FINAL

PROPOSED REMEDIAL ACTION PLAN
JAMECO INDUSTRIES
Wyandanch, Suffolk County, New York
Site No. 1-52-006

February 2003

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Jameco Industries Site. The presence of hazardous waste has created significant threats to human health and the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the discharge of metal plating solutions, cutting oils and semi-volatile organic compounds (SVOCs) has resulted in the disposal of hazardous wastes. These wastes have contaminated the soil and groundwater at the site and have resulted in:

- A significant threat to human health associated with current and potential exposure to contaminated soil and groundwater.
- A significant environmental threat associated with the impacts of contaminants to groundwater.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy:

- Excavation and off-site disposal of metals and SVOC contaminated soil from several areas of concern at the site. The excavations would be backfilled with certified clean fill.
- Extraction and treatment of on-site groundwater to remove floating product, SVOCs and to prevent off-site migration of a groundwater contaminant plume.
- A groundwater monitoring plan will be implemented to evaluate the effectiveness of source remediation in restoring on-site groundwater to the relevant New York State Water Quality Standards.
- Institutional controls in the form of existing use and development restrictions limiting the use of groundwater as a potable source without necessary treatment as determined by the Suffolk County Department of Health Services.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the May 2001 Remedial Investigation (RI) Report, the February 2002 Feasibility Study (FS) Report, and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

NYSDEC, Region 1
Building 40, SUNY
Stony Brook, NY 11790
(631) 444-0240
Mon - Fri, 8:30am - 4:45pm
Attn: Jamie Ascher or Mark Lowery

NYSDEC
625 Broadway
Albany, NY 12233
(518) 402-9620
Mon - Fri, 8:30am - 4:45pm
Attn: George Heitzman

Wyandanch Public Library
14 South 20th Street
Wyandanch, NY 11798
(631) 643-4848
Monday and Friday: 10:00am - 6:00pm
Tuesday through Thursday: 10:00am - 9:00pm
Saturday: 10:00am - 5:00pm
Sunday: 1:00pm - 5:00pm

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from February 24, 2003 to March 27, 2003 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 13, 2003 at the Wyandanch Public Library beginning at 7:00pm.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Jamie Ascher at the above NYSDEC Region 1 address through March 27, 2003.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Jameco Industries site (#1-52-006) is located at 248 Wyandanch Avenue in the Village of Wyandanch, Suffolk County, New York. The site is 7.4 acres in size and is located in a mixed industrial/commercial/residential setting (Figure 1). The Burton Industries Site (V00239), a Voluntary Cleanup Program site, is located north of the Jameco Industries Site at 243 Wyandanch Avenue.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Jameco Industries manufactured plumbing fixtures at the site from 1964 until 1998. One of the major manufacturing processes at the facility involved electroplating fixtures with nickel and chrome.

1964-1975: Effluent wastewater generated during plating operations was pH adjusted to precipitate metals out of solution. The wastewater, including precipitate, was then discharged to one of two seepage lagoons located in the rear yard of the plant. There was also an overflow basin constructed to accommodate discharges to the seepage lagoons (Figure 2, former lagoon area). Wastewater would seep through the soil, leaving behind the metal plating sludge which was periodically removed from the lagoons and disposed off-site.

1975-1998: The use of seepage lagoons was discontinued. Effluent wastewater was discharged into a series of 48 subsurface leaching pools (Figure 2, leach pit area). Wastewater was pH adjusted and sludge was separated from liquid through the use of clarifiers. The discharge of treated wastewater into the industrial leaching pool system was regulated by the NYSDEC's Division of Water under a State Pollution Discharge Elimination System (SPDES) permit.

In 1994, groundwater sampling revealed the presence of hydrocarbons in the northern portion of the site. The contamination was determined to be cutting oil which was discharged into a subsurface leaching pool system located outside the north side of the facility (Figure 2, cutting oil release area). This area of concern was partially remediated as described in Section 3.2.

As part of the manufacturing process, the facility used degreasing machinery to clean metallic plumbing parts. Prior to the RI, volatile organic compounds (VOCs) were detected in soil and groundwater beneath the facility. The source of the contamination was determined to be a leaking solvent storage tank (Figure 2, degreasing tank).

3.2: Remedial History

In December 1983, the NYSDEC listed the site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry). Class 2a is a temporary classification assigned to a site that has inadequate and/or insufficient data for placement in any of the other classifications. In May 1992, the NYSDEC reclassified the site to Class 2. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required. In February 1993, in response to a petition from Jameco Industries Inc., the site was reclassified to Class 4 and additional investigation of the site was undertaken by the responsible party (see Section 4.0) to better define the presence and extent of hazardous waste at the site. Based upon this data, the site was reclassified to Class 2 in February 1996.

1975: The use of the on-site seepage lagoons was discontinued in 1975. That year, sludge was reportedly excavated and removed from the lagoons and disposed off-site. The lagoons were then backfilled with sand and gravel. There is little documentation regarding the activities undertaken in 1975.

1981: A subsurface soil investigation was conducted to verify the presence or absence of plating waste in the area of the former leaching lagoons (Figure 2). Seven soil borings (B-1 through B-7) were conducted and soil samples were collected every two feet (Figure 3). The samples revealed elevated levels of the following metals. Trivalent chromium concentrations were in the range of 4 ppm to 1,460 ppm, copper was 2 ppm to 960 ppm and nickel was 4 ppm to 500 ppm. The SCGs for chromium, copper and nickel are 50 ppm, 25 ppm and 13 ppm, respectively. (Jameco Industries Soil Testing Report, 1981).

1991: Under a stipulation agreement with the New York State Attorney General's Office, a subsurface investigation was undertaken to expand upon the data collected in 1981 regarding the presence of metal plating sludge in the area of the former seepage lagoons. Although field observations made during the soil sampling program noted the absence of distinct sludge layers, the following ranges of trivalent chromium, copper, nickel and zinc were detected. Trivalent chromium was 1 ppm to 3,800 ppm, copper was 8 ppm to 5,640 ppm, nickel was 8 ppm to 1,000 ppm and zinc was 5 ppm to 975 ppm. The SCG for zinc is 20 ppm. (Site Investigation Report, November 1991).

Soil samples collected from the industrial leaching pools (LP-1-AKRF through LP-4-AKRF and LP-GRAB) (Figure 2 and Figure 3) revealed the following ranges of trivalent chromium, copper, nickel and zinc. Trivalent chromium was 474 ppm to 2,870 ppm, copper was 182 ppm to 906 ppm, nickel was 326 ppm to 2,650 ppm and zinc was 104 ppm to 675 ppm. Additionally, six groundwater monitoring wells (MW-1 through MW-6) were constructed to confirm the site specific groundwater flow direction and to assess groundwater quality downgradient of the former seepage lagoons and the industrial leaching pool system (Figure 4). Groundwater samples collected in June 1991 from these wells revealed elevated levels of metals downgradient of the industrial leaching pools and elevated levels of VOCs downgradient of the degreasing machinery. The site specific groundwater flow direction was determined to be generally southeast (Site Investigation Report, November 1991).

1993: The NYSDEC approved a facility maintenance plan which required the installation of three additional on-site groundwater monitoring wells (MW-7, MW-8 and MW-9). In response to detections of VOCs in on-site groundwater, monitoring wells MW-10, MW-11 and MW-12 were installed within the facility, immediately downgradient of the degreasing machinery (Figure 4). Monitoring well MW-10 was screened 90-100 feet below grade, MW-11 was screened 50-60 feet below grade and MW-12 was screened at the water table. The depth to groundwater beneath the site is approximately 10 feet below grade. Groundwater samples were collected from wells MW-10, MW-11 and MW-12 in July 1994 and revealed significant detections of VOCs and to a lesser extent some metals (Maintenance Plan Report, August 1994).

May 1994: While conducting groundwater sampling, free phase petroleum product was detected in monitoring well MW-13. The NYSDECs Bureau of Spill Prevention and Response (BSPR) was informed of this discovery and requested that additional soil and groundwater samples be collected to delineate the areal extent of the contamination. The source of the contamination was traced to an abandoned leaching pool system on the north side of the facility (Figure 2, cutting oil release). It was determined that the contamination present in groundwater was machine cutting oil. Approximately 750 cubic yards of contaminated soil was removed during the excavation and dismantling of the leaching pools (Immediate Response Actions Report, October 1995). Nine post-excavation confirmatory soil samples were collected, which revealed that hydrocarbon contamination was still present in the area (Figure 6). Petroleum hydrocarbons ranged from non-detect (ND) to 75,000 ppm. To delineate the lateral extent of the cutting oil contamination in groundwater, monitoring wells MW-14 through MW-23 were constructed (Figure 4). Monitoring wells MW-15 and MW-19 constructed downgradient of the source area revealed the presence of floating petroleum product.

July 1994: In response to the presence of VOCs in on-site groundwater, a soil gas survey was conducted within the facility in the vicinity of the degreasing machinery. 17 soil gas points were sampled encompassing an area of approximately 8,750 square feet. Soil gas samples were measured with an organic vapor meter and revealed organic vapor concentrations in the range of 7 ppm to 1,808 ppm (Figure 5).

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers. The NYSDEC and Watts Industries Inc. entered into a Consent Order on December 19, 1995. The Order obligates the responsible party to implement a remedial investigation/feasibility study (RI/FS). Upon issuance of the ROD, the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

SECTION 5: SITE CONTAMINATION

An RI/FS has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: 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. Prior to undertaking the RI, the PRP implemented an interim remedial measure (IRM) under NYSDEC oversight. The RI was conducted in several phases beginning in January 1998 and ending in May 2001. The field activities and findings of the investigation are described in the RI report. An IRM was conducted in 1996 (see Section 5.2).

