OHIO ENVIRONMENTAL PROTECTION AGENCY'S

DECISION DOCUMENT
FOR THE

HANCOCK MANUFACTURING SITE
TORONTO, OHIO

July 1996

Declaration for the Decision Document

Site Name and Location

Hancock Manufacturing
Toronto, Ohio

Introduction

This Decision Document presents the selected remedial action for the Hancock Manufacturing site, in Toronto, Ohio. This document summarizes the site history, the Remedial Investigation (RI) and the Feasibility Study (FS) and the clean-up alternatives evaluated in the FS and presented in the Preferred Plan for the site. The Decision Document presents the Ohio EPA's selected alternative to clean-up the site contamination and the rationale and justification for that preference. The Decision Document also incorporates responses to comments received during the public comment period on the Preferred Plan. A responsiveness summary detailing the comments received and the Ohio EPA response is appended to this document.

Community Participation

Documents pertaining to the investigation at the site including the RI/FS and subsequent documents are public documents in the Ohio EPA files. Public documents pertaining to past and future activities at Hancock Manufacturing are available to the public at the Ohio EPA Southeast District Office in Logan, Ohio.

A document repository has been established in the Public Library of Steubenville and Jefferson County - Toronto Branch. The document repository contains copies of the RI/FS and the Preferred Plan. A copy of this Decision Document will be added to the repository. Copies of all final design documents and site reports will also be added to the repository after they are received and approved by the Ohio EPA.

Description of the Selected Remedy

The selected remedial action for the Hancock Manufacturing site addresses the source of contamination by using a soil vapor extration (SVE) system to remove contaminants from soil and by treating contaminated groundwater. The soil remedial alternative will consist of the following:

(1) a soil vapor extraction system (SVE) to remove the contaminants from soils in the two source areas and possibly in the third, potential, source area depending on the results from the pre-design soil sampling in this area,

(2) collection of SVE emissions with an absorptive material system with monitoring of any residual emissions and

(3) a soil sampling program and an air monitoring program to evaluate the effectiveness of the SVE system, ensure compliance with the SVE system's air permit and determine when the cleanup levels have been attained.

The groundwater remedial alternative will consist of the following:

(1) capturing the contaminated ground water plume with one or more pumping wells,

(2) using ultraviolet (UV) oxidation to treat the contaminated groundwater (UV oxidation involves exposing the recovered water to UV light, which causes molecular bonds to break),

(3) discharging treated ground water to the Ohio River in accordance with a National Pollution Discharge Elimination System (NPDES) permit, and

(4) quarterly sampling, at a minimum, of a network of monitoring wells both on-site and off-site until clean-up levels have been achieved.

The selection of UV oxidation as the treatment option is contingent upon the demonstration, through pre-design studies, that this technology will be effective at this site. If the pre-design studies reveal that this technology would not be effective, then air stripping, with carbon adsorption to reduce air emissions and water pollutant discharge, would be implemented at this site.

Decision Summary
Hancock Manufacturing Site
Toronto, Ohio

Decision Summary
Hancock Manufacturing
Toronto, Ohio

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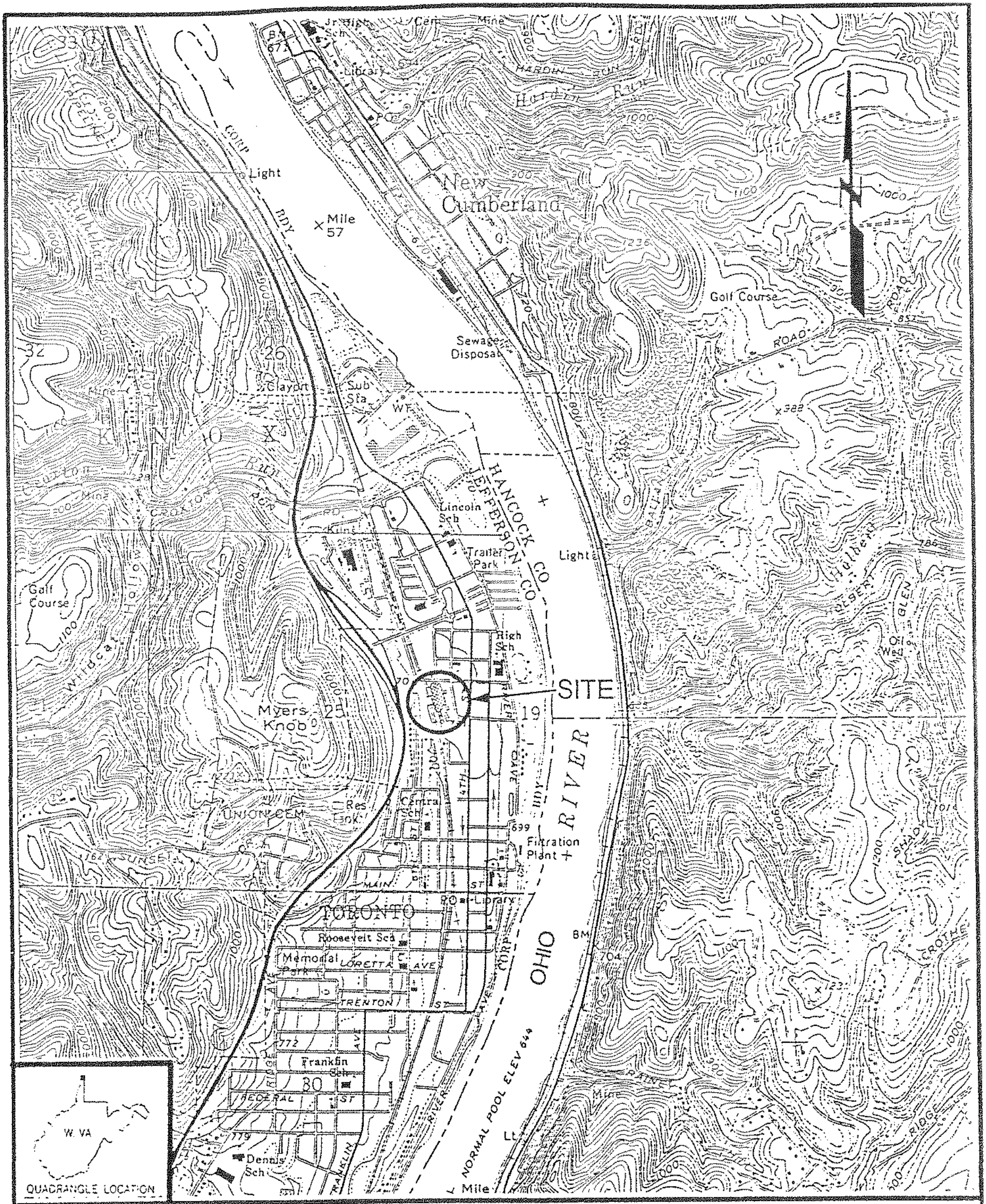
I. SITE DESCRIPTION AND HISTORY

The Hancock Manufacturing Site is located at Cleveland and Fifth Streets in Toronto, Ohio in Jefferson County *(see Figure 1)*. The 7 acre Site is bordered by residences to the north, south and east and by railroad tracks to the west.

For an undetermined period before 1945, the site was used by the American Sewer Pipe Company for the production of ceramic products. Hancock Manufacturing Company (HMC), a separate corporation from the Hancock Manufacturing Company currently leasing the plant site, occupied the plant site from 1945 until 1979. During this time period unregulated use and disposal of a solvent, trichloroethylene (TCE), resulted in the contamination of soil and groundwater at the Site. Since 1945, the plant site has been occupied and used first by the former HMC owner and later by the current Hancock Manufacturing Company, as a metal stamping and drawing plant that manufactures oil filter casings and refrigeration compressor housings.

