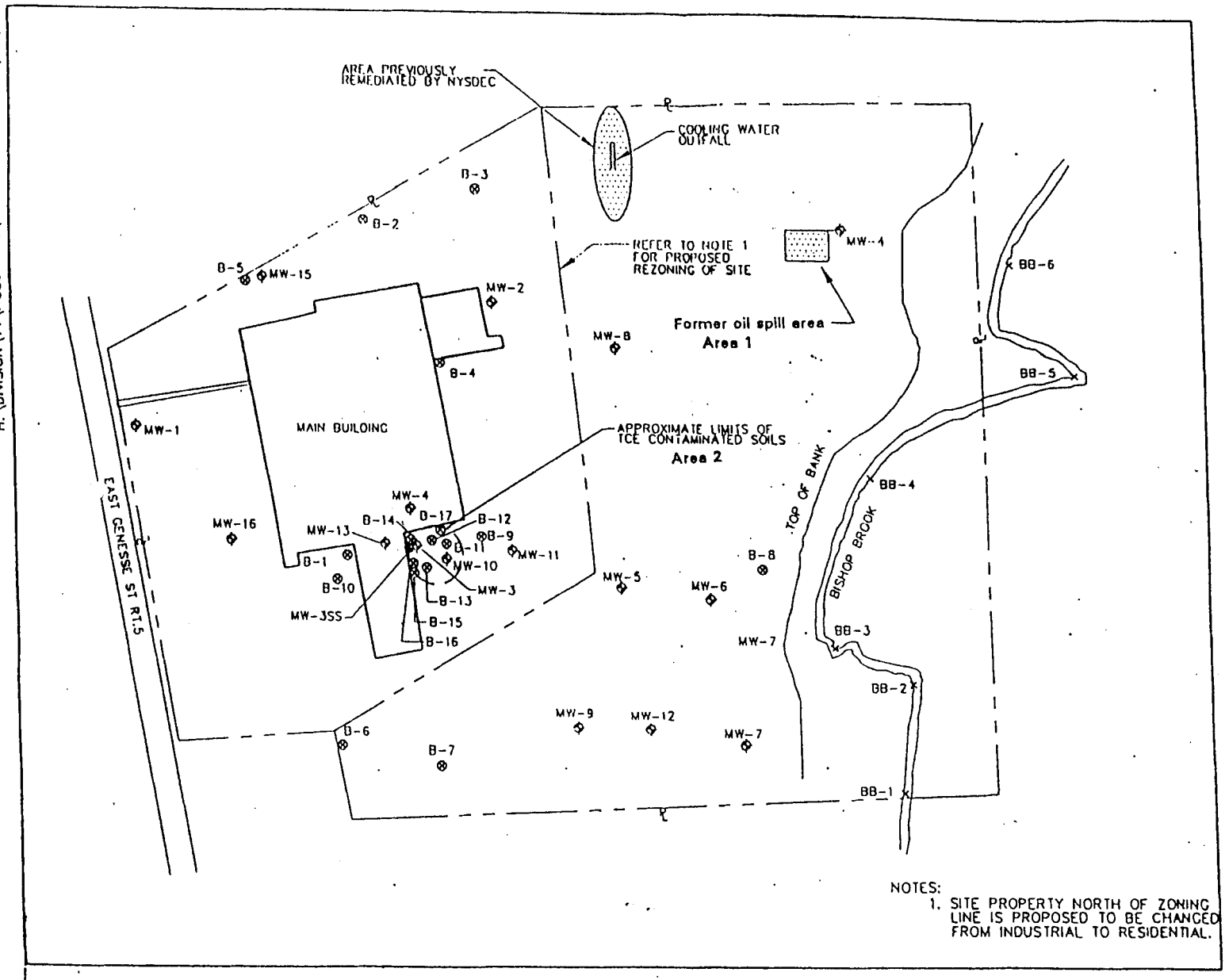
DATE: 2/94 JOB No.: 2125

ACCURATE DIE CASTING
FAYETTEVILLE, NEW YORK
FEASIBILITY STUDY

FIGURE 1
SITE LOCATION

H:\DIVISION\71\ACCURATE\ACCUSP1 SF=150' 5/24/94

FIGURE -2



NOTES:
1. SITE PROPERTY NORTH OF ZONING LINE IS PROPOSED TO BE CHANGED FROM INDUSTRIAL TO RESIDENTIAL.