The following activities were conducted during the RI:

- Research of historical information;
- Installation of 36 soil borings and two monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Groundwater sampling of 25 new, existing or temporary monitoring wells;
- Collection of 15 off-site groundwater samples using a direct push technique; and
- A survey of public and private water supply wells in the area and around the site;

To determine whether the soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The site is underlain by glacial outwash deposits that are approximately 110 feet thick. The aquifer in these deposits is referred to as the Upper Glacial aquifer. Groundwater occurs approximately 10 feet below grade. The site-specific groundwater flow direction is generally southeast. The Upper Glacial aquifer is underlain by the Magothy formation which is deltaic in origin and is comprised of silt and fine to medium grain sands. The Magothy formation is approximately 700 feet thick beneath the site and is the source of the Magothy aquifer. The Magothy aquifer is the primary source of potable water for the area. The upper glacial sands and gravel are separated from the Magothy formation by the Gardiners clay unit. Beneath the Magothy formation exists the clay member of the Raritan formation, which in turn overlies the Lloyd Sand member of the Raritan formation. The Raritan formation overlies crystalline bedrock, which occurs approximately 1,350 feet below grade.

5.1.2: Nature of Contamination

As described in the RI report, many soil and groundwater samples were collected to characterize the nature and extent of contamination. As summarized in Table 1 and Table 2, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs), inorganics (metals) and semi-volatile organic compounds (SVOCs).

The VOCs of concern are 1,2-dichloroethene (1,2-DCE), trichloroethene (TCE) and tetrachloroethene (PCE). The inorganic contaminants of concern are chromium, copper, nickel, and zinc. The SVOCs of concern are polycyclic aromatic hydrocarbons (PAHs).

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 and Table 2 summarize the degree of contamination for the contaminants of concern in soil and groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

Area of Concern #1: Former Seepage Lagoons

Previous investigations of this area of concern (AOC) are discussed in Section 3.2 of this document. During the RI, six soil borings were advanced in this area, MW-26, B-29, B-30, B-31 B-36 and B-37 (Figure 3). Soil samples collected from this area were analyzed for VOCs and metals. Total chromium was detected in the range of 3.8 ppm to 694 ppm. Copper was detected in the range of 3.5 ppm to 15,600 ppm. Mercury was detected in the range of ND to 0.42 ppm. Nickel was detected in the range of 1.8 ppm to 361 ppm and zinc was detected in the range of 15.2 ppm to 5,090 ppm (Table 1). The SCGs for chromium, copper, mercury, nickel and zinc are 50 ppm, 25 ppm, 0.1 ppm, 13 ppm, and 20 ppm, respectively. There were no significant detections of VOCs in any samples collected from this area.

Soil data collected during and prior to the RI indicates that elevated levels of metals exist in subsurface soils in this area.

Area of Concern #2: Degreasing Area

This area within the facility (Figure 2) was the subject of an IRM that is discussed in Section 5.2. Eight post-IRM confirmatory soil samples (SVE-1 through SVE-8) were acquired to assess the effectiveness of the soil vapor extraction system (Figure 3). The primary contaminants of concern were TCE and PCE. The post-IRM soil sample results for TCE ranged from 0.001 ppm to 0.14 ppm. The SCG for TCE in soil is 0.7 ppm. The sample results for PCE ranged from ND to 0.017 ppm. The SCG for PCE in soil is 1.4 ppm.

During the RI, two additional soil borings were conducted in the degreasing area, boring AQ-1 and TCE-1 (Figure 3). Soil samples were collected at 0-2', 4'-6' and 8'-10' below grade in each soil boring. Soil samples from boring AQ-1 were analyzed for VOCs, SVOCs and metals, while samples from boring TCE-1 were analyzed for VOCs only. There were no detections of VOCs in boring TCE-1 or AQ-1 which exceeded SCGs. There were also no significant detections of SVOCs in boring AQ-1, although there were elevated levels of chromium (124 ppm), copper (423 ppm), nickel (73.6 ppm) and zinc (212 ppm) in the 0-2' sample interval at both locations (Table 1).

Data collected during the RI indicates that the IRM conducted in this area was successful in remediating subsurface soil.

Area of Concern #3: Former Industrial Leaching Pool System

The former industrial leaching pool system is comprised of 48 subsurface leaching pools located within a fenced area (Figure 2). Wastewater which was discharged to these pools was regulated by the NYSDEC's Division of Water under State Pollution Discharge Elimination System Permit (SPDES) #0081540. In November 1998, a series of seven soil borings (LP-1, LP-2, LP-3 LP-4, B-32, B-33 and B-34) were advanced within the confines of the leaching pool system (Figure 3). Soil samples LP-1, LP-2, LP-3 and LP-4 were collected from the bottom of specific leaching pools while B-32, B-33 and B-34 were collected via geoprobe in areas between leaching pools. Based upon previous sampling data and the chemistry of the process wastewater which was discharged into the industrial leaching pool system, the metals of concern relative to this area are chromium, copper, nickel and zinc. Samples collected from this area during the RI were analyzed for metals and VOCs.

The range of chromium levels in leaching pool bottom soils (LP-1 through LP-4) was 580 ppm to 23,700 ppm. The range of copper levels was 98.3 ppm to 4,400 ppm. The range of nickel levels was 752 ppm to 8,420 ppm. The range of zinc levels was 155 ppm to 2,120 ppm (Table 1). There were no detections of VOCs.

Soil samples collected from borings B-32, B-33 and B-34 were collected at the 0-2' interval and the 5'-7' interval. Total chromium levels were in the range of 2 ppm to 961 ppm. Copper levels were in the range of 1.2 ppm to 955 ppm. Nickel levels were in the range of 1.9 ppm to 516 ppm and zinc levels were in the range of 7 ppm to 190 ppm (Table 1). There were no detections of VOCs.

In June 1999, three additional soil borings were taken through several leaching pools. These samples were designated LP-1A, 1B and 1C, LP-2A, 2B and 2C and LP-5A, 5B and 5C. These borings were sampled at three specific depths (15'-17', 20'-22' and 25'-27') below grade (Figure 3). Chromium levels were in the range of 9.4 ppm to 140 ppm, copper levels were in the range of 28.2 ppm to119 ppm and nickel levels were in the range of 16.8 ppm to 100 ppm (Table 1).

To address concerns of metals contamination off-site, eight soil samples were collected in areas adjacent to the industrial leaching pool system (HB-1 through HB-7 and tea garden-1 (TG-1)) (Figure 3). Copper levels were in the range of 3 ppm to 44.1 ppm. Mercury levels were in the range of 0.037 ppm to 0.53 ppm. Nickel levels were in the range of 2.7 ppm to 28.5 ppm and zinc levels were in the range of 8.9 ppm to 164 ppm (Table 1). There were no detections of VOCs.

Soil samples collected during and prior to the RI indicates that elevated levels of metals exist in subsurface soils within the industrial leaching pool system.

Area of Concern #4: Cutting Oil Release

During a groundwater sampling effort in 1994, a layer of free phase petroleum product was detected in MW-13. The PRP reported the incident to the NYSDEC Bureau of Spill Prevention and Response (BSPR) on October 4, 1994. Spill #94-08922 was assigned to the incident. The source of the contamination was determined to be a leaching pool system located on the north side of the property which received discharges of machine cutting oil (Figure 2). In July 1995, under the oversight of the BSPR, the leaching pools were removed and 709 tons of contaminated soil was excavated and disposed of at a permitted facility (Figure 6). The area was backfilled with clean fill material.

In July 1995, nine post-excavation confirmatory soil samples were collected, which revealed that petroleum hydrocarbon contamination continued to persist in subsurface soil in the area (Table 3). In April 1999, six soil samples (R4-1 through R4-6) were collected around the perimeter of the excavation to further delineate soil contamination in the area (Figure 3). Soil samples were collected from four to six feet below grade and the samples were analyzed for VOCs, SVOCs and metals. Sample R4-2 revealed 2,600 ppm of cutting oil and R4-5 revealed 2,700 ppm of cutting oil, 220 ppb of benzo(a)pyrene and 410 ppb of chrysene.

The SCG for benzo(a)pyrene and chrysene are 61 ppb and 400 ppb, respectively. There were no significant detections of VOCs or metals in any sample.

Data collected during and prior to the RI indicates that significant soil contamination still exists in this area.

Area of Concern #5: Metal Plating Shop

In January 1998, five soil borings (PA-1 through PA-5) were conducted in the former metal plating shop (Figure 3). Soil samples were collected at the following intervals, 0-2', 4'-6' and 8'-10' below grade. Chromium concentrations ranged from 2.4 ppm to 8,750 ppm. Copper concentrations ranged from 1.9 ppm to 727 ppm. Nickel concentrations ranged from 74.7 ppm to 10,200 ppm and zinc concentrations ranged from 5 ppm to 268 ppm. (Table 1).

In February 1998, under the oversight of the Division of Solid and Hazardous Materials, a portion of the facility floor in the metal plating shop was removed and 222 cubic yards of contaminated soil was excavated and disposed of at a permitted facility. Soil was excavated to a depth of approximately four feet below grade. The excavation was lined with plastic sheeting and then backfilled with clean fill. The January 1998 soil sampling reveals that elevated levels of metals exist below the base of the excavation.

Miscellaneous Areas of Concern

Soil samples (B-27 and B-28) were collected from the bottom of two storm drains located in the facility parking lot (Figure 3). These samples were analyzed for VOCs and metals. While there were no detections of VOCs which exceeded SCGs in either storm drain, concentrations of trivalent chromium (930 ppm and 858 ppm), copper (44,400 ppm and 36,500 ppm), mercury (0.11 ppm and 0.49 ppm), nickel (2,050 ppm and 3,960 ppm) and zinc (8,660 ppm and 7,620 ppm) all exceeded SCGs (Table 1). Additional vertical delineation of the extent of soil contamination within these storm drains will be undertaken during the remedial design phase.

Groundwater

Area of Concern #1: Former Seepage Lagoons

During the RI, groundwater samples were collected from two wells, MW-5 and MW-26 (Figure 4). Groundwater samples were analyzed for VOCs and metals. The following VOCs were detected in MW-5 at concentrations exceeding SCGs; 1,2-DCE (15 ppb) and PCE (25 ppb). The SCGs for 1,2-DCE and PCE in groundwater are 5 ppb. Nickel was detected in MW-5 at 637 ppb. The SCG for nickel is 100 ppb. The following VOCs were detected in MW-26 at concentrations exceeding SCGs; 1,2-DCE (30 ppb) and PCE (18 ppb) (Table 2). Groundwater samples did not exceed SCGs for copper, chromium, nickel, selenium, thallium or zinc.