TCE has been used at the plant site since the early 1950's, where it is used to remove drawing oils from the stampings during the final stages of production. No plant records exist which describe the procedures used by the former company in the disposal of waste TCE sludge. Information from employees indicate that until the early 1960's, waste TCE sludge was disposed of in the southwest corner of the plant property. Additionally, some TCE may have spilled around the TCE storage tank formerly located at the east side of the plant building. Currently, waste TCE is handled, in accordance with Ohio EPA regulations, by storing the material in steel containers prior to off-site disposal.

Hancock Manufacturing notified the Ohio EPA in 1986 when TCE was detected in the facility's production well. As a result of this contamination, Ohio EPA invited Hancock to negotiate an administrative consent order whereby Hancock would perform a remedial investigation/feasibility study (RI/FS). These negotiations failed and in June 1988, Hancock was ordered by Ohio EPA to conduct an RI/FS. In July 1988, Hancock filed a Notice of Appeal with the Environmental Board of Review (EBR). Over the course of nearly two years, the Attorney General's Office, Ohio EPA and Hancock negotiated to settle the appeal of the EBR case. Hancock settled their case in August 1990 by agreeing to comply with new Director's Final Findings and Orders which are identical in substance to the original June 1988 Findings and Orders.



WEIRTON, W. VA. - PA. QUAD

RMT INC 618.02 1292

FIGURE 1-1

SITE LOCATION MAP

SCALE: 1"=2000'

HANCOCK MANUFACTURING
COMPANY, INC.
TORONTO, OHIO

FIGURE 1: Site Location Map

II. NATURE AND EXTENT OF CONTAMINATION

Soils

The extent of soil contamination at the site was initially determined by a series of soil gas surveys that were performed across the entire site. Subsequently, soil sampling was performed in the identified areas in which contamination was found. During , and prior to, the Remedial Investigation (RI), soil samples were collected from various locations and depths (approximately 25 shallow and 10 deep) and sent to an off-site laboratory for analysis *(Figures 2 and 3)*. Additionally, soil samples were also collected from borings during monitoring well installation to assist in determining the vertical extent of soil contamination. These investigations resulted in the identification of three **source areas** (areas which contain significantly higher amounts of contamination than the remaining portions of the site). These areas, which are represented on *Figure 4*, are:

1. **the batch degreaser/TCE storage tank area**
2. **the drainage ditch along the railroad tracks**
3. **the "B-2" area - a small area near the southwest corner of Hancock's building.**

The RI concluded that the soils in the batch degreaser area are more contaminated than soils in the other two source areas. The highest level of TCE found in the batch degreaser area was 4,600 mg/kg compared to the highest level found in the drainage ditch (171 mg/kg) or the "B-2" area (79 mg/kg).

