REMEDIAL DESIGN DOCUMENT
DOLLINGER FACILITY
BRIGHTON, NEW YORK

by

H&A of New York
Rochester, New York

for

AFC-Dollinger Corporation
Richmond, Virginia

File No. 70007-43
July 1993
Revised 17 February 1994

H & A OF NEW YORK

Geotechnical Engineers &
Environmental Consultants

17 February 1994
File No. 70007-43

Division of Hazardous Waste Remediation
Room 222
NYSDEC
50 Wolf Road
Albany, New York 12233-7010

Attention: Mr. David Crosby
Mr. Amar Nagi

Subject: Remedial Design Document
Dollinger Corporation, Site No. 828078

Dear Mr. Crosby:

H&A of New York is pleased to provide, on behalf of Dollinger Corporation, the enclosed final Remedial Design Document (RDD) for the Dollinger facility in Brighton, New York. The document format and its contents are based on:

- discussions with you,
- our detailed outline submittals of 2 and 7 July 1993 which you reviewed,
- the draft Remedial Design Document submitted to you on 15 July 1993,
- the reviewer's comments on the Remedial Design Document that were included with your letter of 26 August 1993,
- our telephone conversation of 3 September 1993 in which we discussed and resolved each of the issues raised in the 26 August letter.
- the Remedial Design Document submitted to you dated 19 October 1993,
- NYSDEC's 10 November 1993 Comments;
- partial response to those comments, dated 29 November 1993,
- the draft response to the remainder of the comments, dated 20 January 1994.
- and our telephone conversations of 11 and 16 February 1994.

189 North Water Street
Rochester, NY 14604-1151
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Offices
Cambridge, Massachusetts
Denver, Colorado
Glastonbury, Connecticut
Scarborough, Maine
Silver Spring, Maryland
Bedford, New Hampshire
Cleveland, Ohio

All comments previously made by the reviewers regarding this RDD were addressed in the preparation of this final document.

Included with this final version of the Remedial Design Document are a set of 100% complete engineering drawings. The drawings have been modified subsequent to our 1 February 1994 submittal to include the additional vapor extraction well and reflect changes to the low permeability cover. In addition, Sections 1.6, 1.10, and 3.3 through 3.6 of Appendix A in the Remedial Design Document were modified to reflect the change in proposed cover system at the site. A licensed Professional Engineer (P.E.) reviewed, signed and stamped these drawings and this Document. An addendum (No. 1) is attached following this letter; it reflects a change concerning design drawing M-1.

Based on our discussions with you, we understand you intend to perform you review, and contact us with your approval for performance of the SVE-related work.

Thank you for your continued input on this project.

Sincerely yours,
H&A OF NEW YORK

Suzanne B. Wheatcraft
Senior Hydrogeologist

Vincent B. Dick
Vice President

Stanley E. Walker, P.E.
Vice President

SBW:VBD:gmc\rdoll02.wp

xc: G. Bailey, NYSDEE-Buffalo
Brighton Library, Document Repository
T.Caffoe and M.J. Peachy, NYSDEC - Avon
R. Elliott, MCHD
T. Keef, Brighton Town Engineer
S. Koorse, Hunton & Williams
A. Wakeman and L. Rafferty, NYSDOH
A. Vincent, AFC-Dollinger

ADDENDUM NO. 1 25 JANUARY 1994

DOLLINGER CORPORATION
SOIL VAPOR EXTRACTION SYSTEM INSTALLATION
H&A FILE NO. 70007-43

General:

All Contractors submitting proposals for the above named project shall take note of the following changes, additions, interpretations, clarifications, etc., in connection with the drawings and specifications and other general documents. The following instructions have precedence over anything contrarily shown on the drawings or described in the specification documents, and all such shall be taken into consideration and be included in the Contractor's bids. Acknowledge receipt of this Addendum by referencing its number and date in your bid letter. Failure to do so may subject bidder to disqualification.

This Addendum No. 1 consists of 1 page.