Area of Concern #2: Degreasing Area

VOC impacts on groundwater posed by this AOC were evaluated by sampling on-site monitoring wells MW-2, MW-10, MW-11, MW-12, MW-25 and TCE-1 (Figure 4). Historically, TCE levels in MW-2 were as high as 5,400 ppb. The SCG for TCE in groundwater is 5 ppb. As a result of the source remediation described in Section 5.2, TCE concentrations have diminished to 12 ppb in MW-2. Similarly, PCE concentrations in MW-2 have diminished from 1,500 ppb to ND. Concentrations of 1,2-DCE have diminished from 470 ppb to 8 ppb. Similar reductions in VOC levels were observed in MW-10, MW-11, MW-12, MW-25 and TCE-1 (Table 2).

In order to evaluate VOC impacts to off-site groundwater, groundwater samples were acquired at five locations (GP-101 through GP-105) and at three depths at each location ("A", 10' below grade, "B", 35' below grade and "C", 60' below grade (Figure 4, Table 2). Groundwater sample GP-101A had 1,2-DCE at 30 ppb, PCE at 9 ppb and TCE at 67 ppb. GP-101C had PCE at 1 ppb and TCE at 2 ppb. GP-103B had 1,2-DCE at 29 ppb, PCE at 9 ppb and TCE at 61 ppb. There were no detections of any other site-related VOCs in any other sample.

The remediation of the source area has resulted in diminished VOC levels in groundwater beneath and downgradient of the source area.

Area of Concern #3: Former Industrial Leaching Pool System

Groundwater samples collected during the RI from monitoring wells MW-3, MW-4 and GP-101A, B, C through GP-105 A, B, C, revealed the following ranges of metals; total chromium (ND to 226 ppb), copper (ND to 1,520 ppb), nickel (15 ppb to 8,980 ppb) and zinc (ND to 160 ppb). The SCGs for chromium, copper, nickel and zinc are 50 ppb, 200 ppb, 100 ppb and 300 ppb, respectively (Table 2). Although low levels of VOCs were detected in these wells, their presence is attributed to residual VOC contamination associated with the degreasing area.

Residual metals contamination in soil within this area are acting as a source of groundwater contamination.

Area of Concern #4: Cutting Oil Release

In May 1995, under the oversight of the BSPR, ten groundwater monitoring wells (MW-14 through MW-23) were installed to determine the impacts of the cutting oil release on groundwater (Figure 4). Monitoring wells MW-15 and MW-19 were found to contain free phase petroleum product. Monitoring well MW-20 contained 30,000 ppb of total petroleum hydrocarbons. Beginning in August 1995 and ending in April 1996, petroleum product was hand bailed from monitoring wells MW-15 and MW-19 on a bi-weekly basis. During this period, approximately 13 gallons of product were removed from the wells. The most recent gauging of the wells, in December 2002, reveals that free phase product still exists in MW-15. Monitoring well MW-19 could not be located.

Data collected during and prior to the RI indicates that significant groundwater contamination exists in this area.

Area of Concern #5: Metal Plating Shop

Groundwater samples were collected from borings PA-1, PA-2 and PA-3 after they intercepted groundwater (Figure 4). Groundwater samples were analyzed for metals with the following results. Total chromium concentrations ranged from 3,590 ppb to 55,000 ppb. Copper concentrations ranged from 687 ppb to 15,000 ppb. Nickel concentration ranged from 2,410 ppb to 40,400 ppb and zinc concentrations ranged from 1,100 ppb to 3,180 ppb (Table 2).

Several other groundwater monitoring wells (MW-10, MW-11, MW-12, TCE-1 and MW-25) which are downgradient of this area were sampled during the RI. Within this suite of wells, chromium concentrations ranged from 3 ppb to 18,000 ppb. Copper concentrations ranged from ND to 25,000 ppb. Nickel concentrations ranged from ND to 37,200 ppb and zinc concentrations ranged from 17 ppb to 5,600 ppb (Table 2). Concentrations of metals were found to be far less in deeper groundwater (MW-10 and MW-11) than in shallow groundwater (MW-12). However, it is apparent that residual metals contamination in soils beneath the former metal plating shop are impacting groundwater.

5.2: **Interim Remedial Measures**

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

July 1996: The Department approved the pilot testing of a proposed soil vapor extraction system to remediate VOC contaminated soil beneath the facility.

May 1997: Based upon the data generated during the pilot testing of the soil vapor extraction system, the NYSDEC approved the design and full implementation of the remedial system. Six soil vapor extraction points were installed within the facility to remediate VOC contaminated subsurface soil.

November 1998: Periodic monitoring of the remedial system's process exhaust revealed extremely low levels of VOCs. Based upon this data, eight confirmatory soil samples (SVE-1 through SVE-8) were collected at a depth of 5'-6' below grade to assess VOC concentrations in subsurface soil (Figure 3). Of the eight samples, only sample SVE-8 had VOC concentrations (TCE at 2.7 ppm) which exceeded its recommended soil cleanup objective (0.7 ppm). The remedial system was re-started and seven months later, in April 1999, the area was re-sampled and TCE concentrations had diminished to 0.019 ppm. On July 22, 1999 the NYSDEC approved the IRM closure report and the system was dismantled.

5.3: <u>Summary of Human Exposure Pathways</u>:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6 of the RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

The site is fenced and access is limited to employees and patrons.

Exposure pathways that are known to or may exist at the site include:

- Ingestion of contaminated groundwater: This pathway could potentially occur in the future if private or public drinking water supply wells existed at or near the site. A potable well search was performed and no private wells were found near the site. Residences and businesses in the area are served by public water from the Suffolk County Water Authority supply wells. Water from these wells is routinely monitored and, if necessary, treated to comply with federal and state drinking water standards.

- Dermal contact with contaminated soil on-site: This pathway could occur if soils are disturbed during excavation activities. Approriate health and safety measures to prevent exposures will be in place during excavation.

- Inhalation of contaminated dust on-site and off-site: It is possible, that during excavation, fugitive dusts containing site related contaminants could be released.

An approved Health and Safety Plan and a Community Air Monitoring Plan will be in place to prevent unacceptable releases which may impact workers or the surrounding community.

- Inhalation of VOCs in indoor air: The potential for VOC impacts on indoor air quality within the facility have been significantly reduced through the implementation of the IRM.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

As described in the RI report, the nearest surface water body is more than 0.5 miles from the site. Based upon on-site and off-site groundwater quality and the mobility of site related contaminants, it is not expected that contamination would impact the nearest environmental receptor.

Site contamination has impacted the groundwater resource in the upper glacial aquifer. Although there are no private or public water supply wells affected by site related contamination, the United States Environmental Protection Agency has designated the groundwater resources in Suffolk County as a sole source aquifer.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to metals and SVOCs in soil and groundwater; and
- the release of contaminants from soil into groundwater that may create exceedances of ambient groundwater quality standards.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards; and
- the soil cleanup objectives specified in Technical and Administrative Guidance Memorandum #4046.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Jameco Industries Site were identified, screened and evaluated in the FS report which is available at the document repositories identified in Section 1.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soil and groundwater at the site. The alternatives presented below are somewhat different than those presented in the FS Report. The descriptions are discussed in two sections, those alternatives appropriate for the remediation of metals contaminated soil and groundwater at AOC #1 Former Seepage Lagoons, AOC #3 Industrial Leaching Pool Area, AOC #5 Metal Plating Area and storm drains B-27 and B-28 and those alternatives appropriate for the remediation of soil and groundwater contaminated by the cutting oil release (AOC #4).

Alternatives for Metals Contaminated Soil and Groundwater

Alternative #1: No Action with Groundwater Monitoring

Present Worth: $155,000
Capital Cost: $5,000
Annual OM&M: $5,000

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.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Under the No Action Alternative, groundwater monitoring would be implemented on an annual basis for a period of thirty years for the purpose of assessing on-site groundwater quality. Institutional controls would also be implemented to restrict the use of on-site groundwater and to ensure safety in the event that contaminated soils were to be disturbed during any subsurface construction activities.

Alternative #2: Containment via Capping

Present Worth: $204,600
Capital Cost: $54,600
Annual OM&M: $5,000

Capping is a method of containment that involves installing an engineered barrier over contaminated soil. Caps may consist of a layered system of clay, soil or a multimedia cap that incorporates polymeric liners.

Capping is used primarily to contain contaminants in soil and to prevent them from migrating into groundwater or migrating via surface runoff. Although contaminated soil would be left in place under this alternative, it would eliminate direct contact exposure pathways for human and environmental receptors.

A groundwater monitoring plan would be implemented to evaluate groundwater quality as a result of source remediation. Groundwater would be monitored on an annual basis for a period of thirty years.

Institutional controls would be incorporated under this alternative to restrict and ensure safety in the event of subsurface construction activities at the site and to restrict the use of on-site groundwater.

Alternative #3: Treatment via Solidification/Stabilization

Present Worth: $605,500
Capital Cost: $580,500
Annual OM&M: $5,000
Solidification/Stabilization (S/S) is a treatment technology in which chemical reagents such as cement are mixed with contaminated soil, either ex situ or in situ, to reduce contaminant solubility and mobility.

Through ex situ S/S, contaminated soil is combined with a chemical reagent in a mixing plant and transformed into a solid stable form. The end product can be disposed off-site or re-placed on-site.

The in situ process involves mixing the contaminated media in an open pit or trench. In either process, ex-situ or in-situ, the process of S/S immobilizes contaminants within the crystalline structure of the solidified material.

S/S could effectively mitigate the potential for impacted soil to act as a continuing source of contamination to groundwater.

The actual volume of soil to be S/S would be determined during the remedial design phase.