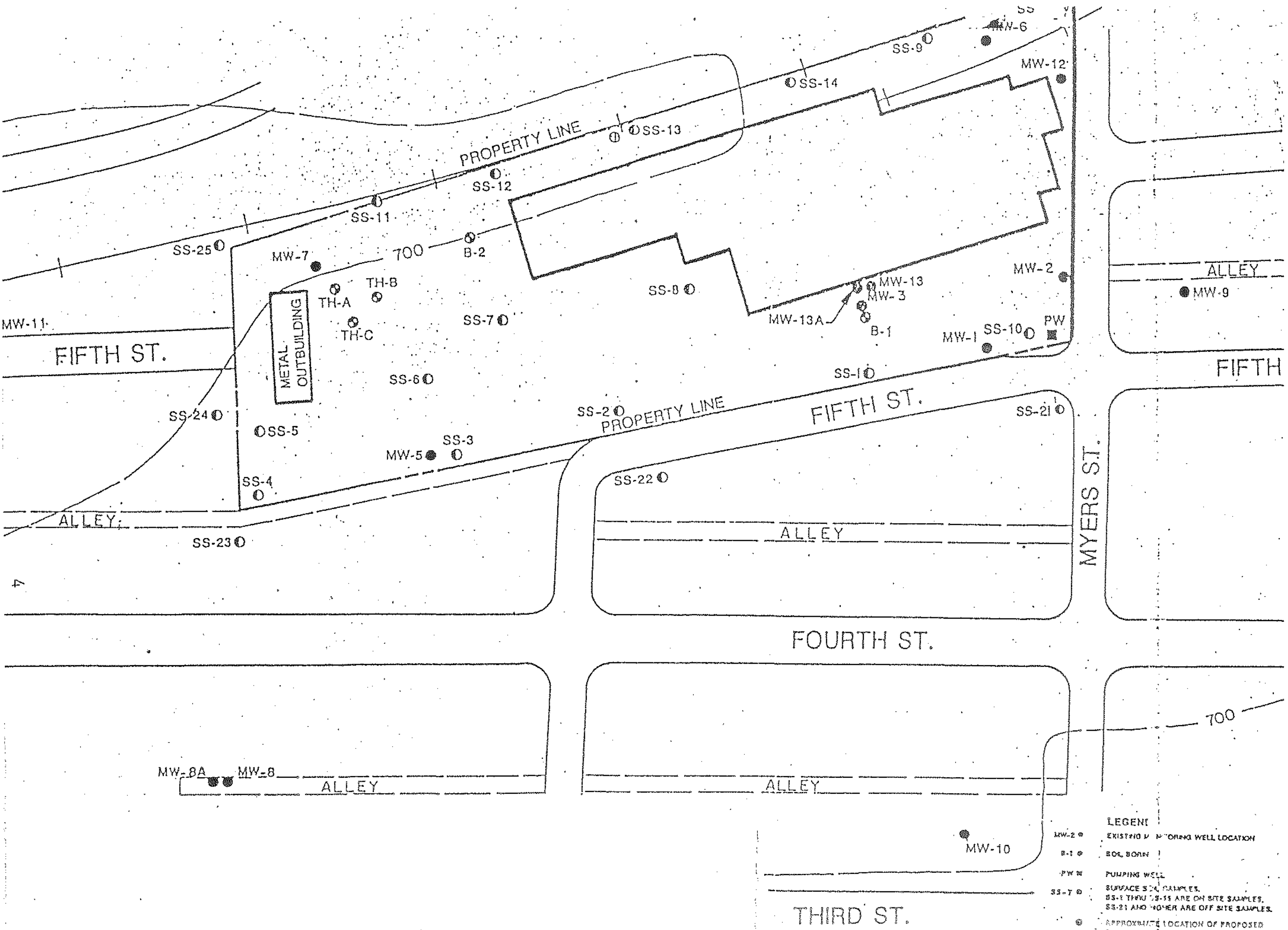


FIGURE 2: Surface Soil Sample Locations

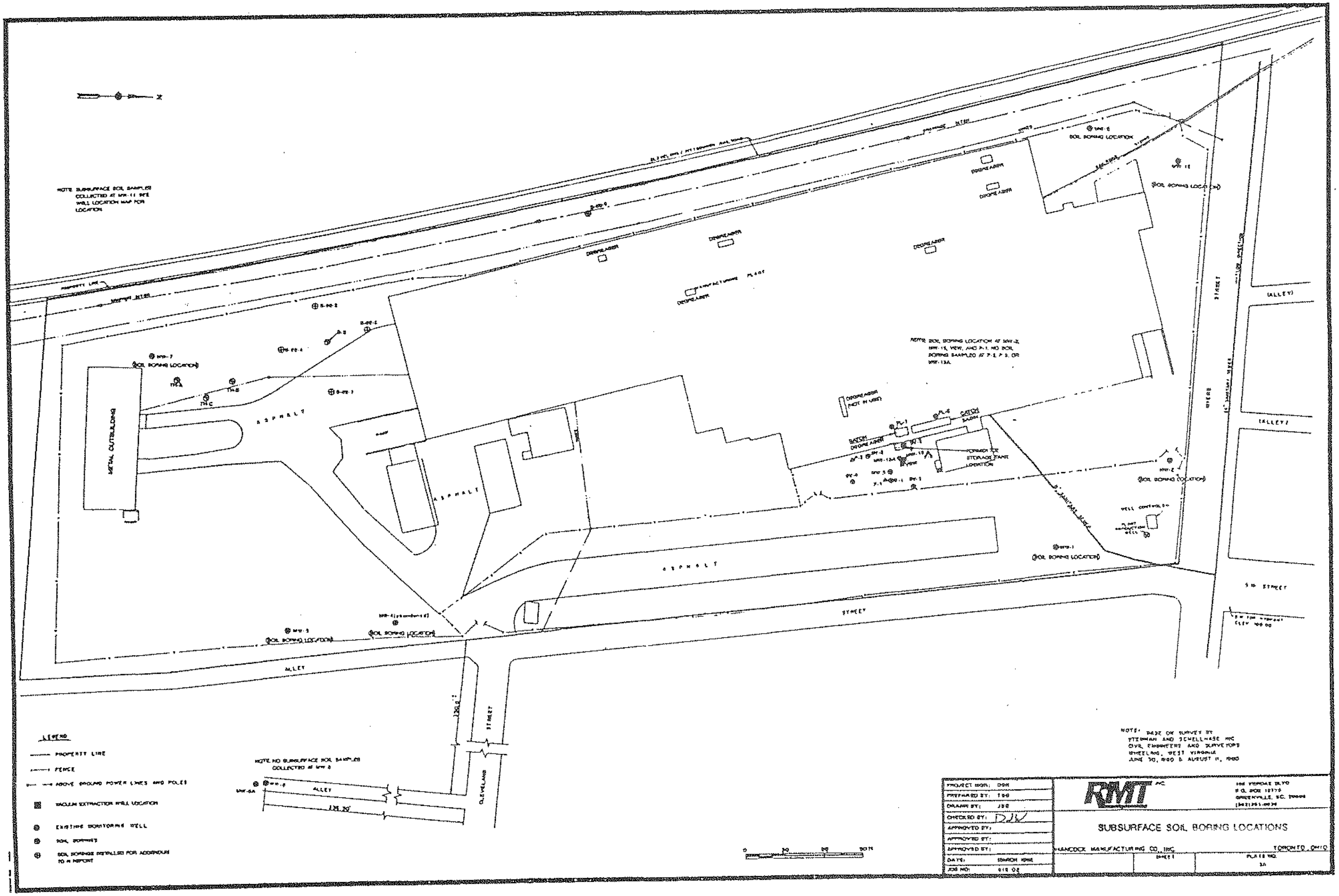


FIGURE 3: Subsurface Soil Boring Locations

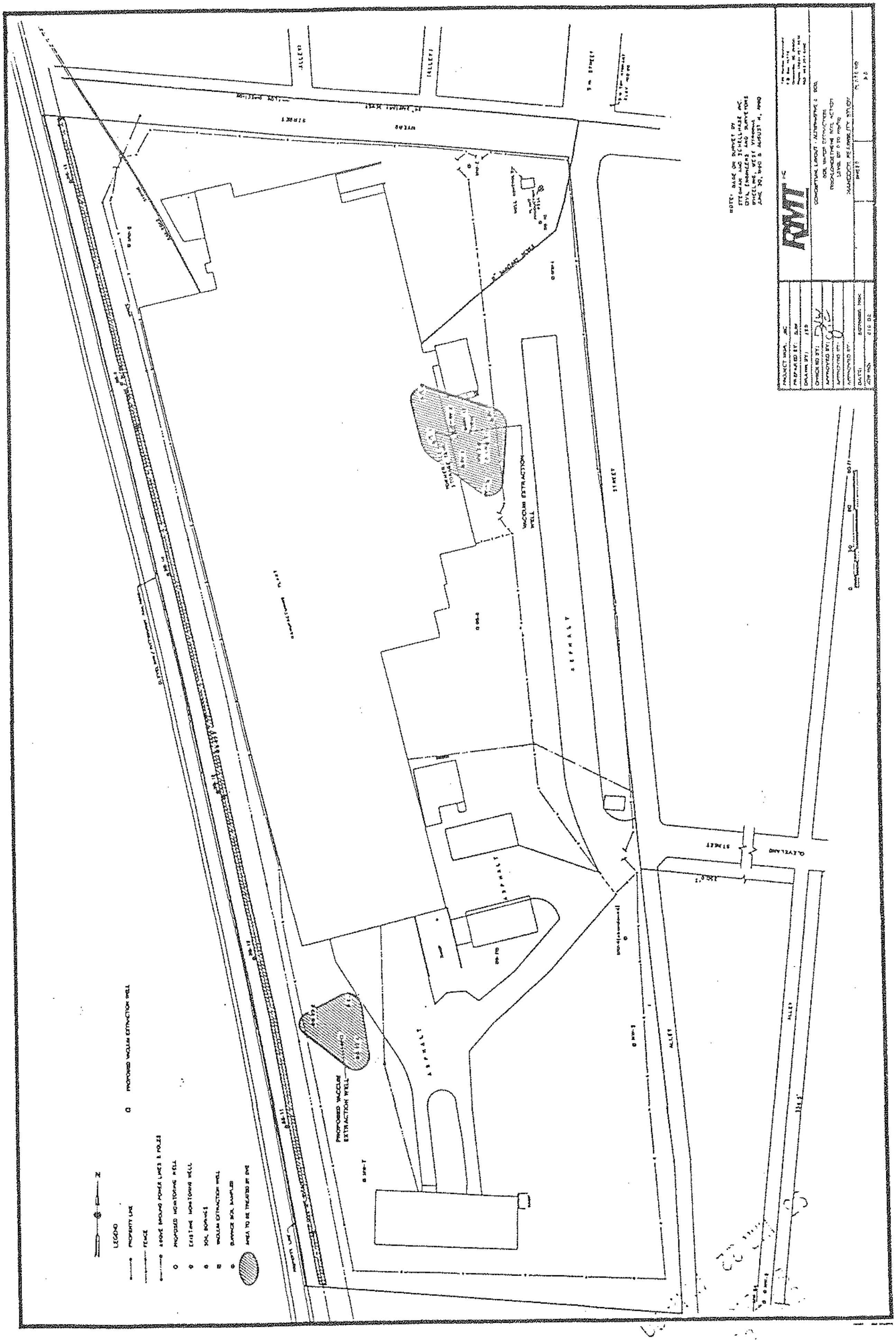


FIGURE 4: Source Areas

Groundwater

A hydrogeologic evaluation was conducted to characterize the aquifer beneath the Site and to determine the nature and extent of groundwater contamination at the Site. The aquifer underlying the Hancock Site is very productive and capable of providing continuous supplies of water to municipal, industrial and residential wells. Evidence of the aquifer's productivity includes Hancock's long term use of a production well at the Site, the hydrogeologic information obtained from the investigation and the information presented on the Ohio Department of Natural Resources Ground Water Resources Map of Jefferson County, which shows that a well, 80 feet deep, in Toronto, Ohio is capable of pumping 700 gallons per minute.

Initially, seven wells were constructed and sampled for volatile organic compounds (VOCs). The results indicated the presence of two chlorinated hydrocarbons, trichloroethylene (TCE) and a breakdown product of TCE, cis-1,2-Dichloroethylene (cis-1,2-DCE). In 1989, an off-site well pair, MW-8 and MW-8A, was installed to assist in determining the downgradient extent of the plume. In 1991, monitoring wells MW-9 through MW-11 were installed to determine the extent of contamination to the north, east and south of the Site. MW-12 replaced MW-6 which was damaged and MW-13 and MW-13A were installed to characterize contamination at the center of the batch degreaser/TCE storage tank source area. Vinyl chloride, also a breakdown product of TCE, has been detected in MW-13. Please refer to *Figure 5* for MW locations.