LEGEND

- ℄ . PROPERTY LINE
- MW-4 ⊗ MONITORING WELL
- B-2 ⊗ BORING SAMPLE LOCATION
- × SEDIMENT SAMPLE LOCATION

ACCURATE DIE CASTIN
FAYETTEVILLE, NEW YOR

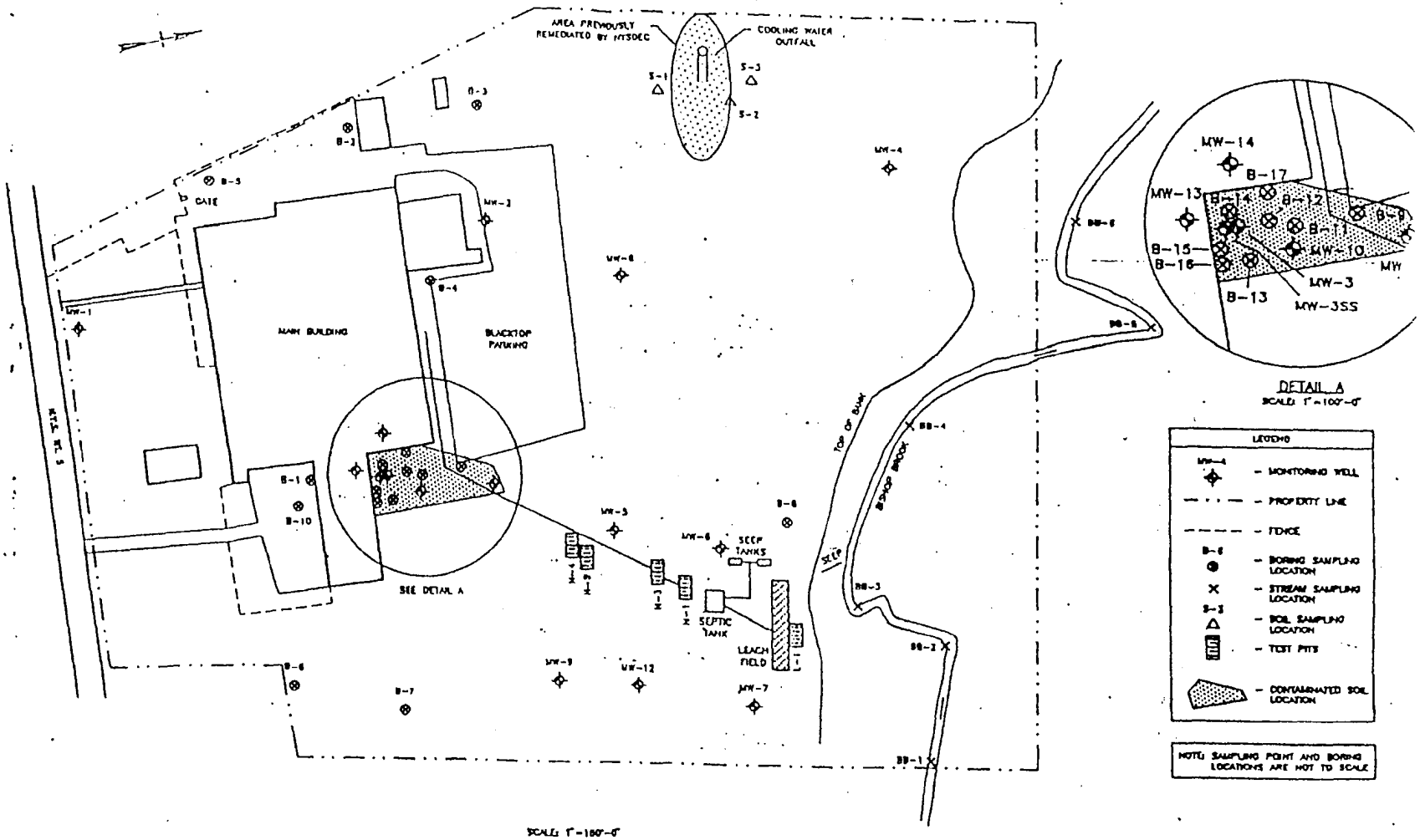
SITE PLAN

150 0 150

APPROX. SCALE IN FEE

FILE NO. 2488.396-03F

O'BRIEN & GE
ENGINEERS I
Syracuse , New York



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ACCURATE DIE CASTING
FAYETTEVILLE, NEW YORK
FEASIBILITY STUDY

FIGURE 3
AREAL EXTENT OF TCE IMPACTED SO

January 1990 - The facility was included in the NYSDEC's Registry of Inactive Hazardous Waste sites as a Class 2 site. This indicates that the site constitutes a significant threat to human health or the environment and that action is required to investigate and, if necessary, remediate the site.

A surface disposal area was located outside the northeast corner of the building and a degreasing system which was used to degrease the castings was located inside the building. A former employee for Accurate Die Casting has testified during a deposition in a Federal Court proceeding that spent TCE from the degreaser system was dumped periodically outside the northeast corner of the manufacturing building. This type of disposal practice, which is not documented by any manifest, has resulted in the contamination of the soil and groundwater at the site. There are no records available to verify the quantity and/or the duration of the TCE disposal from the degreasing system.

2.2: Remedial History

June 1989 - A Phase I environmental assessment was done by Stearns & Wheler for ITT, a potentially responsible party (PRP). Based on the available information, a report was prepared which included the history of the site, potential areas of contamination and investigative efforts to characterize the site.

Early 1990 - During the Phase II environmental assessment, three contaminated areas were identified and remediated as an IRM during the year. IRMs are intended to address both emergency and non-emergency site conditions, and can be undertaken without extensive investigation and evaluation, to prevent, mitigate, or remedy environmental damage attributable to a site. The following IRMs were completed at the site - 1) approximately 70 drums of waste found at the site after foreclosure and located inside the building were characterized and disposed, 2) the sludge from the TCE degreasing system was removed and the system was decontaminated, 3) the TCE free product pool which was discovered above the water table adjacent to and outside the northeast corner of the building was pumped and the contents disposed of until no TCE free product was found in samples.

August 1990 - Transformers containing PCB fluids were removed and disposed off-site. The soil in the transformer area was sampled and soils exhibiting levels above guidance values were removed and disposed off-site.

September 1990 - A Phase II environmental assessment was completed. During this period groundwater, surface water, sediment, and soil samples were collected and analyzed. Based on the results, a report was prepared which concluded that TCE contamination exists in soil, groundwater, and surface water. A soil vapor survey was also conducted during this period.

SECTION 3: CURRENT STATUS

The NYSDEC signed an Order on Consent with ITT to undertake a Remedial Investigation/ Feasibility Study (RI/FS). The RI/FS was initiated by the PRP in August 1991.

Concurrent with the preparation of the FS, negotiations for an IRM were initiated in mid-1993. The work plan for the IRM was approved in May 1994 and field work began in June 1994.

The 1994 IRM included the following tasks:

* excavation of contaminated soil located at the northeast corner of the building, on-site treatment, and replacement in the excavated areas.

* extraction of contaminated groundwater from the shallow aquifer, on-site treatment, and discharge to Bishop Brook.

A Decision Document was prepared and executed by NYSDEC in May 1994. This document contained the details of the 1994 IRM, the evaluation of the remedial technologies and the rationale for the selection of remedial alternative to address the IRM issues. A copy of this document is included in the Administrative Record of this site.

The treatment of soils outside the northeast corner of the building has essentially been completed. The excavated soils were treated by mechanical volatilization. The shallow groundwater remediation was initiated in September 1994 by the installation of an extraction well. A pump test was conducted on September 28, 1994 and the results of the pump test will be utilized to define the parameters for the extraction and on-site treatment of the shallow groundwater remediation program.

An addendum to the existing consent order was prepared and signed on June 6, 1994 by ITT and the NYSDEC to implement the 1994 IRMs at the site.

3.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in two phases. The first phase was conducted between May 1992 and February 1993 and the second phase between July 1993 and February 1994. Reports entitled "Phase I RI Report, January 1993" and "Final RI Report, February 1994" have been prepared describing the field activities and findings of the RI in detail. A summary of the RI follows:

The RI activities consisted of the following:

- Surface soil samples were obtained from the waste oil spill area to determine the extent of residual contamination.

- Soil borings and deep monitoring wells were installed for analysis of soils and groundwater as well as to document the physical properties of soil and hydrogeologic conditions.

- Surface water and sediment samples were obtained to determine the extent of contamination in the brook.

The land surface at the site slopes generally northward with a steep embankment at Bishop Brook, which forms the northern boundary of the site. Based on the subsurface studies, the overburden consists of a dense layer that ranges in composition from red clay to silt with sand, gravel and cobbles. This layer has been interpreted to be glacial till which seems to have somewhat limited the migration of

contaminants to the bedrock. The till is overlain by coarser sand and gravel deposits. The highly fractured bedrock slopes northward down into the Bishop Brook ravine.