A groundwater monitoring plan would be implemented to evaluate groundwater quality as a result of source remediation. Groundwater would be monitored on an annual basis for a period of five years.

A soil management plan would be incorporated under this alternative to ensure safety if subsurface construction activities were undertaken at the site and to restrict the use of on-site groundwater.

Alternative #4: Excavation and Off-Site Disposal

Present Worth: $705,600
Capital Cost: $680,600
Annual OM&M: $5,000

Under this alternative, metals contaminated soil would be excavated from the areas of concern, stockpiled, analyzed and then disposed off-site at a permitted facility. This would effectively remove the current and future sources of groundwater contamination. Confirmatory end point soil samples would be collected to ensure that the full extent of the contaminated soil was removed. The excavated areas would then be backfilled to original grade with certified clean fill.

Preliminary estimates of the volume of contaminated soil to be excavated and disposed range between 2,000 - 3,000 cubic yards. A more accurate estimate of the volume of waste would be determined during the remedial design. Excavated soil would be sampled for waste characterization to determine disposal at the appropriate permitted facility.

A groundwater monitoring plan would be implemented to evaluate groundwater quality as a result of source remediation. Groundwater would be monitored on an annual basis for a period of five years. Deed restrictions would be imposed to restrict the use of on-site groundwater.

Alternatives for SVOC Contaminated Soil and Groundwater

Alternative #1: No Further Action with Monitored Natural Attenuation

Present Worth: $943,000
Capital Cost: $34,400
Annual OM&M: $30,300

The No Further Action alternative recognizes remediation of the site conducted under a previously completed IRM. To evaluate the effectiveness of the remediation completed under the IRM, only continued monitoring would be necessary. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Under the No Further Action with Monitored Natural Attenuation Alternative, additional groundwater monitoring wells would be installed to supplement existing wells for the purpose of monitoring groundwater quality and evaluating the reduction of contaminant mass via naturally occurring processes. It is anticipated that monitoring would continue for a period of 30 years.

Institutional controls would also be implemented in the form of deed restrictions to restrict the use of on-site groundwater and to ensure safety in the event that contaminated soils were to be disturbed during any subsurface construction activities.

Alternative #2: Extraction and Treatment of Groundwater and Excavation of Contaminated Soil

Present Worth: $593,000
Capital Cost: $163,000
Annual OM&M: $86,000

Residual soil contamination would be addressed by additional excavation of soil in the area of the former abandoned leaching pool system on the north side of the site. Excavated soil would be stockpiled, analyzed and disposed of at a permitted facility, thereby removing the source of future groundwater contamination. The extent of the excavation may be limited by physical constraints such as the building foundation and underground utilities. The actual volume of soil to be excavated would be determined during the design phase of the remedy.

Contaminated groundwater would be pumped by extraction wells and passed through granular activated carbon to remove free phase product. Treated groundwater would then be recharged into the aquifer through diffusion wells or recharge basins. Free phase product that is collected would be stored in above ground storage tanks prior to off-site disposal at a permitted facility. Periodic groundwater sampling would be conducted to monitor the effectiveness of the remedy in reducing contaminant levels.

This alternative would limit the mobility of groundwater contamination and free product located within the cone of influence of the extraction wells. The number of extraction wells and volume of carbon required for groundwater treatment would be determined during the remedial design. It is anticipated that the system would operate for five years.

Alternative #3: Enhanced Bioremediation of Groundwater and Excavation of Contaminated Soil

Present Worth: $414,000
Capital Cost: $198,000
Annual OM&M: $21,600

Residual soil contamination would be addressed by additional excavation of soil in the area of the former abandoned leaching pool system on the north side of the site. Excavated soil would be stockpiled, analyzed and disposed of at a permitted facility, thereby removing the source of future groundwater contamination. The extent of the excavation may be limited by physical constraints such as the building foundation and underground utilities. The actual volume of soil to be excavated would be determined during the design phase of the remedy.

Under this alternative, Oxygen Release Compounds (ORC) would be introduced into the groundwater to increase the rate of aerobic breakdown of contaminants. This alternative has been demonstrated to be effective when utilized for the remediation of petroleum-related contaminants.

Periodic groundwater sampling would be conducted to monitor oxygen levels and reductions in contaminant levels. The actual volume of ORC required for the remedial process would be determined during the design phase and could be modified during the OM&M of the remedy. It is anticipated that the remedy would be in place for approximately ten years.

Alternative #4: Air Sparging of Groundwater and Excavation of Contaminated Soil

Present Worth: $707,000
Capital Cost: $67,625
Annual OM&M: $59,550

Residual soil contamination would be addressed by additional excavation of soil in the area of the former abandoned leaching pool system on the north side of the site. Excavated soil would be stockpiled, analyzed and disposed of at a permitted facility, thereby removing the source of future groundwater contamination. The extent of the excavation may be limited by physical constraints such as the building foundation and underground utilities. The actual volume of soil to be excavated would be determined during the design phase of the remedy.

Air sparging is an in-situ process in which air is injected through contaminated groundwater to remove contaminants. Injected air bubbles move vertically and horizontally through groundwater, enhancing the volatilization of volatile compounds. The injected air is re-captured by a soil vapor extraction system and the contaminants are removed from the process air through the use of carbon filtration. Air sparging is generally ineffective for semi-volatile contamination.

The number of sparge and extraction points necessary for the remedy would be determined during the design phase of the alternative. The need for carbon filtration would be determined during pilot testing of the remedy. It is anticipated that the system would operate for ten years.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

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

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

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

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

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.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with

potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 3.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDIES

The NYSDEC is proposing Alternative #4, Excavation and Off-Site Disposal for metals contaminated soil and groundwater and Alternative #2, Extraction and Treatment of Groundwater and Excavation of Contaminated Soil for SVOC contaminated soil and groundwater as the remedies for this site. The elements of these remedies are described at the end of this section.

The proposed remedies are based on the results of the RI and the evaluation of alternatives presented in the FS.

Metals Contaminated Soil and Groundwater

Alternative 4 (Excavation and Off-Site Disposal) is being proposed because, as described below, it would satisfy the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the soils that create the most significant threat to public health and the environment, it would greatly reduce the source of contamination to groundwater, and it would create the conditions needed to restore groundwater quality to the extent practicable.

Alternative 1 or 2 would not comply with the threshold criteria as those remedies would result in untreated hazardous waste remaining at the site. Under Alternative 3, contaminated soil would remain on-site but would be stabilized in order to greatly reduce the potential for contaminant migration. This alternative complies with the threshold criteria as it would treat the hazardous waste present at the site. A soil management plan would be developed to restrict subsurface construction activities and provide notification to the NYSDEC in the event that such activities became necessary.

Alternatives 2, 3 and 4 have short-term impacts which can be easily controlled. The time needed to achieve the remediation goals would be longest for Alternative 2 and shortest for Alternative 4.

Achieving long-term effectiveness is best accomplished by Alternative 4. Alternative 4 is favorable because it would remove virtually all of the contaminated soil above the water table. Alternative 2 (capping) would eliminate the leaching of precipitation through contaminated soil but would not eliminate contaminant entry into groundwater through contact of the water table with contaminated soil. Alternative 3 (solidification/stabilization) would mitigate leaching of contaminants from source areas through contact with the water table but would do so with less certainty than Alternative 4. Alternative 1 (no action with groundwater monitoring) would not achieve long-term effectiveness since contact between contaminant source areas and the water table would present a continuing source of groundwater contamination.

Alternatives 1 and 2 would not result in permanently reducing the toxicity or volume of contaminants. Additionally, neither alternative mitigates the mobility of contaminants to enter groundwater via contact between the water table and contaminant source areas. Alternative 3 does reduce the mobility of contaminants but not the toxicity or volume. Alternative 4 reduces the toxicity, volume and mobility of contamination at the site.

Alternative 1 would be the easiest remedy to implement by virtue of the fact that there would be no construction activities associated with it. Alternatives 3 and 4 would require more construction activities than Alternative 2. However, all of the alternatives are readily implemented.

While costs of the alternatives vary and Alternative 4 would be the most expensive, Alternative 4 provides greater compliance with the primary balancing criteria.

The estimated present worth cost to implement the remedy is $705,600. The cost to construct the remedy is estimated to be $680,600 and the estimated average annual operation, maintenance, and monitoring costs for five years is $5,000.

SVOC Contaminated Soil and Groundwater

Alternative 2 (Extraction and Treatment of Groundwater and Excavation of Contaminated Soil) is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the soils that create the most significant threat to public health and the environment, it would greatly reduce the source of contamination to groundwater, and it would create the conditions needed to restore groundwater quality to the extent practicable.

Alternative 3 (Enhanced Bioremediation of Groundwater and Excavation of Contaminated Soil) and Alternative 4 (Air Sparging of Groundwater and Excavation of Contaminated Soil) would also comply with the threshold criteria but to a lesser degree or with lower certainty.

Because Alternatives 2, 3 and 4 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 2, 3 and 4 would all have short-term impacts which can be easily controlled. The time needed to achieve the remediation goals would be shortest for Alternative 2 and similar for Alternatives 3 and 4.

Alternatives 2, 3 and 4 would all provide long-term effectiveness. Each alternative would provide groundwater treatment and source remediation. Alternative 4 would be the least effective alternative for groundwater treatment because air sparging is not effective for floating product or semivolatile contamination.

Alternatives 2 and 4 would each reduce the toxicity and volume of contamination. Alternatives 2 and 4 would also reduce the mobility of contaminated groundwater by actively capturing it and pumping it to the surface for treatment. Alternatives 3 and 4 would treat groundwater in situ which would not effectively limit the movement of the groundwater contaminant plume.

Alternative 2 would require the installation of additional well points for the extraction of contaminated groundwater and the diffusion of treated groundwater. Alternative 3 would require diffusion points for the application of ORC. Alternative 4 would require the installation of well points for the purpose of injecting air (sparging) into contaminated groundwater. While each alternative would necessitate unique construction activities, all are easily implemented.

While costs of the alternatives vary, Alternative 2 would provide a remedial technology better suited for the remediation of free phase and dissolved phase petroleum hydrocarbons.