Since the beginning of the RI, groundwater sampling has been conducted quarterly for the aforementioned contaminants in the monitoring wells and the plant production well. Groundwater sample results indicate that a plume of contaminated ground water extends off-site, to the southeast, in the direction of the Ohio River.

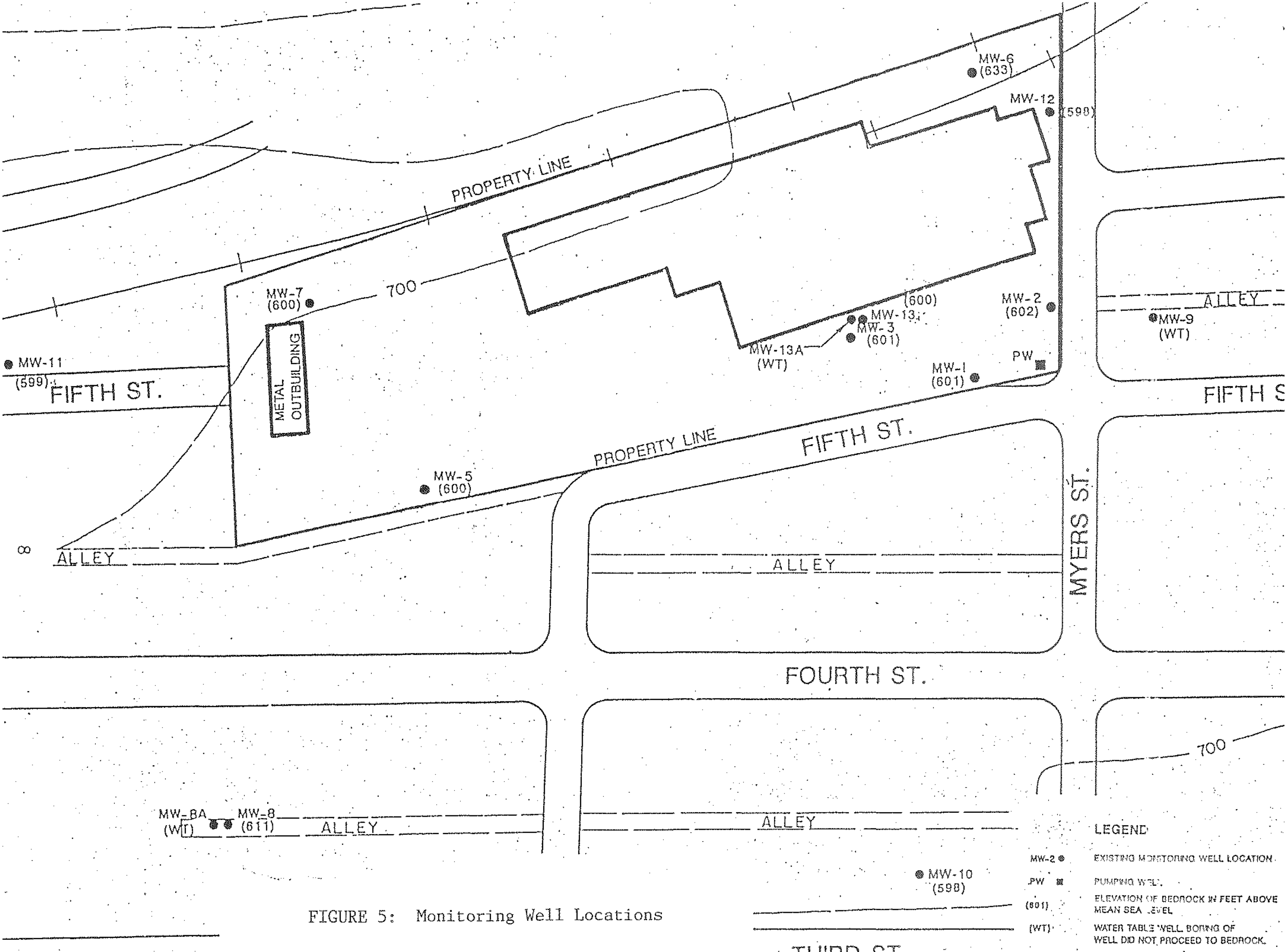


FIGURE 5: Monitoring Well Locations

III. SUMMARY OF SITE RISKS

The constituents of concern at this site identified in the Risk Assessment are TCE and cis-1,2 DCE. All pathways by which humans may be exposed to these constituents of concern were evaluated and quantified to estimate the risk to humans. Both current use and potential future-use exposure pathways were examined.

Estimates of non-carcinogenic and carcinogenic (cancer causing) risks from constituents of concern for different exposure pathways were calculated. The non-carcinogenic risk was determined by adding the hazard quotients for each constituent of concern. The hazard quotient is a quantitative estimate of the hazard associated with individual noncarcinogens. The sum of the hazard quotients is the hazard index for a particular exposure pathway. The exposure pathway hazard indexes are added together to calculate a site hazard index. A total site hazard index of less than 1.0 indicates that adverse effects are unlikely even with sensitive members of the population. A hazard index of greater than 1.0 indicates that there may be a potential hazard at the site associated with the constituents of concern.

Cancer risk is defined as the probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen in addition to the probability of cancer risks from all other causes. As a benchmark in developing clean-up goals at contaminated sites, an acceptable range of excess cancer risk from one in one million ($1x10^{-6}$) to one in ten thousand ($1x10^{-4}$) has been established. The point of departure for risk remaining after a site is cleaned up is $1x10^{-6}$ (i.e. a one in one million excess lifetime cancer risk, above and beyond risks from other unrelated causes).

The risk estimates for the scenarios assessed at the Hancock Site are summarized in the table below and are the estimated risks assuming no clean-up action is taken at the site. For current land use conditions, the non-carcinogenic and carcinogenic risks to off-site residents and on-site workers is within the acceptable range. However, the estimated carcinogenic risk to people exposed to groundwater from the Site is not within the acceptable range. The carcinogenic risk to persons potentially exposed to groundwater from the Site is based on a hypothetical exposure to groundwater. The City of Toronto has an ordinance in place that prohibits the use of drinking water wells within the city.

Risk based soil and groundwater exposure concentrations protective of human health were calculated for this site, and the information is presented in Section IV.

RISK ASSESSMENT SUMMARY

Current Land Use

Off-Site Residents

Exposure Scenario	Hazard Index	Carcinogenic Risk
Inhalation of Constituents in Basements	*	9.5×10^{-7}
Ingestion of Ditch Surface Soil and Sediments	2.8×10^{-4}	1.3×10^{-8}
Dermal Contact with Ditch Surface Soil and Sediments	2.1×10^{-3}	9.7×10^{-8}
Inhalation of Volatile Constituents from the Ditch	*	3.2×10^{-9}

TOTAL	2.4×10^{-3}	1.1×10^{-6}

On-Site Workers

Exposure Scenarios	Hazard Index	Carcinogenic Risk
Ingestion of Surface Soil	7.0×10^{-4}	5.1×10^{-7}
Dermal Contact with Surface Soil	5.8×10^{-3}	4.3×10^{-6}
Inhalation of Volatile Constituents in Ambient Air	*	7.5×10^{-9}

TOTAL:	6.5×10^{-3}	4.8×10^{-6}

Future Land Use

On-Site Adult Resident

Exposure Scenario	Hazard Index	Carcinogenic Risk
Ingestion of Surface Soil	1.6×10^{-3}	5.2×10^{-6}
Dermal Contact with Surface Soil	2.9×10^{-2}	9.4×10^{-5}
Inhalation of Volatile Constituents in Ambient Air	*	3.7×10^{-8}
Ingestion of Groundwater	6.5×10^{-1}	8.1×10^{-4}
Absorption of Constituents in Groundwater while Showering	1.0×10^{-2}	2.4×10^{-5}
Inhalation of Constituents in Groundwater while Showering	*	7.7×10^{-4}

TOTAL:	6.9×10^{-1}	1.7×10^{-3}

On-Site Child Resident

Exposure Scenario	Hazard Index	Carcinogenic Risk
Ingestion of Surface Soil	1.5×10^{-2}	9.6×10^{-6}
Dermal Contact with Soil	5.5×10^{-2}	3.6×10^{-6}
Inhalation of Volatile Constituents in Ambient Air	*	3.6×10^{-6}
Ingestion of Groundwater	3.0	7.6×10^{-4}
Absorption of Constituents in Groundwater while Showering	1.8×10^{-2}	9.1×10^{-6}
Inhalation of Constituents in Groundwater while Showering	*	7.1×10^{-4}

TOTAL:	3.1	1.5×10^{-3}

* A Hazard Index for inhalation was not estimated for the Site. Inhalation reference doses are not available for the two constituents of concern.