Changes to the Drawings

Drawing M-1:

- Refer to Section A-A - Provide flexible connection where ductwork is connected to vacuum extraction skid.
- Refer to Section A-A - Damper mounted vertically is indicated incorrectly as D-2. Shall be changed to D-1.
- Refer to Roof Exhauster Detail - Factory mounted and wired disconnect switch shall be changed to a field mounted (external) non-fused - NEMA 3R lockable disconnect switch.
- Refer to Mechanical Equipment List - Delete fire dampers from L-1, D-1, D-2, and D-3.
- Refer to Notes - Note 2 shall be changed to read as follows:

  "Fans shall be mounted on roof curbs provided by the fan manufacturer and installed per manufacturer's instructions. Roof curbs shall have a raised cant to compensate for roof insulation. All ductwork shall be fabricated and installed in accordance with SMACNA Standards - [2-in. W.C. Negative Pressure Minimum]."

H & A OF NEW YORK

Geotechnical Engineers &
Environmental Consultants

1 February 1994
File No. 70007-43

Division of Hazardous Waste Remediation
Room 222
NYSDEC
50 Wolf Road
Albany, New York 12233-7010

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Included with this final version of the Remedial Design Document are a set of 100% complete engineering drawings. A licensed Professional Engineer (P.E.) reviewed, signed and stamped these drawings and this Document. **An** addendum (No. 1) is attached following this letter; it reflects a change concerning design drawing M-I.

Based on our discussions with you, we understand you intend to perform you review, and contact us with your approval for performance of the SVE-related work.

Thank you for your continued input on this project.

Sincerely yours,
H&A OF NEW YORK

Suzanne B. Wheatcraft
Senior Hydrogeologist

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A. Vincent, AFC-Dollinger

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I. INTRODUCTION

1-01. INTRODUCTION

This document shall serve as the Remedial Design Document (RDD) for the Dollinger facility located in Brighton, New York (see Project Locus - Figure 1). The intent of this RDD is to:

- present the remedial objectives and chosen means to implement these objectives.
- provide design drawings and specifications,
- provide a task implementation schedule,
- describe the means to evaluate the effectiveness of the remedial designs,
- provide a site health and safety plan for implementation and startup of remedial measures,
- describe measures to evaluate effectiveness and handle contingencies, and
- describe the citizen participation plan.

The information provided herein is based on a Remedial Investigation and Feasibility Study (RI/FS), and Record of Decision (RoD) developed for this site. This work is described in detail in the following documents:

- Remedial Investigation Report. Dollinger Facility, Brighton, New York, by H&A of New York. November 1991.
- Addenda A. B. and C to the RI Report, by H&A of New York, January and February 1992.
- Feasibility Study Report. Dollinger Facility, Brighton, New York, by H&A of New York. March 1992.
- Addenda I and II to the FS Report. by H&A of New York, May and July 1992.
- Record of Decision. Dollinger Corporation Site. by New York State Department of Environmental Conservation. Division of Hazardous Waste Remediation, January 1993.

Final engineering diagrams and specifications are attached. They are provided in addition to the text and drawings included herein.

1-02. HISTORY OF SITE OPERATIONS

The site is an 18.5 acre property which is roughly rectangular in shape, located in Brighton, New York at 1 Town Line Circle (Figure 2). An approximately 140,000 sq. ft., 1 story, slab on grade building containing manufacturing, warehousing, and office space is centrally located on the site. Building structural elements (columns, footers) are founded on relatively shallow supporting soils (reportedly four to five feet as shown on the proposed building plans). Exterior walls consist of concrete "tip-up" panels reportedly founded at the same approximate shallow depth. The property is bounded on all sides by other commercial and industrial lots.

The site was the location of the manufacture and assembly of industrial filters between 1970 and 1987. Operations at the facility ceased in approximately 1987 and the building was vacated of personnel, equipment. and operations prior to its sale in 1989.

The site is currently owned by Wilray, Inc. who is currently leasing all or part of the building to one or more tenants.

1-03. HISTORY OF SITE ENVIRONMENTAL INVESTIGATIONS

Previous RI/FS work at the site has identified three areas of concern at the site; a former degreaser area. a former drum storage area. and a site drainage detention pond (Figure 3). The nature and extent of site compounds of concern in each of the media investigated have been defined as follows:

- Groundwater - Compounds in groundwater are primarily limited to TCE and its breakdown products (1,2-DCE, 1,1-DCE and vinyl chloride) present immediately below two of the areas of concern (former TCE degreaser area and former drum storage area). The highest concentration of these compounds was detected in groundwater beneath the former TCE degreaser area (a combined concentration of approximately 50 parts per million (ppm)). Sampling and analysis of the deepest site well, installed across the overburden-bedrock interface below the former TCE degreaser area. did not detect chlorinated volatile organic compounds (VOCs), nor were chlorinated VOCs detected in wells located north, south, east or west of the three areas of concern.