The groundwater in the overburden unit flows to the north towards Bishop Brook. Based on the available data on the bedrock unit, it is assumed that the groundwater flow in this unit is also towards the north. Bishop Brook flows east to west and empties into Limestone Creek several miles west of the site.

The analytical data obtained from the RI were compared to Applicable Standards, Criteria, and Guidance (SCGs) in determining remedial alternatives. Groundwater, drinking water and surface water SCGs identified for the site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of the NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria were used to develop remediation goals.

Based upon the results of the remedial investigation in comparison to the SCGs and potential public health and environmental exposure rates, certain areas and media of the site require remediation.

The results of the RI showed that the groundwater and soil samples obtained from the site contain contamination that is site-related. The primary contaminant in soil and groundwater was found to be TCE. The soil samples collected in the spill area contained polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and volatile organics (VOCs). Zinc was detected in the septic tank sludge and chromium was detected in groundwater samples.

The highest concentration of TCE [340,000 parts per billion (ppb)] in groundwater was detected in the shallow portion of the aquifer outside the north-east corner of the building. The highest concentration of TCE in the groundwater that was detected in the bedrock portion of the aquifer was 5200 ppb. All but one upgradient groundwater sample contained TCE above the groundwater standard which is 5 ppb. Figure 4 shows the extent of TCE contamination in groundwater at the site. Chromium (430 ppb) was the only inorganic that was detected above the groundwater standard in the groundwater sample collected from MW-9. The groundwater standard for chromium is 50 ppb. Table 1 shows the concentration of TCE in groundwater samples collected at five different times.

A groundwater seep in the steep bank of Bishop Brook was sampled before it emerges to the surface and was found to contain 700 ppb of TCE. The seep was also sampled after it emerges and found to contain 67 to 78 ppb of TCE.

The maximum concentration of TCE detected in the surface water samples was 3 ppb. The stream bed sediments were found to be unimpacted by site contamination except for one sample which contained TCE at 0.8 ppb. The surface water standard for TCE is 11 ppb. The sediment criteria for TCE is 1.0 ppb (assuming 0.5% total organic carbon).

The highest concentration of TCE in the subsurface soil was found outside the north-east corner of the building. The concentration of TCE in the subsurface soil samples ranged from non-detect to 7500 parts per million (ppm). Table 2 shows the concentration of TCE and other volatiles detected in subsurface soil samples obtained from various locations at the site. TCE concentrations in the subsurface soil decreased with increasing distance from the north-east corner of the building. The depth of the soil samples collected was between 3 and 30 feet. The concentration of TCE was between non-detect to 9.7

Table 1

Ground Water TCE Concentrations

Accurate Die Casting Facility
Fayetteville, NY

	Trichloroethylene Concentrations (1)				
Date Sampled:	8/30/89	12/4/89	5/20/90	5/28/92	7/22/94
Monitoring Well (3)					
MW-1	112	ND	2	ND	NS
MW-2	ND	ND	1	ND	NS
MW-3	Free Product	>55,000	440,000	340,000	Abandoned
MW-4	NS	7	43	6	270
MW-5	NI	340	344	110	330
MW-6	NI	700	454	510	390
MW-7	NI	ND	ND	ND	ND
MW-8	NI	ND	ND	ND	NA
MW-9	NI	109	106	60	72
MW-10	NI	NI	NI	4,500	1,600
MW-11	NI	NI	NI	5,200	5,500
MW-12	NI	NI	NI	36	44
MW-13	NI	NI	NI	110	740
MW-14	NI	NI	NI	67	150
MW-15	NI	NI	NI	NI	NS
MW-16	NI	NI	NI	NI	NS
MW-17	NI	NI	NI	NI	260
Excavation Sump	NI	NI	NI	NI	20,000

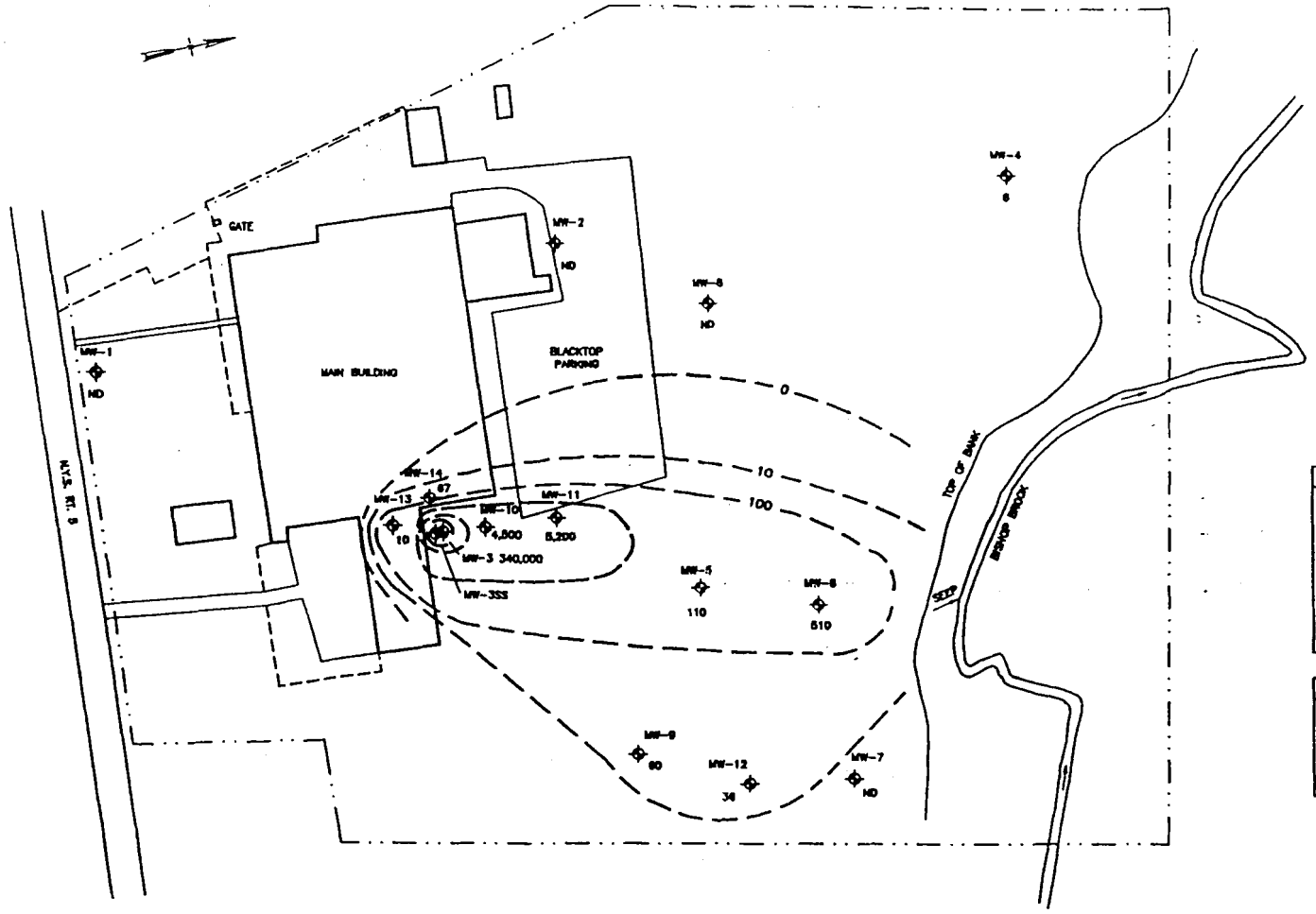
Notes:

ND - Not detected at concentrations greater than analytical detection limit.
NS - Not sampled.
NI - Well not installed at time of sampling.
NA - Not analyzed.
(1) - Concentrations reported in ug/L (ppb).
(2) - Sample collected 8/19/92 because MW-13 and MW-14 were dry on 5/28/92.
(3) - Monitoring wells MW-1 through MW-16 installed by Stearns & Wheler, monitoring well MW-17 installed by O'Brien & Gere Engineers, wells MW-1, MW-7, MW-10, MW-11, MW-15, and MW-16 are bedrock groundwater monitoring wells.

Table 2
Organic Contaminants Present in Soil
Accurate Die Casting Facility -- Feasibility Study Report

Location	Depth (Ft below grade)	Analyte (ug/kg) Trichloroethene	Methylene Chloride	Acetone	PCB 1260
MW-3	4.0 - 6.0	1,800			
MW-3	19.0 - 20.0	7,500,000			
MW-4	0 - 2.0				2,000
B-9	15.0 - 16.5	<1,400			
B-11	25.0 - 26.5	1,300			
B-12	24.0 - 25.8	1,800			
B-13	15.0 - 17.0	4,500			
B-13	24.0 - 24.5	4,200			
B-14	15.0 - 17.0	800			
B-15	18.0 - 18.3	6,600			
B-16	15.0 - 17.0	2,700			
B-17	15.0 - 17.0	<1,200			
MW-10	24.5 - 26.5	840	6 *		
MW-10	27.5 - 31.8	390		250	
MW-11	30.0 - 32.0	30	2 *	24	
MW-12	20.0 - 26.5				
MW-13	17.5 - 19.5	38	11 *		
MW-14	4.0 - 8.0	5 *	11 *		
MW-14	25.0 - 26.5		11 *		
Septic Tank			12 *	12 *	

* Data Validation procedure determined that these numbers may not be accurate or precise
Note: Shaded Area denotes levels of contamination which exceed state guidance values.



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DATE: 9/92 JOB No.: 2125

ACCURATE DIE CASTING
FAYETTEVILLE, NEW YORK
SUBSURFACE INVESTIGATION

FIGURE 4
TCE CONCENTRATION IN GROUNDWATER
2 JUNE 1992/19 AUGUST 1992

ppm up to a depth of approximately 20 feet. Higher concentrations of TCE were found between 20 and 30 feet. In accordance with NYSDEC guidance, the clean-up goal for TCE is 0.7 ppm based on the leachability of the contaminant to groundwater.

An elevated level of Zinc (644 ppm) was detected in a septic tank sludge sample. The septic tank is located in the northern portion of the site and was connected to a drainage system from the manufacturing building (Figure 3).

Additional soil sampling was conducted in the spill area described in Section 3.1, to determine if residue from the oil spill is present. The soil samples obtained from this area detected PAH (semi-volatiles) ranging from non-detect to 49 ppm, PCBs ranging from non-detect to 2.3 ppm and dichloroethene (volatile) ranging from 19 ppm to 190 ppm. Table 3 shows the concentrations of PAHs detected in the soil samples obtained from the spill area.

The investigation identified five areas of concern at the site which need to be or have been remediated. The areas of concern are as follows (Figure 2): 1)former oil spill area, 2)an area of subsurface soil contaminated with TCE, 3)a plume of dissolved TCE in the shallow groundwater, 4)dissolved TCE in the bedrock aquifer, and 5)sludge contained in a septic tank.

3.2 Summary of Human Exposure Pathways:

Exposure pathways consist of five elements: a source of contamination, transport through environmental media, a point of exposure, a route of human exposure, and an exposed population. An exposure route is the mechanism by which contaminants may enter the body (e.g., inhalation, ingestion, absorption). Without all the elements, an exposure pathway is not complete. Risk assessments evaluate any current or future exposure pathways which could be complete. The Village has rezoned part of the site to residential. In this scenario, a complete exposure pathway at the site would be ingestion of and dermal (skin) contact with contaminated soil in the spill area. Some of the individual PAHs and VOCs found in the soil obtained from the spill area exceed the guidance levels for protection of human health. The magnitude of potential exposures for contaminated groundwater were calculated only for future conditions because the residences around the site obtain their drinking water from the Village's public water system. The results showed that this pathway would pose an unacceptable risk to human health, if the groundwater at the site were to be used as a source for water supply.

3.3 Summary of Environmental Exposure Pathways:

The groundwater at the site discharges into Bishop Brook. If unremediated, the contaminated groundwater would continue to contribute contamination to the Brook. The level of contamination would likely increase as the more heavily contaminated portion of the plume reached the Brook. There is a potential for the contaminated soil in the oil spill area to migrate to the Brook by surface water run-off. There is also a potential for wildlife to be exposed to the contaminated soil in the oil spill area.

SECTION 4: ENFORCEMENT STATUS

The NYSDEC and ITT entered into Consent Orders on September 20, 1990 and August 19, 1991. The First Order obligates the responsible party to implement the IRM program as stated in Section 2.2. The Second Order is for the implementation of the RI/FS program. An amendment to the second order

TABLE 3
PAH and Total PCB Concentrations in Soil from Outfall Area
Accurate Die Casting Facility - Feasibility Study Report