The estimated present worth cost to implement the remedy is $593,000. The cost to construct the remedy is estimated to be $163,000 and the estimated average annual operation, maintenance and monitoring costs for five years is $86,000.

The combined costs to implement the proposed remedies (Alternative #4: Excavation and Off-Site Disposal of Metals Contaminated Soil and Alternative #2: Groundwater Treatment/Soil Excavation of SVOC Contamination) for the entire site is $1,298,000.

The elements of the proposed remedies for the entire site are as follows:

Institutional controls would be imposed in the form of existing use and development restrictions preventing the use of groundwater as a source of potable water without necessary water quality treatment as determined by the Suffolk County Department of Health Services. The property owner would complete and submit to the NYSDEC an annual certification until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls and engineering controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective.

Metals Contaminated Soil and Groundwater

1. Additional soil samples would be collected during the design phase to supplement previous data and to better assess the nature and extent of soil contamination at each area. Contaminated soil would be excavated to the water table, stockpiled, analyzed for disposal characteristics and transported off-site to a permitted disposal facility from those locations identified as areas of concern. The target locations are, AOC #1 (former leaching lagoons), AOC #3 (former industrial leaching pool system), AOC #5 (metal plating shop) and the two exterior storm drains identified as B-27 and B-28. Post excavation confirmatory endpoint soil samples would be collected to ensure compliance with the recommended soil cleanup objectives specified in TAGM #4046.

2. Excavated areas would be backfilled to original grade with certified clean fill.

3. Additional groundwater monitoring wells would be installed to acquire and supplement previous data gathered at the site and to replace wells lost during construction activities at the site. A long-term groundwater monitoring plan would be implemented to evaluate the effectiveness of source remediation as it relates to restoring groundwater quality to relevant SCGs. This program would allow the effectiveness of the soil excavation program to be monitored and would be a component of the operation, maintenance, and monitoring for the site.

SVOC Contaminated Soil and Groundwater

1. Contaminated soil would be excavated to the water table, stockpiled, analyzed for disposal characteristics and transported off-site to a permitted disposal facility. Additional soil samples would be collected during the design phase to better evaluate the areal extent of soil contamination. The extent of the excavation may be limited by physical constraints such as the building foundation and underground utilities. Post excavation confirmatory endpoint soil samples would be collected to ensure compliance with the recommended soil cleanup objectives.

2. The excavation would be backfilled to original grade with certified clean fill.

3. Additional groundwater monitoring wells would be installed to supplement existing wells and to replace those wells lost during construction activities at the site. Groundwater sampling would be conducted prior to implementing the remedy to better assess the nature and extent of floating and dissolved product. Extraction wells would be constructed to pump floating product to the surface for treatment. Treated groundwater would be recharged through diffusion wells or recharge basins.

4. The operation of the components of the remedy, including groundwater monitoring, would continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

Jameco Industries 1-52-006
Table 1 - Soil Data
Metals (ppm)

Sample Location	Sample Depth (feet)	Sample Date	Chromium (III)	Chromium (VI)	Copper	Mercury	Nickel	Zinc
Area of Concern #1: Former Seepage Lagoons								
MW-26	0-2	9/15/1998	6.8	ND	3.5	ND	4	20.9
MW-26	5-7	9/15/1998	23.2	ND	15,600	0.11	154	5,090
MW-26	10-12	9/15/1998	4.6	ND	17.3	0.11	1.8	19
B-29	0-2	9/15/1998	694	ND	846	0.42	361	424
B-30	5-7	9/15/1998	3.8	ND	4.4	0.09	5.5	15.2
B-31	10-12	9/14/1998	11.4	ND	10.6	ND	4.5	21.9
Area of Concern #2: Degreasing Area								
AQ-1	0-2	1/29/1998	124	ND	423	ND	73.6	212
AQ-1	4-6	1/29/1998	20.7	ND	120	ND	5.9	17.3
AQ-1	8-10	1/29/1998	21.6	ND	109	ND	2.5	23.3
WWT FL	6-8	4/6/1999	24.6	NA	87.3	ND	10.7	22.2
Area of Concern #3: Former Industrial Leaching Pools								
LP-1	6-8	11/18/1998	602	ND	98.3	0.052	777	155
LP-2	6-8	11/18/1998	23,700	ND	4,400	0.14	8,420	2,120
LP-3	6-8	11/18/1998	905	ND	197	0.04	1,220	226
LP-4	6-8	11/18/1998	580	ND	106	0.042	752	164
B-32	0-2	11/18/1998	961	ND	955	0.17	516	190
B-32	5-7	11/18/1998	3.4	ND	1.6	0.048	2.2	28.9
B-33	0-2	11/18/1998	85.1	ND	51.6	0.046	32.3	18.9
B-33	5-7	11/18/1998	2	ND	1.2	0.043	1.9	7
B-34	0-2	11/18/1998	182	ND	262	0.046	440	89.9
B-34	5-7	11/18/1998	3.7	ND	1.9	0.039	2.4	24.9
LP-1A	15-17	6/23/1999	140	NA	119	ND	100	25.1
LP-1B	20-22	6/23/1999	41.5	NA	59.1	ND	34.5	16
LP-1C	25-27	6/23/1999	14.4	NA	37.4	ND	34.8	11.8
LP-2A	15-17	6/23/1999	47.2	NA	48.6	ND	27.6	11.1
LP-2B	20-22	6/23/1999	19.1	NA	28.2	ND	16.8	8.4
LP-2C	25-27	6/23/1999	10.1	NA	53.5	ND	21.1	18.9
LP-5A	15-17	6/23/1999	125	NA	68.7	ND	69.3	21.1
LP-5B	20-22	6/23/1999	53.7	NA	71.8	ND	46.7	19.2
LP-5C	25-27	6/23/1999	9.4	NA	29.8	ND	17.4	20.7
TAGM 4046 Soil Cleanup Objectives			50	50	25	0.1	13	20

Jameco Industries 1-52-006
Table 1 - Soil Data
Metals (ppm)

Sample Location	Sample Depth (feet)	Sample Date	Chromium (III)	Chromium (VI)	Copper	Mercury	Nickel	Zinc
Area of Concern #4: Cutting Oil Release								
R4-2	4-6	4/6/1999	3.2	NA	2	ND	1.5	13.3
R4-5	4-6	4/6/1999	5.2	NA	7	ND	4.8	24.1
Area of Concern #5: Metal Plating Shop								
PA-1	0-2	1/23/1998	2,620	NA	230	0.1	308	21.4
PA-1	4-6	1/23/1998	8,750	NA	727	ND	654	268
PA-1	8-10	1/23/1998	371	NA	57.8	ND	74.7	24.1
PA-2	0-2	1/23/1998	1,060	NA	104	ND	5,480	71.8
PA-2	4-6	1/23/1998	340	NA	266	0.21	1,120	16.9
PA-2	8-10	1/23/1998	8.6	NA	1.8	ND	332	5
PA-3	0-2	1/23/1998	102	NA	104	ND	6,300	37
PA-3	4-6	1/23/1998	6	NA	4	ND	10,200	55.5
PA-3	8-10	1/23/1998	3.9	NA	1.9	ND	723	14.9
PA-4	0-2	1/23/1998	4,510	NA	514	ND	2,600	70.2
PA-4	4-6	1/23/1998	356	NA	21.6	0.24	1,380	30
PA-4	8-10	1/23/1998	359	NA	70.8	0.21	1,250	32.5
PA-5	0-2	1/23/1998	185	NA	502	ND	759	95.1
PA-5	4-6	1/23/1998	12.6	NA	8.8	0.16	10.4	21.5
PA-5	8-10	1/23/1998	2.4	NA	6.7	ND	98.2	5.1
West Portion of Site								
B-35	5-7	9/15/1998	8.8	ND	4.6	0.074	7	22.2
MW-25	0-2	9/15/1998	214	0.21	295	0.3	301	115
MW-25	5-7	9/15/1998	11.8	ND	10.4	ND	36.4	26.1
East Portion of Site								
B-36	5-7	9/14/1998	4.1	ND	5.5	ND	2.9	24.7
B-37	5-7	9/14/1998	112	ND	72.8	ND	32.5	46.2
TAGM 4046 Soil Cleanup Objectives			50	50	25	0.1	13	20

Jameco Industries 1-52-006
Table 1 - Soil Data
Metals (ppm)

Sample Location	Sample Depth (feet)	Sample Date	Chromium (III)	Chromium (VI)	Copper	Mercury	Nickel	Zinc
Off-Site Residential Area (South of Site)								
HB-1	0-3	11/19/1998	49.4	ND	44.1	0.53	28.5	164
HB-1	2	11/19/1998	7.8	ND	9.8	0.04	6.1	23.3
HB-2	0-3	11/19/1998	15	ND	30	0.08	10.2	49.5
HB-2	2	11/19/1998	17.6	ND	25.6	0.091	13.2	62.4
HB-3	2	11/19/1998	4.1	ND	3.7	0.037	2.7	8.9
HB-4	2	11/19/1998	4	ND	3	0.05	3.1	17.4
HB-5	2	11/19/1998	19.8	ND	38.9	0.12	12.8	87.4
HB-6	2	11/19/1998	31.8	ND	31	0.037	20	45.2
HB-7	2	11/19/1998	34.4	ND	32.4	0.085	24.8	81.6
TG-1	2	11/19/1998	24	ND	42.3	0.046	20.8	53.2
Off-Site Industrial Area (North of Site)								
R4-6	4-6	4/6/1999	1.8	NA	1.5	ND	1.4	8
Storm Drain / Dry Wells								
B-27	10-12†	9/15/1998	930	ND	44,400	0.11	2,050	8,660
B-28	10-12†	9/15/1998	858	ND	36,500	0.49	3,960	7,620
TAGM #4046 Soil Cleanup Objectives			50	50	25	0.1	13	20

<u>notes</u>
ND=non detect
NA=not analyzed

Jameco Industries 1-52-006
Table 2: Groundwater Data
VOCs and Metals
(ppb)