  Groundwater concentrations in the former degreaser area will be reduced by a high vacuum soil vapor extraction (SVE) which will be used in an effort to reduce soil concentrations to below the cleanup criteria (0.15 to 1.2 ppm, depending on the compound).

- Sediment and Soil - The shallow pond sediment nearest the storm sewer outfall pipe, and shallow soil at each of the areas of concern. contains detectable concentrations of the chlorinated VOCs described above, semi-volatile phthalates. and polyaromatic hydrocarbons (PAHs).

  The maximum shallow soil concentrations measured are approximately 100 ppm for volatiles and 10 ppm for semi-volatiles. As above, the soil cleanup criteria for volatiles ranges from 0.15 to 1.2 ppm, and is 0.33 ppm for semi-volatiles.

Volatile organics were detected as high as approximately 250 ppm in the pond sediment, semi-volatiles detected at approximately 850 ppm. The cleanup criteria for volatiles in the sediment varies but is generally less than 1 ppm, and for the semi-volatiles it ranges from less than 1 ppm to 10 ppm, depending on the compound.

II. REMEDIAL OBJECTIVES

2-01. REMEDIAL OBJECTIVES FOR FORMER DEGREASER AND DRUM STORAGE AREAS

2.1.1 Degreaser and Drum Storage Area Soils

Soils beneath the former degreaser and drum storage areas have been found to contain VOCs in exceedance of the site specific soil cleanup criteria (Table I).

Beneath the former degreaser these exceedances have been noted in samples down to 14 feet deep. which is therefore the target remediation depth. However. extraction wells will be screened to 16 feet to provide complete penetrations of the target zone. The areal extent of the former degreaser area soil cleanup is based on soil and soil vapor samples (Figure 3).

A shallow (to 12 feet depth) soil sampling grid was used to delineate the areal and vertical extent of VOC-containing soil in the former drum storage area. Although site compounds were detected to as deep as eight feet. soil cleanup criteria were not exceeded in samples below approximately 3.5 feet. The remedial effort has therefore been designed to address soils to at least 3.5 feet.

A 2-Phase, high vacuum soil vapor extraction (SVE) was selected by the RoD as the preferred option for remediating of the soils under the former degreaser room and the former drum storage area. Shallow groundwater, as it is encountered in the drum storage area SVE trench piping. will be removed along with the vapor phase. This process and the means to measure the success of its operation, are described in Section 3-01.

The SVE will be operated until the soil criteria or asymptotic conditions are reached. or until modifications to enhance the system are made. If modifications are unsuccessful. a focused feasibility study will be performed to evaluate. among other options. the "no action" alternative. Once the soil criteria are met, the SVE will be evaluated with respect to further remediation and control of shallow source area groundwater, to the extent technically practicable.

To remediate semi-volatile contaminated surface soils adjacent to the degreasing room. the upper six inches of soil (approximately) will be removed from an area approximately 12.5 x 33 feet around soil sampling point GS-A8 (Figure 3). The soil will be excavated and temporarily held on site until confirmatory samples from the excavation indicate the soil criteria arc reached (see Table I for soil cleanup criteria). At this time it is anticipated that the removed soil will be disposed off-site. The remediation of this site area is described in more detail in Section 3-02.