Analyte (ppm)	RAO[1]	S-1	S-2	S-3	S-4	S-5	S-5s	S-6	S-8	S-9	S-10	S-11	S-12	S-13	S-13s	S-14	S-14s	S-15	S-16	S-17	S-18
Naphthalene	13																				1.3
Acenaphthylene	41																				6.9
Acenaphthene	50		0.12										2						0.2		4
Fluorene	50		0.11																0.1		3
Phenanthrene	50	0.19	1.6		0.17			3.6	0.26	0.82	6.1	0.26	15			24		1.7	1.7	0.9	25
Anthracene	50	0.19	0.19					1.2		0.79	4.8		6			3.3		1.3	0.3	0.1	4
Fluoranthene	50	0.16	1.7					3	0.26	0.68	7.3		17	8.1		20		1.3	1.6	1.3	24
Pyrene	50	0.34	1.1		0.15	0.89		2.9	0.6	0.76	7.3		11	3.9		13		1.4	3.8	1.3	15
Benzo(a)Anthracene	0.224		0.38					2.1	0.1	0.74	4.4		13	4.1		8.3			0.67	0.34	5.7
Chrysene	0.40	0.11	0.66					5.1	0.16	0.12	14		17	14		17		10	1.2	0.66	8.4
Benzo(b)Fluoranthene	1.10		0.46								6.4		8.9	3.1		6.3			0.73	0.47	4.6
Benzo(k)Fluoranthene	1.10		0.47							0.27	4.4		8.4	2.4		5.4			0.74	0.51	5.1
Benzo(a)Pyrene	0.061		0.38								6.2		9	1.8		6.4		1.3	0.81	0.49	5.3
Indeno(1,2,3-cd)Pyrene	3.2																				
Dibenzo(a,h)Anthracene	0.014																				
Benzo(g,h,i)Perylene	50																				
Total PAH Compounds	500	0.99	7.17	0	0.32	0.89		17.9	1.38	4.18	60.9	0.26	107.3	37.4		104		17	11.8	6.12	113
Total PCBs	(2)	0.01			0.32	1.9		0.7		0.37	2.6	0.24	1.7	1.43		1.5		1.5			
Methylene Chloride	0.1						0.52B														
Dichloroethylene	0.3						.018B								190		19				
Trichloroethylene	0.7																				

Notes:

- Blanks indicated the compound was not detected
- RAO is Remedial Action Objective set by the NYSDEC expressed in mg/kg dry weight (ppm)
- RAO for PCBs is 1.0 mg/kg dry weight (ppm) in surface soils and 10 ppm in subsurface soils
- Samples designated with an "s" represent split sampling data performed by NYSDEC in July 1993

was executed to implement the current IRM program. Upon issuance of the Record of Decision, the NYSDEC will seek to implement the selected remedy under a new Order on Consent with the ITT.

The following is the chronological enforcement history of this site.

Date	Index No.	Subject of Order
1990	A7-0223-90-02	IRM
1991	A7-0258-91-03	RI/FS
1994	Amendment	IRM

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR 375-1.10. These goals are established under the guideline of meeting all standards, criteria, and guidance (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and to the environment at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Eliminate to the extent practicable, the contamination present within the soils on site.
- Eliminate the potential for direct human or animal contact with contaminated soils on site that present significant threats.
- Provide for attainment of groundwater standards for groundwater quality at the site to the extent practicable.

Table 4 presents the soil and groundwater remedial action goals established for the site.

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Accurate Die Casting site were identified, screened and evaluated in a Feasibility Study (FS). This evaluation is presented in the report entitled Feasibility Study Report, August 1994. A summary of the detailed analysis follows.

6.1 Description of Remedial Alternatives

Alternative 1: No Action

Present Worth:	$ 76,863
Capital Cost:	$ 0
Annual O&M:	$ 5,000

Table 4 Soil and Groundwater Remedial Action Goals (RAOs)

ACCURATE DIE CASTING SITE

SOIL

Total volatile Organic Compounds (VOCs)	10 ppm
Individual VOC	1 ppm
Polycyclic Aromatic Hydrocarbons (PAHs)	Note A
Polychlorinated Biphenyls (PCBs)	
Subsurface Soils	10 ppm
Surface soils	1 ppm

GROUNDWATER (*)

t-1,2-Dichloroethene	5 ppb
Trichloroethene	5 ppb
1,1,1-Trichloroethene	5 ppb
Vinyl Chloride	2 ppb
Ethylbenzene	5 ppb
Toluene	5 ppb
Xylene	5 ppb
PCB	0.1 ppb
Chromium	50 ppb

(*) Remedial action goals for groundwater are based on 6 NYCRR Part 703.5, groundwater standards.

Notes:

Note A - The remedial action goals for the PAHs will be to the site background conditions which will be determined during the design of the remedial action.

ppm - Parts Per Million (mg/kg or mg/l)

ppb - Parts Per Billion (ug/kg or ug/l)

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. Under this alternative, the contaminated groundwater at the site would be periodically monitored. The cost calculated for annual monitoring is based on a 30 year period. If necessary, the annual monitoring would continue after the 30 year period.

The no action alternative is an unacceptable alternative as the site would remain in its present condition, and human health and the environment would not be adequately protected.

Alternative 2: Groundwater Recovery and treatment / Soil Containment / Off-Site Disposal of Sludge

Present Worth:	$ 1,473,120
Capital Cost:	$ 797,500
Annual O&M:	$ 43,950

In this alternative, contaminated groundwater from the bedrock aquifer would be actively recovered by pumping. The recovered groundwater would be treated by air stripping/carbon adsorption. A cap would be constructed in the former oil spill area (area 1). The sludge from the septic tank would be removed and disposed of in an off-site landfill. A maintenance program would be established to maintain the cap.

Alternative 3: Groundwater Recovery and Treatment / Off-site Disposal of Soil and Sludge

Present Worth:	$ 1,850,000
Capital Cost:	$ 1,174,500
Annual O&M:	$ 43,950

As in alternative 2, contaminated groundwater from the bedrock aquifer would be actively recovered by pumping and the recovered groundwater would be treated by air stripping/carbon adsorption method. The contaminated soil from the former oil spill area (area 1) and the sludge from the septic tank would be excavated and/or removed for off-site disposal.

NOTE: The FS report for the site was prepared concurrently with the IRM work plan. Therefore, the remedial alternatives evaluated in the report focused on addressing all areas of concern at the site including the current IRM tasks. This ROD does not focus on the concerns already addressed by the current 1994 IRM. The remedial alternatives presented in this document are identical to those in the FS report except that the items which have been addressed by IRMs have been omitted. For this reason, the ROD has evaluated only three remedial alternatives.

6.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is contained in the Feasibility Study.