IV. SUMMARY OF CLEAN-UP VALUES

The contaminants of concern at the Hancock site identified during the RI are TCE and cis-1,2 DCE. Two additional contaminants of concern, trans-1,2 DCE, and vinyl chloride, were identified after the RI. TCE is listed by U.S.EPA as a probable human carcinogen while vinyl chloride has been listed as a carcinogen. TCE and cis-1,2 DCE have been detected in both soils and groundwater at the Hancock site while trans-1,2 DCE has been detected in only one soil sample and in groundwater. Vinyl chloride has been detected only in groundwater at this site.

Groundwater Clean-up Levels

Because all four contaminants have been detected in groundwater, groundwater clean-up levels have been established for each of these contaminants. TCE has frequently exceeded the maximum contaminant level (MCL) in several on-site and off-site wells. Vinyl chloride has exceeded MCLs in MW 13. MCLs are standards promulgated under the Safe Drinking Water Act establishing a maximum allowable level of a contaminant in water which is delivered to any user of a public water system. MCLs are used as clean-up levels for groundwater unless a particular contaminant does not have an established MCL or unless there are multiple contaminants in groundwater. If MCLs are not available or if the MCLs are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure, then the 10^{-6} risk level shall be used as the point of departure for determining remediation goals [NCP, 40 CFR Part 300.430 (e)(2)(i)(A)(2)] In these instances, a risk based exposure concentration protective of human health is calculated, taking into consideration the combined effects of the contaminants.

MCLs will be used as clean-up levels for vinyl chloride (2 ug/l), cis-1,2 DCE (70 ug/l) and trans-1,2 DCE (100 ug/l). The MCL will be used as an initial clean-up level for TCE (5 ug/l). However, once TCE is reduced to 5 ug/l , the concentrations of the other three contaminants will be evaluated and if the carcinogenic risk exceeds 10^{-6} then the concentration of TCE will be reduced to 3 ug/l in order to meet the 10^{-6} risk goal.

Soil Clean-up Levels

TCE and cis-1,2 DCE have also been detected in on-site soils. In soil samples collected at the site where cis-1,2 DCE was detected, TCE was typically found at significantly higher concentrations. Some of these locations include FL-1, FL-2, B-1 and B-2 (Figures 4-1 and 4-2). Because of the similar chemical nature of these constituents, clean-up action levels for soil are based on TCE concentrations. In order to establish a soil clean-up value for TCE, risks from ingestion of TCE contaminated soils and dermal contact with TCE contaminated soils were evaluated as well as leaching of TCE from soils into groundwater.

A health-based clean-up level was calculated by considering exposure to TCE through incidental ingestion of soil and dermal contact with soil. According to this calculation, a TCE concentration of 7.6 mg/kg in soil would result in an excess carcinogenic risk to the potentially exposed population of 1×10^{-6}. U.S. EPA lists TCE as a probable human carcinogen (Class B2); no conclusive evidence exists that ingestion or exposure to soil that is affected with TCE causes cancer in humans (IRIS, U.S.EPA 1995).

In addition to the TCE health-based soil clean-up value, Hancock developed two TCE leach-based clean-up values in the FS. The leach-based clean-up levels take into account the release of TCE from the soils into the groundwater. Both clean-up values were calculated by using the Summers Model which is a model used to develop a soil clean-up level that is protective of groundwater. K_d is one of the variables in the Summers Model and it represents the partitioning of a contaminant between the liquid (water) and solid (soil) phase. The two different leach-based clean-up levels were developed using two different K_d values. One leach-based clean-up level was calculated using a K_d value based on the organic carbon partitioning coefficient (K_{oc}) for TCE and the percentage of organic carbon in the soils at the Hancock site. The K_{oc} for TCE is a theoretical value. The clean-up level using the K_{oc} based K_d value is 0.35 mg/kg. Hancock developed the other leach-based clean-up level by conducting experiments on soils from the Site to determine a site specific K_d value. The clean-up level using the site-specific K_d value is 10.1 mg/kg. The Ohio EPA is not confident that the results from the experiment conducted by Hancock are reproducible and adequately represent the actual conditions at the Site. Additionally, there is a lack of adequate consensus in the literature regarding the utilization of the results from experiments similar to Hancock's experiment. Therefore, Ohio EPA is hesitant to accept the 10.1 mg/kg clean-up value as one that will be protective of groundwater.

Ohio EPA will establish the health-based value of 7.6 mg/kg as an initial clean-up value. Exposure, through incidental ingestion and/or dermal contact, to soils with TCE at concentrations of 7.6 mg/kg or less will result in an acceptable excess cancer risk of 10^{-6} or below. Based on the results of their study, Hancock believes that this value will be protective of groundwater. However, because uncertainties exist, a groundwater monitoring program will be established to ensure that soils are cleaned-up to a protective level. If, at some point during or after soil remediation, it is determined that a soil clean-up level of 7.6 mg/kg is not protective of groundwater, then Ohio EPA and Hancock will work together to establish an appropriate leach based clean-up value, and remediation of soils will continue until this value has been acheived.

V. DESCRIPTION OF ALTERNATIVES

A description of the soil and groundwater remedial alternatives selected for detailed analysis is provided in this section. Cost estimates are also provided. Each of the soil remedial alternatives has cost estimates for both the 7.6 mg/kg and 0.35 mg/kg soil clean-up values. All costs presented in the Preferred Plan and in this Decision Document are based on 1992 costs. The Operation and Maintenance (O&M) cost presented for each alternative is the present worth for the O&M costs. Although the actual cost for each alternative may differ from the estimate at the time of implementation, the estimates are valid for comparative purposes.

Based on current data, it is uncertain whether or not treatment of soil in the area of Boring B-2 would be required with a soil clean-up level of 7.6 mg/kg for TCE. Therefore, additional sampling conducted prior to or during the design phase is necessary in order to determine if the TCE concentrations in soil exceed 7.6 mg/kg in this area. The alternatives for addressing soil remediation are summarized below:

No Action - Soils

The No Action alternative for soil is retained as the baseline case for comparison against other alternatives. The only active component of this alternative is the surface soil monitoring. This alternative would not effectively reduce migration of constituents to groundwater. Additionally, this alternative does not reduce the potential for exposure to constituents of concern by human or environmental receptors.

Cost Estimates

0.35 mg/kg Clean-up Value for Soils

Capital Costs	$ 26,000
Operation and Maintenance (O&M) Costs for 30 years	$ 511,000*
Total Present Worth	$ 537,000

*Cost includes annual monitoring at 14 soil locations.

7.6 mg/kg Clean-up Value for Soils

Capital Costs	$ 26,000
Operation and Maintenance (O&M) Costs for 30 years	$364,000**
Total Present Worth	$390,000

**Cost includes annual monitoring at 9 soil locations.

Institutional Controls and Long-Term Monitoring - Soils

This alternative includes (1) the installation of a fence around the source areas, (2) the development and implementation of a long-term monitoring program for surface soils and (3) the utilization of a land use deed restriction.