H&A OF NEW YORK

Lcttcr of Transmittal

Geotechnical **Engineers &**
Environmental **Consultants**

To NYSDEC
50 Wolf Road
Albany, **New** York

Attention Amar Nagi

Date ***2/22/94***

File Number ***70007-43***

Subject Approved Remedial - Design Document

Copies	Date	Description
1	***2/17/94***	Approved Remedial Design Document and Issue D of - Drawings

Remarks

Revisions made as discussed. Please destroy or return the version of this document and **drawings** previously provided, dated 1 February ***1994.***

Copies are also being mailed to:

D. Crosby, **NYSDEC-Albany**
G. Bailey, NYSDEE-Buffalo
Brighton Town Library
T. Caffoe & H.J. Peachy, NYSDEC-Avon
R. Elliott, MCHD
T. Keef, **Brighton** Town Engineer
S. Koorse, **Hunton** & Williams
R. Shaheen, Wilray
A. **Wakeman** & L. Rafferty, **NYSDOH**
A. Vincent, AFC-Dollinger

Signed **Suzanne** B. Wheatcraft

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Haley & Aldrich, Inc.
Cambridge, Massachusetts
Glastonbury, Connecticut
Scarborough, Maine
Bedford, New Hampshire

2.1.2 Degreaser Area Groundwater

The groundwater in the former degreaser area will be remediated by the 2-Phase SVE. Cleanup goals for site groundwater are performance based. as described in the previous section. Remediation of the soil is expected to result in lower groundwater concentrations because the soil is believed to be currently acting as a VOC source to the groundwater.

As stated in the RoD, the SVE system should act as a groundwater migration control measure and a groundwater source reduction measure. The gradients that will be created by the SVE will act to impact the migration, and source reduction will occur through vapor and groundwater removal. Migration control will be evaluated by monitoring of water levels and determination of gradients during routine sampling. The rate of removal and decrease of VOC concentrations will be evaluated during system operation.

The groundwater remediation goal is significant reduction on the former degreaser source area. Since the SVE technology does not have a sufficient track record to allow us to say with certainty what amount of reduction will occur. shallow source area groundwater will be remediated to the extent technically practicable.

2-02. SEDIMENT REMEDIAL OBJECTIVES FOR POND AREA

Samples of the sediment in the pond have shown an area (see Figure 3) where concentrations of volatiles and semi-volatiles exceed the site specitic clean-up criteria (see Table I). The stormwater drainage pond located downstream from the former degreaser and drum storage source areas appears to have received run-off of VOCs and semi-volatile compounds in the past. In addition. during periods of high groundwater levels, VOCs appear to migrate to the pond through the storm sewer bedding and/or via infiltration into the storm sewer itself that runs past the two source areas to the receiving pond.

Sampling has also identified an average approximate depth of the sediment that exceeds the criteria. In some places. contamination is as deep as a foot, in others, Icss. This depth is not uniform across the pond - affected sediment is thicker near the outfall pipe and thins to the west. toward the property line. A sampling grid in the pond area was used to characterize the sediment for disposal Figure 13. Each sample was submitted to an analytical laboratory for analysis for volatiles. semi-volatiles and metals. It is anticipated that these results will be utilized in characterizing the material for disposal.

2-03. REMEDIAL OBJECTIVES FOR STORM SEWER LINE

Pond water samples contained some VOCs in excess of the clean-up criteria (see Table I). To address the possibility that shallow groundwater. containing VOCs, is moving through the storm sewer pipe bedding to the detention pond, four bentonite collars will be installed along this line at locations designed to prevent this flow from reaching the pond (Figure 3). The pond will subsequently be sampled: if the presence of elevated VOCs continues after collar installation, the affected section of the storm sewer will be slip lined. Section 3-03 describes in detail the installation and sampling proposed.

2-04. REMEDIAL OBJECTIVES AND ARARS

Under the terms of the Consent Order, the substantive requirements of certain Applicable. Relevant and Appropriate Regulations (ARARs) need to be met. Specifically, for this site, these regulations apply to air discharges, releases to the site sanitary sewer, and land disposal regulations.

The air discharges that result from the SVE operation will be regulated under a NYS air emission permit. Such a permit was initially obtained for the pilot test. An application to modify this permit for the final emission point, using pilot test data, will be made prior to SVE start-up. The application is in preparation for submittal to the NYSDEC Region 8 office.

Releases to the site sewer will be permitted by the Town of Brighton and Monroe County. A permit was issued for the pilot test discharges: an application to modify this permit for the final emission point, will be made prior to SVE start-up. As requested, the Department will be invited to this meeting with Town and County personnel.