Sample Identification	1,2-Dichlorethene	Tetrachloroethene	Trichloroethene	Total Chromium	Copper	Nickel	Zinc
MW-1							
5/94	ND	ND	ND	49	26	ND	173
1/95	ND	ND	ND	65	84	42	250
4/95	ND	ND	ND	40	54	ND	160
7/95	ND	ND	ND	52	71	ND	180
10/95	ND	ND	ND	75	NA	NA	NA
1/96	ND	ND	ND	124	141	105	353
4/96	ND	ND	ND	53	63	43	182
10/96	ND	ND	ND	37	44	26	149
4/97	ND	ND	ND	43	52	35	301
10/97	ND	2	ND	5	6	5	32
4/98	ND	ND	ND	37	44	34	110
11/98	ND	ND	ND	7	21	6	105
11/00	ND	ND	ND	25	NA	NA	NA
MW-2							
5/94	ND	28	1,200	9,120	3,160	4,490	747
1/95	ND	26	180	4,000	3,800	5,700	700
4/95	ND	11	46	4,900	3,500	4,300	690
7/95	ND	0.5	5	3,900	4,100	3,600	670
10/95	ND	ND	21	4,090	NA	NA	NA
10/96	48	37	7	3,010	3,340	2,530	553
4/97	470	93	1,400	482	830	10,200	394
10/97	2	0.8	5	59	84	538	215
4/98	99	53	410	51	684	4,560	208
11/98	36	13	48	165	231	10,600	263
11/00	8	ND	12	258	118	7,620	203
12/02	2	ND	4	389	292	1,410	49
MW-3							
5/94	ND	ND	10	139	597	1,750	109
1/95	ND	ND	4	320	4,500	3,500	680
4/95	ND	25	170	200	2,800	2,000	370
7/95	ND	4	12	61	6,600	4,200	890
10/95	ND	ND	ND	201	NA	NA	NA
1/96	ND	1.7	5.3	226	4,630	2,640	469
4/96	29	3.9	94	490	3,030	3,350	430
10/96	25	9	150	183	1,600	1,670	340
4/97	1	1	38	188	436	402	112
10/97	6	1	14	1,440	2,170	3,530	294
4/98	0.5	0.8	8	84	472	686	258
11/98	ND	ND	1	4	127	195	49
11/00	ND	ND	ND	78	225	154	58
12/02	3	2	20	203	300	1,390	96
SCG	5	5	5	50	200	100	300

Jameco Industries 1-52-006
Table 2: Groundwater Data
VOCs and Metals
(ppb)

Sample Identification	1,2-Dichlorethene	Tetrachloroethene	Trichloroethene	Total Chromium	Copper	Nickel	Zinc
MW-4							
11/00	ND	1	12	226	419	8,980	ND
12/02	ND	0.7	2	49	102	2,120	56
MW-5							
5/94	ND	ND	ND	137	639	373	582
1/95	ND	ND	ND	100	730	230	480
4/95	ND	ND	ND	130	920	270	420
7/95	ND	ND	ND	100	750	190	360
10/95	ND	ND	ND	221	NA	NA	NA
4/96	81	ND	ND	222	1330	469	888
10/96	13	ND	ND	220	1160	475	598
4/97	90	ND	ND	52	308	191	382
10/97	21	ND	ND	47	142	265	168
4/98	2	ND	ND	4	11	31	148
11/98	15	25	5	1	9	637	24
MW-6							
5/94	17	20	7	92	1,210	3,960	537
MW-7							
5/94	ND	30	4	10	ND	25	26
1/95	ND	39	3	ND	ND	ND	ND
4/95	ND	15	0.6	ND	ND	ND	ND
7/95	ND	13	0.8	ND	ND	ND	35
10/95	ND	51	9.7	21	NA	NA	NA
1/96	2.9	17	1.3	ND	7	ND	33
4/96	ND	1.3	ND	ND	9	ND	33
10/96	ND	2	150	12	5	7	22
4/97	21	51	6	11	12	9	49
10/97	38	44	9	124	22	250	401
4/98	2	0.7	ND	2	24	104	61
11/98	1	ND	ND	ND	2	ND	17
11/00	75.6	ND	12.6	NA	NA	NA	NA
MW-8							
5/94	NA	NA	NA	10	ND	66	23
MW-9							
5/94	ND	2	0.3	10	ND	ND	34
1/95	ND	ND	ND	ND	ND	ND	24
4/95	ND	ND	ND	ND	NA	ND	25
7/95	ND	ND	ND	17	19	ND	100
10/95	ND	ND	ND	21	NA	NA	NA
1/96	ND	ND	ND	24	28	16	108
4/96	ND	ND	ND	ND	22	16	162
10/96	ND	ND	ND	8	10	4	101
4/97	2	ND	ND	3	ND	ND	165
10/97	ND	ND	ND	14	15	11	181
4/98	ND	ND	ND	108	17	9	90
11/98	3	4	ND	ND	1	6	102
SCG	5	5	5	50	200	100	300

Jameco Industries 1-52-006
Table 2: Groundwater Data
VOCs and Metals
(ppb)

Sample Identification	1,2-Dichlorethene	Tetrachloroethene	Trichloroethene	Total Chromium	Copper	Nickel	Zinc
MW-10							
7/94	3	1	39	40	10	150	130
11/98	15	ND	18	3	4	ND	17
MW-11							
7/94	1	ND	34	80	220	70	230
11/98	ND	ND	ND	18	10	15	17
MW-12							
7/94	250	44	1,600	ND	ND	ND	60
1/95	ND	120	3,300	18,000	21,000	21,000	5,600
4/95	ND	400	1,500	14,000	25,000	22,000	4,700
7/95	ND	100	1,800	10,000	13,000	16,000	3,000
10/95	ND	75	1,700	5,870	NA	NA	NA
1/96	ND	75	1,400	--	--	9,700	4,260
4/96	1,400	220	4,200	2,570	6,730	38,800	5,000
10/96	1,800	190	1,900	2,070	7,260	37,200	2,680
4/97	580	360	3,400	739	4,060	18,600	1,720
10/97	400	120	3,000	621	2,160	8,340	703
4/98	48	55	380	34	3,520	2,100	563
11/98	60	ND	78	28	5,310	7,070	859
MW-15							
4/99	62	37	9	26	34	20	99
MW-16							
4/99	10	0.8	0.4	NA	NA	NA	NA
MW-17							
4/99	98	68	9	54	41	26	55
MW-18							
4/99	5	0.8	0.6	NA	NA	NA	NA
MW-20							
4/99	22	8	2	16	45	13	50
MW-21							
4/99	48	51	7	ND	NA	NA	NA
MW-22							
4/99	2	ND	0.5	ND	NA	NA	NA
MW-23							
4/99	14	13	1	ND	NA	NA	NA
SCG	5	5	5	50	200	100	300
MW-25							
11/98	ND	ND	7	2,740	483	212	144
MW-26							
11/98	30	18	2	8	156	6	58
GP-101A							
11/98	30	9	67	4	108	3,350	147
GP-101B							
11/98	ND	ND	ND	13	22	163	160
GP-101C							
11/98	ND	1	2	15	24	102	69
SCG	5	5	5	50	200	100	300

Jameco Industries 1-52-006
Table 2: Groundwater Data
VOCs and Metals
(ppb)

Sample Identification	1,2-Dichlorethene	Tetrachloroethene	Trichloroethene	Total Chromium	Copper	Nickel	Zinc
GP-102A							
11/98	ND	ND	ND	6	ND	39	20
GP-102B							
11/98	ND	ND	ND	3	6	59	35
GP-102C							
11/98	ND	ND	ND	2	ND	20	40
GP-103A							
11/98	ND	ND	ND	ND	ND	28	73
GP-103B							
11/98	29	9	61	3	ND	15	ND
GP-103C							
11/98	ND	ND	ND	2	ND	30	19
GP-104A							
11/98	ND	ND	ND	NA	NA	NA	NA
GP-104B							
11/98	ND	ND	ND	3	2	56	23
GP-104C							
11/98	ND	ND	ND	2	ND	40	21
GP-105A							
11/98	ND	ND	ND	2	ND	39	21
GP-105B							
11/98	ND	ND	ND	2	ND	47	ND
GP-105C							
11/98	ND	ND	ND	2	ND	51	109
TCE-1							
1/98	68	67	870	17,600	10,600	1,700	2,300
11/98	ND	ND	ND	7,490	10,900	726	1,410
SCG	5	5	5	50	200	100	300
PA-1							
1/98	NA	NA	NA	55,000	15,000	2,410	1,130
PA-2							
1/98	NA	NA	NA	41,000	5,910	14,800	3,180
PA-3							
1/98	NA	NA	NA	3,590	687	40,400	1,100
R4-6							
4/99	NA	NA	NA	39	18	13	130
SCG	5	5	5	50	200	100	300

Notes:
1) all concentrations in ppb
2) SCG - NYS Groundwater Standards for Class GA Groundwater

ND= Non Detect
NA= Not Analyzed

Table 3
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
Alternatives for Metals Contamination			
Alt #1:No Action/Groundwater Monitor	$5,000	$5,000	$155,000
Alt #2: Capping	$54,600	$5,000	$204,600
Alt #3: Solidification/Stabilization	$580,500	$5,000	$605,000
Alt #4: Excavation and Off-Site Disposal	$680,600	$5,000	$705,000
Alternatives for SVOC Contamination			
Alt #1: No Further Action	$34,400	$30,300	$943,000
Alt #2: Groundwater Treatment/Excavation	$163,000	$86,000	$593,000
Alt #3: Bioremediation/Excavation	$198,000	$21,600	$414,000
Alt #4: Air Sparging/Excavation	$67,625	$59,550	$707,000
Total Costs to Implement Alt #4 (Excavation and Off-Site Disposal of Metals Contaminated Soil) and Alt #2 (Groundwater Treatment and Excavation of SVOC Contamination)	$843,600	$91,000	$1,298,000