As proposed, the alternative would limit access to the site and thus access to the contaminated soil. The contaminated surface soils would be sampled on an annual basis. This alternative would not effectively reduce the migration of constituents to groundwater. Moreover, the implementability of the institutional controls is questionable if the current owners were to sell the property.

Cost Estimates

0.35 mg/kg Clean-up Value for Soils

Capital Costs	$ 85,000
O&M Costs for 30 years	$ 511,000*
Total Present Worth	$ 596,000

*Costs include annual monitoring at 14 soil locations.

7.6 mg/kg Clean-up Value for Soils

Capital Costs	$ 85,000
O&M Costs for 30 years	$ 364,000**
Total Present Worth	$ 449,000

**Costs include annual monitoring at 9 soil locations.

Soil Vapor Extraction (SVE) with Treatment of Air Emissions

This remedial alternative consists of (1) the soil vapor extraction (SVE) system which will remove the contaminants from the soil in the three source areas identified in the RI, and (2) an air emissions treatment system containing an adsorptive material such as activated carbon to treat emissions produced by the SVE system.

SVE is a method to remove VOCs from soil by moving air through the soil under forced vacuum conditions. The contaminants are transferred to the air as it moves through the soil and the VOC-laden air is collected and discharged or treated, depending on the amount and type of contaminants present. The effectiveness of SVE at the Hancock site has been proven through a full-scale pilot study in the Degreaser/Former Storage Tank Area. Data from this pilot study also indicate that high VOC concentrations were present in the exhaust gases. In order to minimize the transfer of contaminants from soil to air, several different technologies to treat the air emissions were evaluated. The thermal incineration and catalytic incineration treatment technologies were not cost effective when compared to adsorbent material systems.

This alternative will reduce the toxicity, mobility and volume of the constituents in soil, and by installing equipment to treat air emissions, the concentration of contaminants being released to the air will be significantly reduced.

Cost Estimates

0.35 mg/kg Clean-up Value for Soils

Activated Carbon

Capital Costs	$ 911,000
O&M Costs for 3 years	$ 381,000
Total Present Worth	$ 1,292,000

Adsorption Bed

Capital Costs	$ 974,000
O&M Costs for 3 years	$ 560,000
Total Present Worth	$ 1,534,000

7.6 mg/kg Clean-up Value for Soils

Activated Carbon

Capital Costs	$ 828,000
O&M	$ 125,000
Total Present Worth	$ 953,000

Adsorption Bed

Capital Costs	$ 860,000
O&M	$ 171,000
Total Present Worth	$ 1,031,000

SVE for the Degreaser and B-2 Source Areas and Excavation of the Drainage Ditch Sediments

This remedial alternative consists of the same remedial measures as the SVE with treatment of air emissions alternative except for the drainage ditch area (one of the three source areas identified in Section II of this Decision Document). In this area, contaminated material would be excavated and taken to an off-site facility for treatment and/or disposal. The treatment/disposal facility would be selected based on whether the material is a hazardous waste per Ohio Administrative Code (OAC) 3734-52-11. Cost estimates are included in this Decision Document for excavation, transport, and disposal of the material as a hazardous waste and as a nonhazardous waste.

This alternative would minimize the potential for future constituent exposure to human receptors by direct contact with the soil at the Site. Excavation of the soil and disposal

in a secure landfill will reduce mobility but not the volume and toxicity. The SVE component will reduce toxicity, mobility and volume through treatment of air emissions.

Cost Estimates

Disposal as Hazardous Waste

0.35 mg/kg Clean-up Value for Soils

Activated Carbon

Capital Costs	$ 3,455,000
O&M Costs for 3 years	$ 350,000
Total Present Worth	$ 3,805,000

Adsorption Bed

Capital Costs	$ 3,513,000
O&M	$ 529,000
Total Present Worth	$ 4,042,000

7.6 mg/kg Clean-up Value for Soils

Activated Carbon

Capital Costs	$ 3,348,000
O&M	$ 107,000
Total Present Worth	$ 3,455,000

Adsorption Bed

Capital Costs	$ 3,438,000
O&M	$ 154,000
Total Present Worth	$ 3,592,000

Disposal as Non-hazardous Waste

0.35 mg/kg Clean-up Value for Soils

Activated Carbon

Capital Costs	$1,019,000
O&M Costs for 3 years	$350,000
Total Present Worth	$1,369,000

Adsorption Bed

Capital Costs	$1,078,000
O&M	$529,000
Total Present Worth	$1,607,000

7.6 mg/kg Clean-up Value for Soils

Activated Carbon

Capital Costs	$912,000
O&M	$107,000
Total Present Worth	$1,019,000

Adsorption Bed

Capital Costs	$1,003,000
O&M	$154,000
Total Present Worth	$1,157,000

The alternatives to address groundwater remediation are summarized below:

No Action - Groundwater

The No Action alternative for groundwater provides a baseline for comparing the effects of other alternatives. Because there are no active components of this alternative other than environmental monitoring, long-term human health and environmental risks for the Hancock site would be the same as those identified in the Risk Assessment.

Cost Estimates

Capital Costs	$ 26,000
O&M Costs for 30 years	$ 981,000
Total Present Worth	$ 1,007,000

Institutional Controls and Long-Term Monitoring - Groundwater

This groundwater remedial alternative includes (1) the establishment of deed restrictions to be used in conjunction with the existing City of Toronto ordinance that prohibits the use of drinking water wells within the city and (2) long-term groundwater monitoring. This alternative does not include remedial actions to lower the contaminant concentrations in groundwater or to prevent further off-site migration, and therefore, contaminant concentrations in groundwater will continue to exceed MCLs. Moreover, the implementability of the institutional controls is questionable if the current owners were to sell the property.

Cost Estimates

Capital Costs	$ 52,000
O&M Costs for 30 years	$ 981,000
Total Present Worth	$ 1,033,000

Groundwater Pumping and Discharge to the POTW

This groundwater remedial alternative consists of (1) pumping the plant production well at an increased rate, in order to capture the contaminated groundwater plume, (2) using the recovered water as non-contact cooling water, which is necessary for the plant to operate, then 3) discharging this untreated water to the Toronto POTW, and (4) implementing a long-term groundwater monitoring program.

This alternative has been evaluated based on the assumption that recovery wells in addition to the plant well are not necessary at this site. The assumption is based on a groundwater capture model presented in Reassessment of Site Hydrology at Hancock

Manufacturing Co., Inc. (RMT, December 1989). It is possible that further evaluation during remedial design could show that multiple pumping wells are necessary to effectively remediate the groundwater at the Site.

The concentration of VOCs in the untreated water that reaches the Toronto POTW will probably be reduced by both volatilization and biological activity. Additionally, contaminant concentrations will be diluted before they reach the POTW.

Implementation of this alternative will reduce the constituent concentrations in groundwater at the Site and in the area immediately surrounding the Site. However, some of the contaminants will be released into the air at the POTW. Pumping the plant production well could potentially lower concentrations of the constituents in groundwater to below MCLs.

Cost Estimates

Capital Costs	$ 34,000
O&M Costs for 10 years	$ 895,000
Total Present Worth	$ 929,000

Pump, Treat, and Discharge Groundwater to Surface Water Body

This groundwater remedial alternative consists of (1) pumping the plant production well to capture the contaminated ground water plume, (2) treating the contaminated ground water (air stripping, carbon adsorption, chemical oxidation and ultraviolet oxidation were the four technologies evaluated), (3) using the treated water as non-contact cooling water, which is necessary for the plant to operate, and discharging any of the treated groundwater not used for plant processes through the combined sewer system to the Ohio River in accordance with an NPDES permit, and (4) developing a long-term groundwater monitoring program.