The first two evaluation criteria are considered "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not an alternative would meet applicable environmental laws, regulations, standards, and guidance. Please refer to Tables 5 and 6 for the SCGs applicable for this site. The chemical specific SCGs are classified as the cleanup goals determined for the site. Action specific SCGs are classified as the applicable regulations such as 6 NYCRR Part 372 for off-site disposal, NYSDEC's Air Guide 1 for air emissions and 6NYCRR Part 375 for removing the hazardous waste and remediating the site. Alternative 1 would not comply with this criterion because it would not remove and/or remediate the contaminated soil and groundwater. Alternative 2 would comply with action-specific SCGs but chemical-specific SCGs would not be met because the contaminated soil and sludge would be left in place. The potential exposures to the contaminated soil would be eliminated by the placement of the cap under Alternative 2. Alternative 3 is identical to 2 except that the contaminated soil and sludge would be excavated from the site for off-site disposal and landfilling.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective. Alternative 1 would not eliminate potential exposure because contaminated soil and groundwater would not be remediated. Alternative 3 would be most protective of human health and the environment because the soil and sludge would be removed from the site and the groundwater would be remediated. Alternative 2 would comply with this criterion by eliminating the potential for contact with soils by the placement of cover. The contaminated groundwater would be treated under both alternatives 2 and 3.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

Alternative 1 will not be evaluated for the remaining criteria because it did not comply with the threshold criteria.

3. Short-term Effectiveness and Impacts. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and implementation are evaluated. For all the alternatives, the short-term effectiveness of the groundwater remediation would be minimal because it would take several years to decades for this operation to be complete. Air emissions and the failure of the treatment system resulting in the discharge of contaminated groundwater to the Brook would be the risks from the operation of the groundwater remediation system. The air emissions would be controlled by carbon adsorption method and the failure of the treatment system would be controlled by the periodic maintenance. Alternative 3 would be more effective but would have the greater short term impacts because of dust from excavation activities. Alternative 2 would provide less disturbance of the contaminated soils when compared to Alternative 3. The dust generation during excavation activities under Alternatives 2 and 3 can be controlled by water spray which is an effective control method.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions.

Soil Remediation:

TABLE 5
Review of Chemical-Specific SCGs And To Be Considered Criteria
Accurate Die Casting Facility -- Feasibility Study Report

MEDIA	TITLE OF REGULATION	CITATION Federal	CITATION State
SOIL	NYSDEC Guidance Document for Setting Clean-up Levels		TAGM HWR-92-4046
GROUNDWATER	Water Quality Regulations		6 NYCRR 700-705
	Groundwater Classificaitons and Quality Standards		6 NYCRR 703 10 NYCRR 5.1 10 NYCRR 170
	Standards, Limitations for Discharges to Class GA Waters	NPDES	6 NYCRR 703 TOGS 1.1.1
	Federal & State DOH Sanitary Codes for Drinking Water	SDWA MCLs, MCLGs	10 NYCRR 5.1, 5.3
	Ambient Water Quality Standards & Guidance Values		TOGS 1.1.1
	SDWA	40 CFR 141, 143 PL 93-523	
	EPA Health Advisories and NAS SNARLS		
SURFACE WATER	SPDES/NPDES	NPDES	6 NYCRR 750-758 6 NYCRR 701.5
	Ambient Water Quality Standards & Guidance Values		TOGS 1.1.1
	Water Quality Regulations, Surface Water Classifications and Standards	FWQC CWA § 303, 304	6 NYCRR 700 - 705
AIR	NYS Guidelines for the Control of Toxic Ambient Air Contaminants		6 NYCRR 212
	National Emission Standards for Hazardous Air Pollutants	NESHAPS	
	NY State Air Pollution Control Regulations		6 NYCRR 201,202, 6 NYCRR 219

TABLE 6
Review of Remedial Action-Specific SCGs And To Be Considered Criteria
Accurate Die Casting Facility -- Feasibility Study Report

ACTION/RESPONSE	ACTIVITY TO MEET RESPONSE	CITATION		ARAR	Potential ARAR*
		Federal	State		
No Action	Monitoring		6 NYCRR 373	X	
			6 NYCRR 360	X	
Institutional Controls	Alternate Water Supply or User Treatment System		10 NYCRR 5 et seq.	X	
Containment	Cap	40 CFR 264	6 NYCRR 373	X	
			6 NYCRR 360	X	
	Vertical Barriers	40 CFR 268			X
Excavation &/or Soil Treatment	Disposal on site or in landfill	40 CFR 268	6 NYCRR 376		X
Collect/ Treat/ Discharge	Discharge to Surface Waters	NPDES	6 NYCRR 751		X
	Discharge to POTW	40 CFR 403	6 NYCRR 750 - 758		X
	Discharge to Groundwater	40 CFR 144	6 NYCRR 703		X
	Monitor	40 CFR 122, 125	6 NYCRR 751		X
			TOGS 86-W-52		X
All work on site	OSHA Regulations	29 CFR 1926		X	
Discharge of gases to atmosphere	Soil venting, discharge from air stripper or other treatment unit	40 CFR 60	6 NYCRR 257		X
	Incinerator		6 NYCRR 219		X
	Permit process		6 NYCRR 201		X
	Discharge of toxics	Clean Air Act			X
Incineration	Hazardous waste standards, emissions, monitoring requirements, etc.	40 CFR 264	6 NYCRR 373		X
	Emission limits	40 CFR 60	6 NYCRR 219		X

*Applicability of regulation is dependent on remedial technology(ies) chosen for site

Alternative 3 would provide long-term effectiveness and would permanently remediate the site. Alternative 2 would be effective with periodic maintenance and would provide adequate control to eliminate direct contact with the contaminated soil. The remedial action objectives (RAOs) would be achieved upon completion of the remedial activities under Alternative 3 whereas the RAOs would not be achieved under Alternative 2. Because the contaminated soil would be left at the site with a cap under Alternative 2, there would long-term problem such as cracks developing in the cap which would be controlled by periodic maintenance.

Groundwater Remediation:

The goal of groundwater remediation under both alternatives is to attain groundwater standards. The remediation would remove the contaminated groundwater but the effectiveness of the remediation and whether the Alternatives achieved the RAOs can be determined only by the long-term operation and monitoring of the pump and treatment system. This is because of the possible presence of non-aqueous phase liquid (NAPL) in groundwater and the geology of the bedrock.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site. Under Alternatives 2 and 3, groundwater extraction and treatment would reduce the volume of the contamination in groundwater in the aquifer. The treated groundwater would meet surface water standards and would be discharged to the brook. The mobility of the contaminated groundwater would be controlled by the pumping operation. All the contaminated soils from area 1 and sludge would be removed from the site thereby reducing the volume of the contaminated soil at the site under Alternative 3. Alternative 2 would reduce the mobility of the contaminants from the soil media by the placement of a cap.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personnel and equipment is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.. Between Alternatives 2 and 3, Alternative 3 is the easiest to implement because it involves excavation and transportation only. Alternative 2 is also easily implementable with readily available technologies. The necessary permits and Department approvals can be readily obtained for off-site disposal under Alternative 3 and the construction of the cap under Alternative 2.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. Between Alternatives 2 and 3, Alternative 2 would be lowest in cost but the remedy cannot be considered as permanent. The capital cost of Alternative 3 would be higher than Alternative 2 but the O&M costs are less. Both Alternatives 2 and 3 would be cost effective but Alternative 3 would be more protective and would be permanent. Table 7 provides the cost summary.