USGS 7.5' Series Topographic

Bay Shore West, New York Quadrangle

Jameco Industries #1-52-006
Figure 1 - Site Location Map

FIGURE 1
SCALE
1 : 24 000

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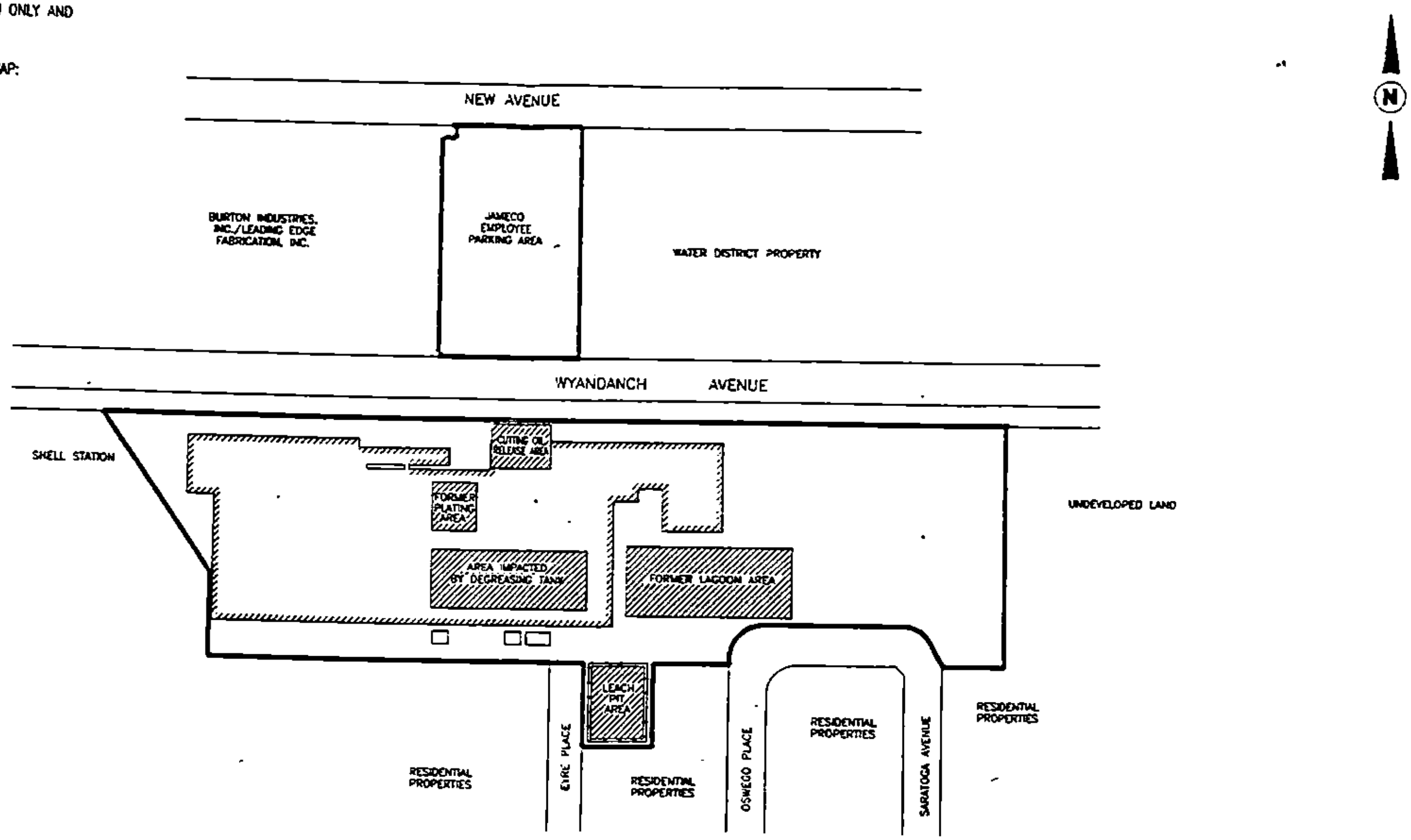
NOTES

1.) THIS DRAWING IS A GRAPHICAL REPRESENTATION ONLY AND SHOULD NOT BE USED AS A SURVEY.