This alternative was evaluated based on the assumption that recovery wells in addition to the plant well are not necessary at the Site. The assumption is based on a groundwater capture model presented in Reassessment of Site Hydrology at Hancock Manufacturing Co., Inc. (RMT, December 1989). It is possible that further evaluation during remedial design could show that multiple pumping wells are necessary to effectively remediate the groundwater at the Site.

Implementation of this alternative will reduce constituent concentrations in groundwater at the Site and in the area immediately surrounding the Site. Pumping the plant production well could potentially lower concentrations of the constituents in groundwater to below MCLs.

Cost Estimates

Air Stripping

Capital Costs	$ 430,000
O&M Costs for 10 years	$ 1,396,000
Total Present Worth	$ 1,826,000

Carbon Adsorption

Capital Costs	$701,000
O&M Costs for 10 years	$1,737,000
Total Present Worth	$2,438,000

Chemical Oxidation

Capital Costs	$384,000
O&M Costs for 10 years	$1,598,000
Total Present Worth	$1,982,000

Ultraviolet Oxidation

Capital Costs	$376,000
O&M Costs for 10 years	$1,067,000
Total Present Worth	$1,443,000

In-Situ Air Sparging/ Soil Vapor Extraction

This groundwater remedial alternative consists of (1) an air sparging system to remove the contaminants from the ground water (by injecting air into the groundwater, the rate of volatilization is increased). The system would be designed so that these contaminants are then captured by the SVE system, and (2) a groundwater monitoring program.

Implementation of this alternative will reduce constituent concentrations in groundwater at the Site. However, impacted groundwater that has left the Site will not be satisfactorily treated by this alternative. Constituents of concern in the groundwater below the site could potentially be reduced to below MCLs.

Cost Estimates

Capital Costs	$ 234,000
O&M Costs for 10 years	$ 1,168,000
Total Present Worth	$ 1,402,000

VI. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting the remedial alternative for the Hancock site, Ohio EPA considered the following eight criteria:

1. Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection, and describes how risks are eliminated, reduced or controlled through treatment, engineering controls, and/or institutional controls.

2 Compliance with all State, Federal and Local laws and regulations addresses whether or not a remedy will meet all of the applicable State, Federal and Local environmental statutes.

3. Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once clean-up goals have been met.

4. Reduction of toxicity, mobility, or volume is the anticipated performance of the treatment technologies to yield a permanent solution. This includes the ability of the selected alternative to reduce the toxic characteristics of the chemicals of concern or remove the quantities of those chemicals to an acceptable risk concentration or regulatory limit and/or decrease the ability of the contaminants to migrate through the environment.

5. Short-term effectiveness involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until clean-up goals are achieved.

6. Implementability is the technical and administrative feasibility of a remedy, including the availability of goods and services needed to implement the chosen solution.

7. Cost includes capital and operation and maintenance costs.

8. Community acceptance will be assessed in the Decision Document following review of the public comments received on the RI Report, the Feasibility Study and the Preferred Plan.

The preferred soil alternative is cost effective when compared to the treatment alternative which included excavation of ditch soils/sediments. Additionally, the effectiveness of SVE at the Hancock site has been proven through a full-scale pilot study in the Degreaser/Former Storage Tank Area.

The preferred groundwater alternative is the most appropriate for this site because of the relatively large area of groundwater contamination. The air-sparging alternative would be most effective in small, confined areas of contamination.

Although the groundwater alternative involving pumping and discharging to the POTW costs less than the preferred alternative, it was not chosen because: 1) no significant reduction in toxicity, volume and mobility would be achieved, 2) the contaminants would be released untreated into the air, and 3) the volume of the proposed discharge would potentially reduce the POTW's operating capacity and treatment effectiveness.

UV oxidation was selected as the preferred method for treating groundwater because, based on information presented in the FS Report, this treatment option is more cost effective than chemical oxidation, carbon adsorption, and air stripping with carbon adsorption to control air emissions. Moreover, UV oxidation is a treatment option which destroys the contaminants rather than transferring the contaminants to other media.

VII. SELECTED REMEDY

The Ohio EPA's selected remedy for the Hancock site is a combination of SVE with treatment of air emissions and groundwater pump, treat, and discharge to a surface water body. The soil remedial alternative will consist of (1) a soil vapor extraction system (SVE) to remove the contaminants from soils in the two source areas and possibly in the third, potential, source area, depending on results of pre-design soil sampling in this area, (2) collection of SVE emissions with an absorptive material system with monitoring of any residual emissions and (3) a soil sampling program. These programs will monitor the effectiveness of the SVE system, ensure compliance with the SVE system's air permit and determine when the cleanup levels have been attained. The groundwater remedial alternative consists of (1) capturing the contaminated groundwater plume with a pumping well(s), (2) using ultraviolet (UV) oxidation to treat the contaminated groundwater (UV oxidation involves exposing the recovered water to UV light, which causes molecular bonds to break), (3) discharging treated ground water to the Ohio River in accordance with a National Pollution Discharge Elimination System (NPDES) permit, and (4) quarterly sampling, at a minimum, of a network of monitoring wells both on-site and off-site until clean-up levels have been achieved. The selection of UV oxidation as the preferred treatment option is contingent upon the demonstration, through pre-design studies, that this technology will be effective at this site. If the pre-design studies reveal that this technology would not be effective, then air stripping, with carbon adsorption to reduce air emissions and water pollutant discharge, would be implemented at this site.

Utilization of these two alternatives will comply with all state, federal and local regulations. The remedy will reduce toxicity, volume and mobility of the constituents by removing them from the soil and groundwater. This remedy is implementable using currently available technology, will be effective in the long-term since the removal of the contaminants will be permanent, and will be effective in the short-term since the contaminants will begin being removed from the soils and groundwater immediately when the remedies are implemented.

APPENDIX A

RESPONSIVENESS SUMMARY

SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

This Responsiveness Summary has been prepared to address each of the comments submitted in written or oral presentations on the preferred plan for a remedial action.

Comments from Hancock Manufacturing

1. Table of Contents, page 1, Section 4.2, Ground Water. " Groundwater" is presented as one word throughout the document.

Ohio EPA Response: Acknowledged.

2. Page 4, second paragraph. Please add "in accordance with Ohio EPA regulations" to the last sentence.

Ohio EPA Response: This has been incorporated into the Site Description and History section of the Decision Document.

3. Page 9, last paragraph. Please add the following text to the discussion of carcinogenic risk to persons potentially exposed to ground water from the Site is based on a hypothetical exposure to ground water. The City of Toronto has an ordinance in place that prohibits the use of drinking water wells within the city. Therefore, there are currently no residences within the City of Toronto that used private wells for their primary water supply. Additionally, the carcinogenic risk associated with ground water use is attributed primarily to the presence of trichloroethene (TCE). U.S. EPA lists TCE as a probable human carcinogen (Class B2); no conclusive evidence exists that ingestion or exposure to water that is affected with TCE causes cancer in humans (IRIS, U.S. EPA 1995)."

Ohio EPA Response: Ohio EPA cannot state with certainty that no residences within the City of Toronto use private wells for their primary water supply. However, we have included a statement in the Summary of Risks section of the Decision Document explaining that no residential wells, currently used as primary water supplies, were found near the site during the RI/FS.

4. Page 12, second paragraph. The cleanup level for TCE in ground water is listed as 3 ug/l, which is below the MCL for TCE. The cleanup levels for the other constituents coincide with their respective MCLs. MCLs are health-based concentrations that protect consumers of drinking water, and should be used for all constituents. There is no technical basis to require one of four constituents to be remediated below the MCL. Additionally, requiring a cleanup level of 3 ug/l instead of the MCL of 5 ug/l could cause remediation activities to be needlessly extended for years if the time versus concentration curve has become asymptotic at a concentration of 5 ug/l.