As presented in Section 3.2.2 of this document, the transportation, manifesting and disposal of site soil and sediment will be performed under applicable provisions of the following: 6 NYCRR Part 364 Waste Transporter Permits, 6 NYCRR Part 372 Hazardous Waste Manifest System and Related Standards for Generators. Transporters and Facilities. and 6 NYCRR. Subpart 373-1.2.3 Hazardous Waste TSDS.

2-05. ANALYTICAL QA/QC

Site soil and water samples submitted to an analytical laboratory will undergo QA/QC protocol. As shown on Table II. matrix spikes, matrix spike duplicates, equipment blanks. and trip blanks will be analyzed. The results of these analyses will be provided to the Department in the data packages that include the sample analytical results.

III. REMEDIATION IMPLEMENTATION

3-01. SOIL VAPOR EXTRACTION

3.1.1 Svstem Pilot Test Performance, Results and Intluence on Full-Scale Svstem Design

In June and July of 1993 H&A of New York conducted a 2-Phase vacuum extraction pilot test in the former degreaser area inside of the building and in the vicinity of a former drum storage area located north of the building. The objective of this pilot study was to simulate conditions expected during 2-Phase vapor extraction, compare results to those similar systems currently in use at several sites. and to correlate the results to evaluate system effectiveness at achieving the site remedial goals. This type of vapor extraction process is called 2-Phase because it uses high-vacuum suction to remove soil vapor and water from the subsurface simultaneously.

Pilot Test Extraction Wells/Trench

The pilot study involved installation of one four-inch extraction well (VE-1) and a vacuum extraction trench to assist in evaluating the benefits of 2-Phase extraction at this location. **A** two-inch monitoring well (201-S) located inside the building was also used for extraction purposes during this study. These wells and the trench are shown on Figure 4.

Pilot Test Vacuum Source

The pilot test was performed using a vacuum truck to simulate the operation of a 2-Phase SVE. Although a 2-Phase SVE is capable of achieving deep vacuum (>25" Hg) continuously. without loss of performance. the vacuum provided by the truck available for this application was restricted to less than 10 hours of uninterrupted operation at high vacuum. In addition, due to equipment conditions. the vacuum truck was unable to deliver sufficient vacuum for optimum 2-Phase SVE conditions. Pilot testing performance data retlects the variation in vacuum. and. therefore. results have been extrapolated to establish design conditions. In addition. design conditions have been compared to observed performance at other sites to validate the design criteria.

Pre-test Activities

Pre-test activities involved the collection of static water levels at monitoring wells on-site, installation of shield points for subsurface vacuum measurements. and the collection of groundwater samples from the target extraction wells so that a comparison could be made once testing was completed.

Pilot Test Results

Results obtained during 2-Phase extraction from well VE-1 showed groundwater drawdown from wells 104-S and 201-S. Drawdown was created even though the applied vacuum was low (<10" HgV). Additionally, subsurface vacuum measurements were obtained through the installed shield points up to 12 feet from the extraction well. Development of an unsaturated zone did not occur, thus not allowing subsurface vacuum measurements at the deep shield points installed below the static water table. Groundwater production from VE-1 was approximately 500 gallons. Similar responses were observed while extracting from well 201-S, and the trench. Extraction well 201-S produced a greater amount of water (1200 gallons) but a limited area of influence was created due to possible short-circuiting by sub-slab high permeability fill material.

During the first two days of the pilot test at VE-1, vapor concentrations exceeded the air permit concentrations by one to two orders of magnitude for cis-1,2-dichloroethene, trichloroethene and toluene. The vapor discharge was then routed into a drum of water and "bubbled through". Samples collected before and after the drum showed a decrease in the vapor concentrations to below permit levels. Since the permit levels are in pounds per year, the two day exceedance does not represent an actual exceedance since emissions are below the permit levels when averaged over the entire test length.

Subsurface measurements acquired during the pilot test were supplemented with data from previous experience on sites of similar soil permeability and conditions in order to establish design well spacing. This supplementary extraction data came from a facility in Illinois with soil permeabilities of 10E-7 cm/sec, which has undergone lengthy pilot testing activities through the USEPA SITE program. The soils at the Illinois site are glacial till, similar to the Dollinger site, but with a lower moisture content and slightly deeper zone of saturation. Well spacing has been established at 25 ft. in areas where no other methods of permeability enhancement are in place (Figure 5). Based on this comparative site and the pilot test data, a conservative radius of influence of 15 feet was established for extraction wells at the AFC-Dollinger site.