2.) BASEMAP TAKEN FROM SUFFOLK COUNTY TAX MAP: DIST. 100 SECT. 82 BLOCK 2 LOT 73.1



LEGEND

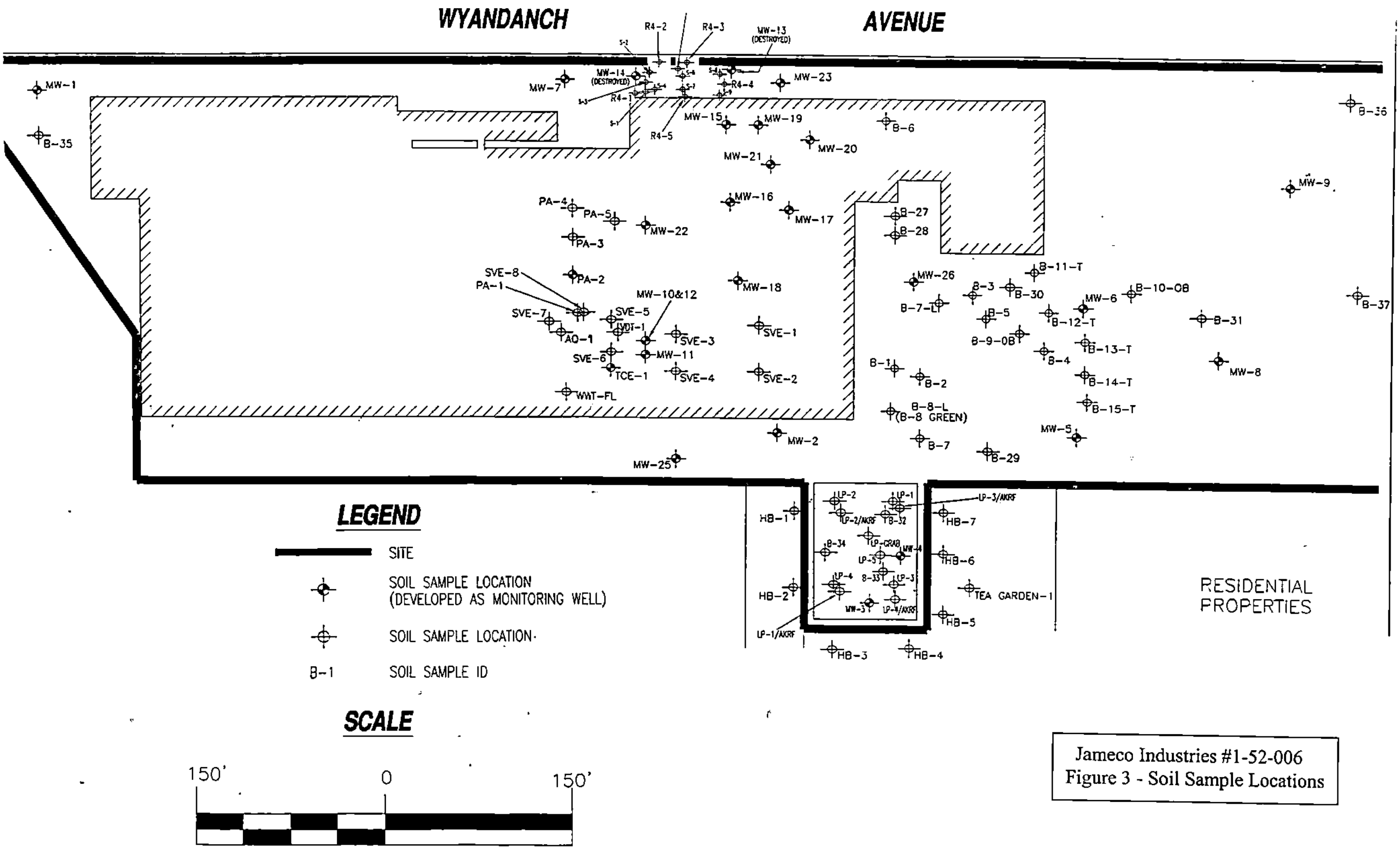
SITE BOUNDARIES

SCALE

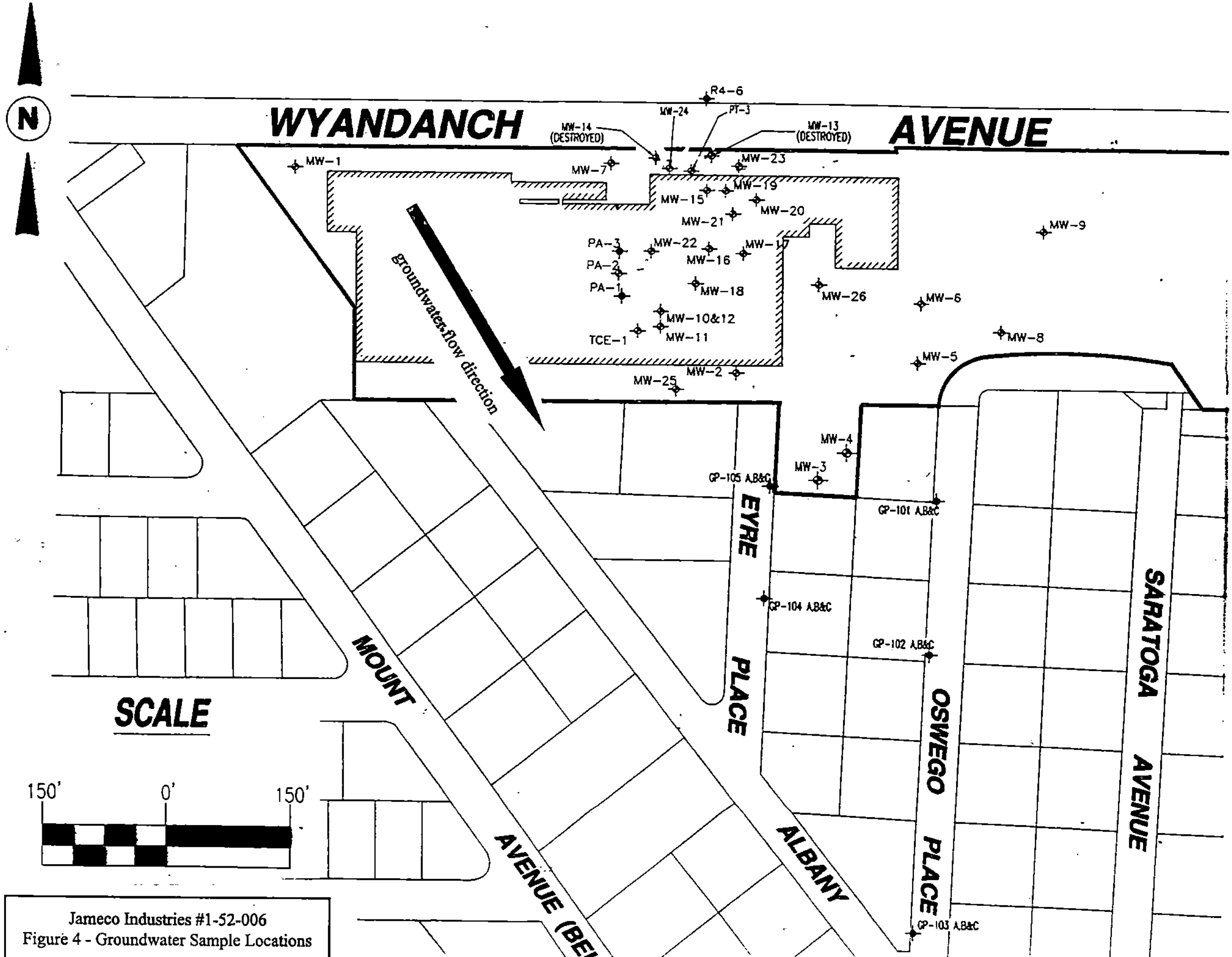
150' 0 150'

Jameco Industries #1-52-006

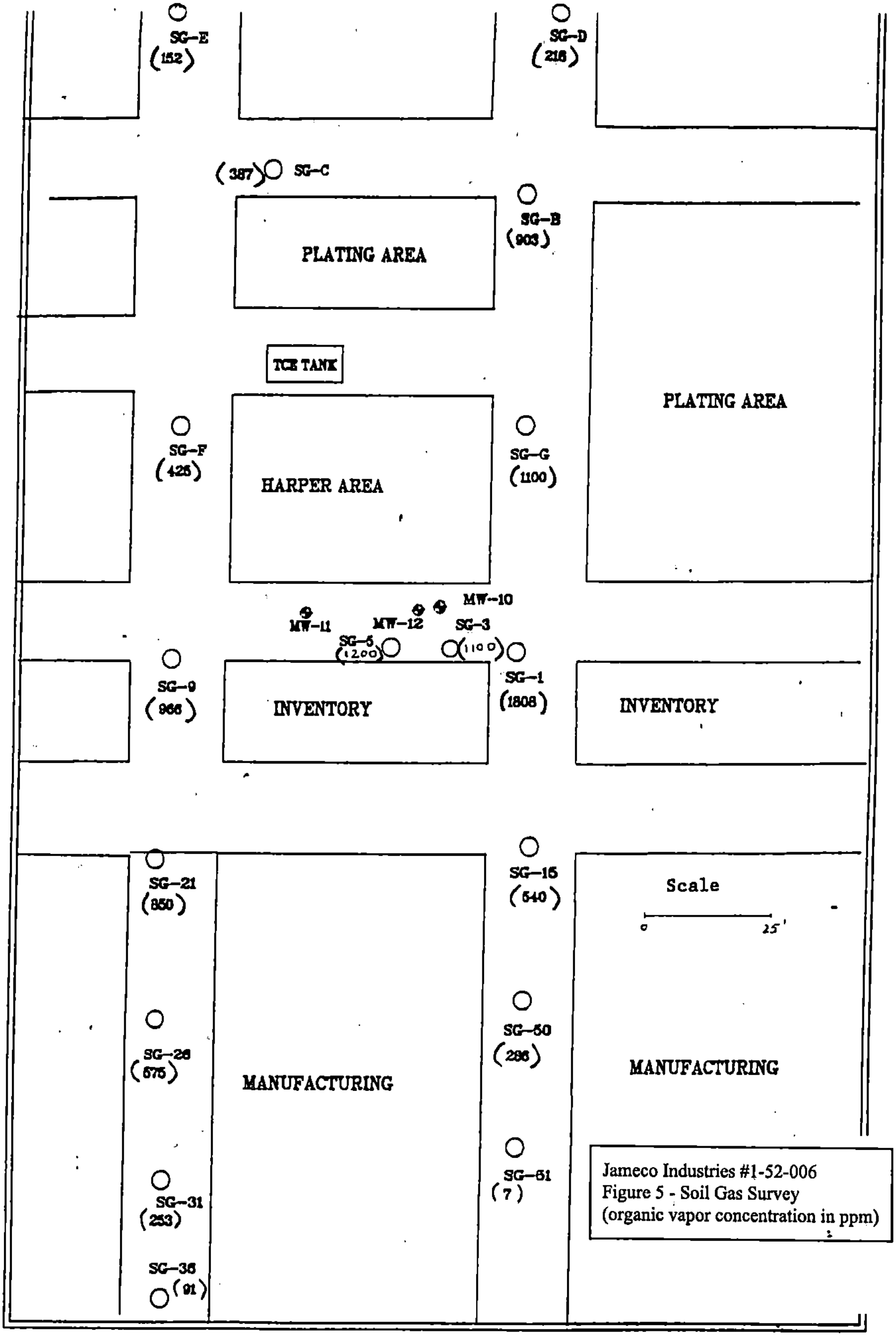
Figure 2 - Areas of Concern



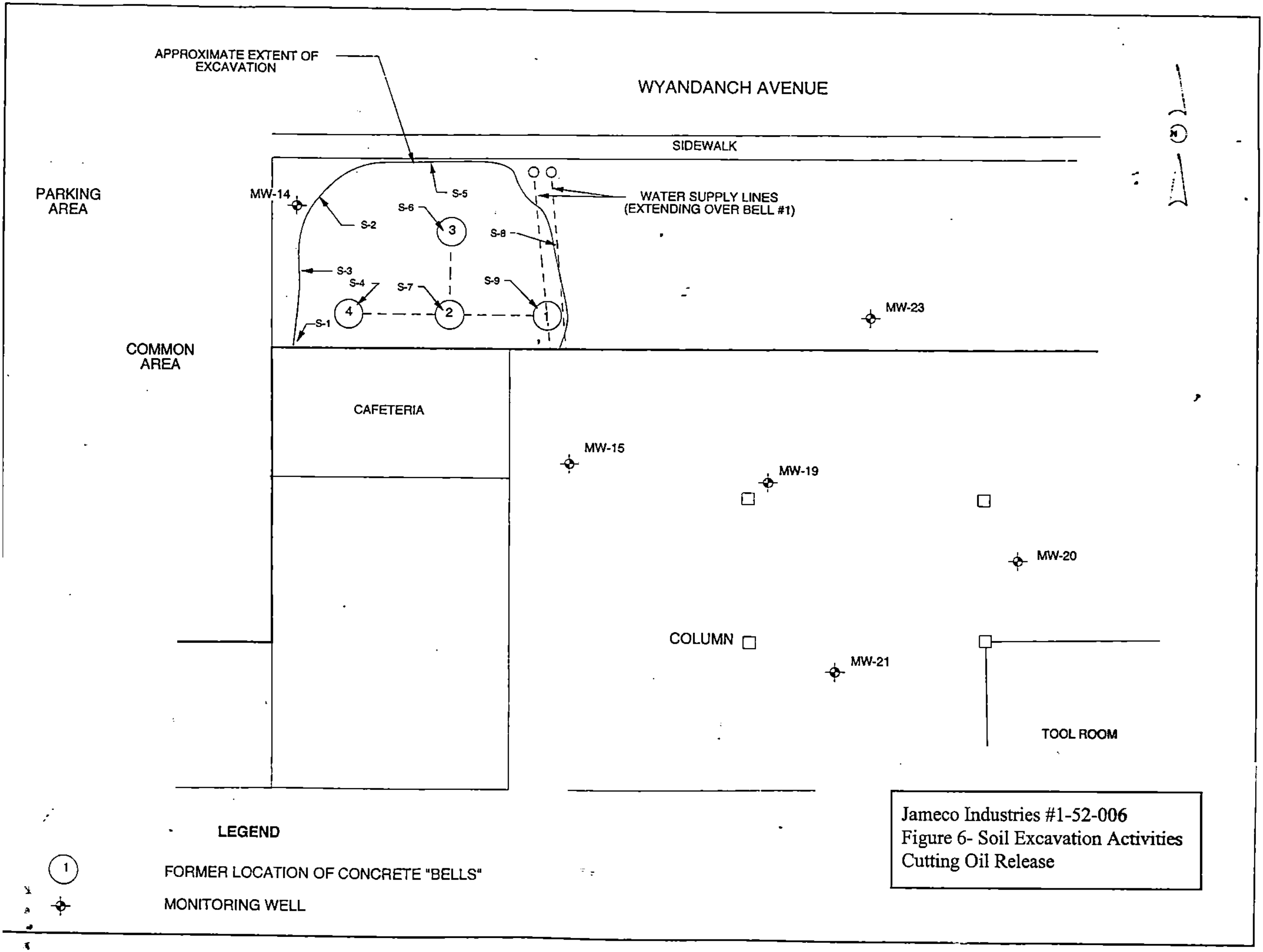
Jameco Industries #1-52-006
Figure 3 - Soil Sample Locations



Jameco Industries #1-52-006
Figure 4 - Groundwater Sample Locations



Jameco Industries #1-52-006
Figure 5 - Soil Gas Survey
(organic vapor concentration in ppm)



Jameco Industries #1-52-006
Figure 6- Soil Excavation Activities
Cutting Oil Release