Ohio EPA Response: Per the NCP [40 CFR Part 300.430(e)(2)(i)(A)(2)], if MCLs are not sufficiently protective because of the presence of multiple contaminants at a site, then, the 10^{-6} risk level shall be used as the point of departure for determining remediation goals. TCE, vinyl chloride, cis-1,2 DCE and trans-1,2 DCE have all been detected in groundwater at the Hancock site. At this site, a concentration of 3ug/l TCE meets the acceptable 10^{-6} risk level . Since the MCL for TCE is 5 ug/l, the 3 ug/l value was selected as the clean-up level in the Preferred Plan.

Regarding Hancock's concern that a cleanup level of 3 ug/l instead of 5 ug/l could cause remediation activities to be needlessly extended for years, Ohio EPA will agree to use the MCL (5 ug/l) as the clean-up value if the concentrations of other contaminants (vinyl chloride, cis-1,2 DCE and trans-1,2 DCE) in addition to TCE at 5 ug/l do not exceed a 10^{-6} risk. Once TCE is reduced to 5 ug/l, the concentrations of the other contaminants will be evaluated and as long as the total risk does not exceed 10^{-6} then the 5 ug/l level will remain the clean-up value for TCE.

5. Page 12, last paragraph. Please include the following text in the discussion of the health-based cleanup level for TCE in soil: "U.S. EPA lists TCE as a probable human carcinogen (Class B2); no conclusive evidence exists that ingestion or exposure to soil that is affected with TCE causes cancer in humans (IRIS, U.S. EPA 1995)."

Ohio EPA Response: This has been incorporated into the Decision Document in the Summary of Clean-up Values section.

6. Page 13, first paragraph. Please state that the organic carbon partitioning coefficient (K_{oc}) for TCE used to calculate a TCE cleanup level of 0.35 mg/kg in soil is a theoretical value.

Ohio EPA Response: This has been incorporated into the Decision Document in the Summary of Clean-up Values section.

7. Page 13, second paragraph, second sentence. Please replace the second sentence with the following sentence: "Exposure, through incidental ingestion and/or dermal contact, to soils with TCE at concentrations of 7.6 mg/kg or less will result in an acceptable excess cancer risk of 10^{-6} or below."

Ohio EPA Response: This sentence has been re-worded in the Decision Document.

8. Page 13, second paragraph, last sentence. Two changes are needed. First, once soil is remediated to 7.6 mg/kg and the ground water cleanup level for TCE is achieved, as shown by monitoring data, the 7.6 mg/kg should be regarded as

being protective of ground water, and additional long term ground water monitoring should not be required. Second, if 7.6 mg/kg proves to be insufficient to achieve the ground water cleanup level of 5 ug/l for TCE, a lower soil cleanup level need not necessarily be 0.35 mg/kg. That new soil cleanup level, if needed, should be arrived at through discussions between Hancock Manufacturing and Ohio EPA. Hancock Manufacturing reserves its right to contest a lower level that in its view, is more stringent than needed to protect ground water at 5 ug/l, the MCL for TCE in ground water.

Ohio EPA Response: Once both soil and groundwater levels have been achieved long term groundwater monitoring will not be required. However, groundwater monitoring will be required for three years after the groundwater clean-up levels have been achieved. Ohio EPA and Hancock will work together to determine frequency (minimum of semi-annually) of monitoring and an appropriate monitoring well network. If clean-up values are exceeded during this three year period, the Agency will work with Hancock to determine if additional monitoring will be required.

Regarding the leach-based clean-up levels, if it is determined that the 7.6 mg/kg soil clean-up value is not protective of groundwater, then Ohio EPA will work with Hancock to identify an appropriate leach based clean-up value.

9. Page 13, Section 5.2 Description of Alternatives. It should be noted that all costs presented in the Preferred Plan are based on 1992 dollars. Although the actual cost for each alternative may differ from the estimate at the time of implementation, the estimates are valid for comparative purposes. Also, please state that the Operation and Maintenance (O&M) cost presented for each alternative is the present worth for the O&M costs.

Ohio EPA Response: This has been incorporated into the Decision Document in the Description of Alternatives section.

10. Page 18, Section titled "Institutional Controls and Long-Term Monitoring - Groundwater". Please state that the concentrations of constituents in ground water would eventually be lowered due to degradation and natural attenuation.

Ohio EPA Response: Degredation and natural attenuation vary greatly depending on site specific conditions, such as oxygen levels and the concentration and type of microorganisms in the groundwater. Time-frames can be from months to many years. Moreover, the breakdown products in some instances can be as toxic or even more toxic than the original compound (eg. vinyl chloride is a break down product of TCE). We do not have the information on this site to predict how long it would take for concentrations to be lowered and by how much they would be lowered. Therefore, it may be misleading to state that the concentrations of constituents would eventually be lowered due to degredation and natural attenuation.

11. Page 18, last paragraph. In the description of this alternative, please state that the recovered water is used as non-contact cooling water, which is necessary for the plant to operate.

Ohio EPA Response: We have incorporated this information into the Decision Document in the discussions of two of the groundwater alternatives (Pump and Discharge to POTW and Pump, Treat and Discharge to Surface Water Body).

12. Page 19, first paragraph, first line, and next to last paragraph, first line. Please state that the assumption that recovery wells in addition to the plant well are not necessary at this site is based on a ground water capture model presented in <u>Reassessment of Site Hydrology at Hancock Manufacturing Co., Inc.</u> (RMT, December 1989).

Ohio EPA Response: We have incorporated this information into the Decision Document in the discussions of two of the groundwater alternatives (Pump and Discharge to POTW and Pump, Treat and Discharge to Surface Water Body).

13. Page 19, second paragraph, second sentence. Please replace the word "some" with the words "the concentrations".

Ohio EPA Response: This sentence has been reworded in the Decision Document for clarification.

14. Page 20, cost estimate to Pump, Treat, and Discharge Groundwater to Surface Water Body using Air Stripping. The Capital Costs are $430,000, and the Total Present Worth is $1,826,000.

Ohio EPA Response: These cost estimates have been revised in the Decision Document.

15. Page 21, last paragraph, fourth line. Only two soil source areas will require remediation using SVE with a soil cleanup level of 7.6 mg/kg for TCE.

Ohio EPA Response: The following language has been added to the beginning of the <u>Description of Alternatives</u> section of the Decision Document: Based on current data, it is uncertain whether or not treatment of soil in the area of Boring B-2 would be required with a soil clean-up level of 7.6 mg/kg for TCE. Therefore, additional sampling conducted prior to or during the design phase is necessary in order to determine if the TCE concentrations in soil exceed 7.6 mg/kg in this area.

16. Page 21, last paragraph, next to last line. Please insert the word "a" prior to "pumping",and replace the word "wells" with "well(s)".

Ohio EPA Response: These changes have been incorporated in the Decision Document.

17. Page 21, last paragraph, next to last line. Treatment of contaminated water is unnecessary in either a plan that includes discharge to the Toronto POTW or direct discharge to surface water. In both circumstances, the concentration of TCE, when the water reaches the POTW or surface water, will be very low (probably below detection) due to natural volatilization and dilution. Thus, treatment after pumping water from the aquifer serves no useful purpose.

Ohio EPA Response: If the groundwater is not treated, the contaminants will be released to another medium (air) or the concentrations will be diluted in route to the treatment plant or the surface water body. Pumping groundwater without treatment will not result in reduction of toxicity, mobility or volume of the contaminants.

18. Page 22, first paragraph, last line. Please replace this sentence with the following text: "If the pre-design studies reveal that this technology would not be effective, then the cost effective treatment system at the time remediation is initiated would be implemented at the site."

Ohio EPA Response: Because a number of options were evaluated in the FS Report and Air Stripping was an option selected for detailed analysis, we feel that choosing Air Stripping as the alternative treatment option is reasonable. The effectiveness of Air Stripping has been demonstrated at many sites and it is relatively cost effective. If a new technology is introduced during the pre-design stage, then we will review any information Hancock submits and weigh the technology against all the technologies presented in the FS Report.