Extraction Performance

Extraction efficiencies were calculated from vapor phase contaminant concentrations and flow rates. These efficiencies were calculated based on Dollinger pilot test results, obtained during maximum performance from the vacuum truck. The values represent the calculated rates using the total volatiles concentration in the extracted air/water, multiplied by the flow rate. A summary of extraction efficiencies observed at each extraction point is listed below:

Extraction Well/Trench	Mass Removal (Pounds/Hour)	Mass Removal (Pounds/Day)
VE-1	0.74	17.76
201-S	0.02	0.48
Trench	0.00078	0.02

Groundwater and soil vapor recovery from the vacuum extraction trench and well 201-S were lower than that from VE-I due to the inability of the truck to generate and maintain a suitably high vacuum. This resulted in low mass removal rates as vacuum was unable to propagate through the formation and subsequently produce adequate flow.

Analytical results from the groundwater sampling event provided favorable information to support the use of 2-Phase SVE at this site. Concentrations of total volatile organic compounds (TVOCs) detected in groundwater at VE-I decreased from 227 ppm TVOCs (results of sample screening prior to extraction) to 76 ppm TVOCs (results from well sampled the first hour after cessation of extraction). Extraction well 201-S also showed a TVOC decrease of 7.8 ppm to 7.3 ppm due to vacuum application. Groundwater sample collection did not occur at the trench because it had been dewatered during pilot testing.

Full-scale Remedial Design

H&A of New York performed full-scale design activities at the Dollinger facility using an approximate extraction well radius of intluence of 15 feet. In the former degreaser area. it is recommended that eleven to fourteen extraction wells be installed through a phased approach to achieve desired results. The initial well installation phase will provide wells in the former degreaser area and in the manufacturing area of the site building. This should provide for additional data acquisition during extraction from the Phase I wells and provide for the subsequent installation of up to three wells. as needed. Extraction from VE-I would continue, as part of the remedial plan. Well 201-S will be used as an observation well. not part of the extraction well network.

Three vacuum extraction trenches are also proposed in the former drum storage area to address shallow contamination requiring remediation. Figure 6 shows the proposed remedial design site layout for the Dollinger facility.

The design drawings and specifications are provided as a separate submittal along with this RDD. in a biddable format.

3.1.2 Description of Process and Media Addressed

The 2-Phase Extraction process is an innovative remedial technique developed for in-situ remediation of volatile organic compounds in soils and groundwater. The process uses high vacuum (>25 inches Hg at the source) to recover groundwater by entrainment in the flow of recovered soil vapors. The process can greatly simplify remedial installations by eliminating the need for groundwater recovery pumps within individual wells and simultaneously reducing groundwater treatment requirements by in-process stripping.

2-Phase SVE simultaneously recovers soil vapor and groundwater under vacuum from a modified conventional recovery well. Figure 7 conceptually shows how 2-Phase SVE impacts subsurface conditions, maximizing soil vapor and groundwater recovery in the contaminated zone.

Soil vapors and groundwater that enter the well under vacuum are removed from the well casing. Vapor velocities and vapor/liquid ratios cause conveyance of the groundwater and soil moisture to the surface with minimal pressure drop which results in increased applied vacuums within the well casing. Furthermore, the desiccation of the shallow soils results in increased permeability and thus additional volatile vapors removal. Figure 8 shows a typical wellhead used for 2-Phase SVE.

The majority of the volatiles present in groundwater recovered by the 2-Phase SVE process are stripped during extraction. This stripping of VOCs from the groundwater acts as a source control measure preventing the groundwater from recontaminating surrounding soil. The contaminant mass originally contained within the groundwater is transferred to the vapor phase for treatment. Small residual contaminant loadings in the groundwater typically require only carbon polishing prior to discharge. The extraction process accelerates groundwater extraction rates and. the removal of soil vapors and materials sorbed to soils in saturated zones by enhancing partitioning. The majority of the contaminants recovered are removed from the ground in the vapor phase and/or transferred to the vapor phase.

The SVE will be designed to operate from a single vacuum extraction skid placed within the former degreaser room.