8. Community Acceptance - A public meeting was held on September 26, 1994 and the Proposed Remedial Action Plan was presented. No significant comments were raised during this public meeting. A comment letter was received during the comment period which ended on October 14, 1994. The response to this comment letter is provided in the Responsiveness Summary, Appendix A of this document along with a copy of the comment letter.

TABLE -7

REMEDIAL ALTERNATIVES COST SUMMARY
ACCURATE DIE CASTING FACILITY – FEASIBILITY STUDY REPORT

ALTERNATIVE	DESCRIPTION	CAPITAL COST	ANNUAL O&M	ESTIMATED PRESENT WORTH (1)
1	– No Action – Long–term monitoring	$0	$5,000	$76,863
2	– Cap soil in situ – Extract & treat ground water – Long–term monitoring	$797,500	$43,950	$1,473,120
3	– Dispose of soil off–site – Extract & treat ground water – Long–term monitoring	$1,174,500	$43,950	$1,850,000

Note: (1) Present worth value calculated assuming an interest rate of 5% and period of 30 years.

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SECTION 7: SUMMARY OF THE SELECTED ALTERNATIVE

Based upon the results of the RI/FS, and the evaluation presented in Section 6, the NYSDEC is selecting Alternative 3 as the remedy for this site.

The selection is based upon the following factors:

Alternative 1 is not protective, therefore, has been rejected. Alternative 2 would be protective and less costly than Alternative 3 but would not meet chemical-specific SCGs and would require continued maintenance for long-term effectiveness. Alternative 3 would be the most protective in the long term, have no significant short term impact and be cost effective. Alternative 3 would reduce the volume of the contaminated soil at the site whereas alternative 2 would not. Therefore, Alternative 3, which would be protective, cost effective and permanent, is the preferred remedy for this site.

The estimated present worth cost to implement the remedy is $1,850,000. The capital cost to construct the remedy is estimated to be $1,174,500 and the estimated average annual operation and maintenance cost for 30 years is $43,950.

The elements of the selected remedy are as follows:

1. A **remedial design** program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Uncertainties identified during the RI/FS will be resolved.

2. **Excavation of soils from area 1 and removal of the sludge from the septic tank for off-site disposal.** The soils from area 1 and the sludge from the septic tank will be excavated and disposed of in an off-site landfill. The excavated areas will be backfilled with clean soil. Excavation will be carried out in accordance with the recommended cleanup goals.

3. **Pumping of groundwater for on-site treatment and disposal.** The groundwater from the bedrock aquifer will be pumped, treated on-site and discharged into Bishop Brook. The goal of the groundwater treatment will be to achieve the groundwater standards.

4. A **Long-term groundwater monitoring** program will be implemented to periodically sample the groundwater at the site. This will determine the effectiveness of the groundwater remediation program.

5. The remediation of soil contaminated with TCE located in the north-east corner of the building which is identified as area 2 in Figure 2, page 3 has essentially been completed as an IRM. Confirmatory soil samples in this area needs to be taken. The IRM also includes the remediation of shallow groundwater remediation which is in progress. Upon completion, the IRM will have controlled the groundwater migration to Brook and eliminated the potential exposure to contaminated soil.

SECTION 8: HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Citizen Participation Plan was prepared for this site in **December 1993** detailing the citizen participation activities that have been carried out during the course of this project. A mailing list was established for this site. The Village of Fayetteville Clerk's office was established as the site's document repository along with NYSDEC offices in Syracuse and Albany. All the copies of the site related reports and documents were placed in the document repository for public review.

A public notice inviting public comment on the IRMs to be implemented was mailed in **April 1994** to the residents of the mailing list. This public notice provided the details of the site, investigations done to date, and the details of the IRMs to be implemented at the site.

A public meeting was held on **April 26, 1994** to present the details of the IRM and to receive public comment. The public comment period established for the IRM ended on May 6, 1994. A responsiveness summary and a Decision Document was prepared for the IRM which are available at the document repository for review. The Decision Document was executed by NYSDEC in May 1994. This document contained the details of the 1994 IRM, the evaluation of the remedial technologies and the rationale for the selection of remedial alternative to address the IRM issues. A copy of this document is included in the Administrative Record of this site.

A public notice inviting public comment on the Proposed Remedial Action Plan was mailed in **September 1994** to the persons on the mailing list. This public notice provided the details of the site, investigations done to date, details of the IRMs that were implemented at the site, and the details of the Proposed Remedial Action Plan.

A public meeting was held on **September 26, 1994** to present the details of the Proposed Remedial Action Plan and to receive public comment. A 30 day comment period was in effect from September 12, 1994 thru October 14, 1994. No significant comments were raised during the public meeting. A comment letter was received during the public comment period and the response to this comment letter is provided in Appendix A of this document.

APPENDIX A

RESPONSIVENESS SUMMARY

ACCURATE DIE CASTING INACTIVE HAZARDOUS WASTE SITE

RECORD OF DECISION

OCTOBER 1994

RESPONSIVENESS SUMMARY
ACCURATE DIE CASTING SITE

The Accurate Die Casting site is located on a 32-acre parcel at 547 East Genesee Street in the Village of Fayetteville, New York. The site includes parking areas adjacent to the main building, a wooded area to the north, scrub growth to the east, and a lawn to the south. The topography is generally flat on the south end of the site and slopes to the north on the north half of the site. At the northern edge of the site, there is a steep embankment adjacent to Bishop Brook, which flows from east to west. Bordering properties include abandoned farmland to the north, residential areas to the east and west and commercial properties to the south along East Genesee Street.

A series of investigations conducted at the site showed contamination in groundwater and soil. The primary contaminant found is trichloroethylene (TCE), a volatile organic compound. Based on the findings of preliminary investigations, three Interim Remedial Measures (IRM) were implemented at the site. They were: 1) approximately 70 drums found at the site after foreclosure and located inside the building had their contents identified and were then disposed, 2) the sludge from the TCE degreaser system was removed and the system was decontaminated, 3) the TCE free product pool which was discovered above the water table outside the north-east corner of the building was pumped until no free product was found in samples and the TCE was disposed.

Based on the results of the detailed investigations, two additional IRMs are being implemented at the site. They are: 1) remediation of soil contaminated with TCE and 2) remediation of shallow groundwater contaminated with TCE. A public meeting was held on **April 26, 1994** to present the details of the IRM and to receive public comment. The public comment period established for the IRM ended on May 6, 1994. A responsiveness summary and a decision document was prepared for the IRM which are available at the document repository for review.

A public meeting was held on **September 26, 1994** to present the details of the Proposed Remedial Action Plan and to receive public comment. A 30 day comment period was issued which was in effect from September 12, 1994 thru October 14, 1994. No significant comments were raised during the public meeting. A comment letter was received during the public comment period. The PRAP inferred in the Section, History of the Site, that the contamination at the site may have been due to the releases/spills from the TCE storage tank located outside the northeast corner of the building. The comment letter requested to change this statement based on the details obtained during a deposition in a Federal Court proceeding. A former employee has testified that spent TCE from the degreaser system was dumped periodically outside the northeast corner of the building. This type of disposal practice, which had not been documented by any manifest, has resulted in the contamination of the soil and groundwater at the site. This comment is addressed by the Department on the second paragraph on page 5 of this document.

The selected remedy for the site involves the excavation of the contaminated soil from area 1 (Figure 2) and sludge from the septic tank for off-site disposal. The excavated areas will be filled with clean soil. The bedrock groundwater will be extracted and treated on-site. The treated groundwater will be discharged to Bishop Brook.

APPENDIX B

ADMINISTRATIVE RECORD

ACCURATE DIE CASTING INACTIVE HAZARDOUS WASTE SITE

RECORD OF DECISION

OCTOBER 1994

Reports:

Summary Report, Phase II Environmental Assessment and Remediation Efforts, Stearns & Wheler, September 1990.

Volume I - Report, Volume II - Appendix A
Volume III - Appendix B-G (Appendix B is the Phase I report)

Summary Report, TCE Free Product Recovery, Stearns & Wheler, April 1991.

Summary Report, Investigation and Characterization of Sub-Slab Systems, Stearns & Wheler, August 1991.

Remedial Investigation/Feasibility Study Work Plan, Stearns & Wheler, May 1992.

Draft Remedial Investigation Report, Stearns & Wheler, January 1993.

Citizen Participation Plan, NYSDEC, December 1993.

Final Remedial Investigation Report, Stearns & Wheler, February 1994.

IRM Work Plan, O'Brien & Gere, May 1994.

IRM Decision Document, NYSDEC, May 1994.

Feasibility Study Report, O'Brien & Gere, August 1994.

Proposed Remedial Action Plan, NYSDEC, September 1994.

Record of Decision, NYSDEC, November 1994.

Consent Orders:

Consent Order Agreement between NYSDEC and ITT Commercial Corporation to implement the IRMs at the site, September 1990.

Consent Order Agreement between NYSDEC and ITT Commercial Corporation to implement the RI/FS at the site. August 19, 1991.

Amendment to the RI/FS Consent Order Agreement between NYSDEC and ITT Commercial Corporation to implement the 1994 IRMs at the site. June 6, 1994.

Correspondence:

Comment letter from V. Nattanmai (DEC) to N. Wood (ITT) on the Phase II Environmental Assessment Report. November 6, 1990.

Work Plan (Scope of Work) prepared by NYSDEC for the full-scale RI/FS.

Letter from V. Nattanmai (DEC) to N. Wood (ITT) to implement the RI/FS. March 4, 1991.

Comment letter from V. Nattanmai (DEC) to T. Hineline (Stearns & Wheler - SW) on RI/FS Work Plan. November 15, 1991.

Response letter from T. Hineline (SW) to V. Nattanmai (DEC) on RI/FS Work Plan. December 17, 1991.

Comment letter from V. Nattanmai (DEC) to T. Hineline (SW) on draft RI report. March 30, 1993.

Response letter from T. Hineline (SW) to V. Nattanmai (DEC) on draft RI report. May 7, 1993.

Comment letter from V. Nattanmai (DEC) to T. Hineline (SW) on responses to the DEC's comments on the draft RI report. June 7, 1993.

Letter from T. Hineline (SW) to V. Nattanmai (DEC) on additional field work for the RI. June 30, 1993.

Comment letter from V. Nattanmai (DEC) to T. Hineline (SW) on final RI report. January 12, 1994.

Response letter from T. Hineline (SW) to V. Nattanmai (DEC) on final RI report. February 25, 1994.

Comment letter from V. Nattanmai (DEC) to T. Hineline (SW) on draft FS report. April 26, 1994.

Response letter from J. Heckathorne (O'Brien & Gere - OBG) to V. Nattanmai (DEC) on draft FS report. May 4, 1994.

Letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) on the revisions to be done in the draft FS report. May 27, 1994.

Comment letter to J. Heckathorne (OBG) from A. English (DEC) on the final FS report. July 6, 1994.

Response letter from D. Towers (OBG) to V. Nattanmai (DEC) on the revisions to be done in the final FS report. August 11, 1994.

1994 INTERIM REMEDIAL MEASURES

Comment letter from V. Nattanmai (DEC) to T. Brown (OBG) on the IRM Work Plan. August 20, 1993.

Comment (additional comments) letter from V. Nattanmai (DEC) to T. Brown (OBG) on the IRM Work Plan. November 5, 1993.

Letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) to clarify some of the issues of the IRM work Plan. November 22, 1993.

Response letter from V. Nattanmai (DEC) to J. Heckathorne (OBG) to November 22 letter on the IRM Work Plan. December 8, 1993.

Letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) on the revisions to be done on the IRM work Plan. January 14, 1994.

Comment letter from V. Nattanmai (DEC) to J. Heckathorne (OBG) on the first round of revisions to the IRM Work Plan. February 9, 1994.

Letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) on additional revisions to be done on the IRM work Plan. March 2, 1994.

Memorandum from S. Mitchell (DEC) to V. Nattanmai (DEC) on wastewater discharge limits. December 2, 1993.

Letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) on wastewater discharge limits. March 28, 1994.

Letter from V. Nattanmai (DEC) to J. Heckathorne (OBG) requesting for additional information on the IRM Work Plan. March 24, 1994.

Memorandum from S. Mitchell (DEC) to V. Nattanmai (DEC) on revised wastewater discharge limits. March 28, 1994.

Response letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) on the additional information for the IRM Work Plan. March 28, 1994.

Letter from V. Nattanmai (DEC) to J. Heckathorne (OBG) IRM issues discussed during the April 7, 1994 meeting. April 14, 1994.

Response letter from J. Heckathorne (OBG) to V. Nattanmai (DEC) on the IRM issues discussed during the April 7, 1994 meeting. April 26, 1994.

Letter from V. Nattanmai (DEC) to J. Heckathorne (OBG) on the responses towards the IRM issues discussed during the April 7, 1994 meeting. May 3, 1994.

Letter from V. Nattanmai (DEC) to J. Heckathorne (OBG) on the final revisions to the IRM Work Plan. May 23, 1994.