As indicated above. a consequence of applying high vacuum to soil in the former drum storage and degreaser areas is that groundwater containing VOCs will also be withdrawn from the subsurface. Therefore. the high vacuum SVE will also function as a shallow groundwater source control mcasurc. This means that groundwater containing the highest concentrations of VOCs will bc extracted from below ground surface. thereby preventing additional VOC loading on remaining site groundwater resources.

3.1.3 Design Drawings and Specifications

In response to the site compounds of concern present at the AFC-Dollinger building. the remedial program will utilize 2-Phase extraction. Project activities include: 1) installation of up to fourteen vacuum extraction wells; 2) installation of up to three vacuum extraction trenches; 3) installation of a monitoring network to evaluate subsurface response; 4) installation of vacuum extraction equipment; and 5) installation of vapor phase and liquid phase treatment systems. This section of the report describes the installation of this system. The design drawings and specifications package provided separately shows and describes this information in detail.

All wells installed within the system shall be 4-in. I.D.. 16 feet deep with a 0.010-inch screen from 5 feet to 16 feet deep. The annulus is to be backfilled with clean. silt-free, tine filter sand to 1 foot above the top of the screen. After the sand is placed. the well screen and sand pack are to be tilled with clean water and surged to aid in settlement of the sand pack. Additional sand will be added as needed. A two-foot bentonite seal will be placed above the sand layer, then a grout mixture with 3 to 5 percent bentonite powder shall be added to a depth of 0.5-feet below grade. The well will be

completed with a concrete surface seal and the well casing may stick up 3 feet above grade. Completions inside the manufacturing areas of the building and in high traffic areas may be designed to be flush with the floor or ground surface.

These wells are to be installed in two separate work phases. The initial eleven extraction wells will be installed in the main building, in the former degreaser room, and behind the building. These wells, and the existing VE-1, will be piped to the extraction unit. The placement of the three remaining wells. as proposed, will be evaluated after six months of operation using the initial wells only. Any necessary additional wells will be added within the first year. The additional wells may be located adjacent to the former degreaser pit sump and/or in line with the southernmost wells.

All trenching installed for remediation of shallow contamination shall contain 4-in. I.D. PVC slotted well screen for horizontal runs, buried at 3.5 ft. below grade. This piping shall be connected to a 4-in I.D. PVC trench riser pipe with a 3-foot riser stick-up above grade. Horizontal pipe shall be backfilled with a silt free. tine filter sand layer 6-inches above and below. The remaining backfill shali consist of native soil free of angular rocks and sharp objects. The finished surface will be a bentonite clay mat or a CIM industrial membrane (urethane coating applied to a geotextile), with sand and topsoil covering it. The trenching specitications are provided in Appendix A and on the design drawings provided separately. The drawings show existing ground surface elevations and the trench area design specitications address the issue of final grading and surface area drainage.

During operation of the SVE wells and trenches. a monitoring network of 13 nearby observation wells (listed in Section 3.1.8) will bc regularly sampled. Groundwater elevations will also be measured. The frequency of this monitoring is presented on Table II.

The process equipment package represents a compact arrangement designed to maximize available vacuum at the wellhead. The unit will be designed to provide high reliability. flexibility and low system operating and maintenance costs. The system is also specifically designed to provide vapor-phase conditioning (dropping temperature to condense water) as a means of optimizing treatment efficiency. The equipment is shown and described in detail in the drawings and specitications provided separately.

Figure 9 shows the simplified Row and main equipment subsystems contained in the process equipment package. The main equipment subsystems consist of the following:

- Groundwater/vapor separator.
- Two-stage vacuum pump with high efficiency discharge separator and self contained sealing equipment. and
- Vapor phase pretreatment system.

Instrumentation for process evaluation includes pressure, vacuum and temperature indicators, a recovered groundwater totalizer, a vortex shedding flow meter for vapor flow determination, and sample ports for acquisition of vapors and recovered liquids for analysis.

The integrated vacuum system. including vapor phase pretreatment and controls is packaged on a 7 ft. x 7 ft. x 9 ft. skid, pre-wired and capable of rapid set up and operation. The unit also can be readily relocated if conditions warrant.

A summary of components used within the vacuum system follows. Each of these components is described in the specifications and design drawings provided separately.

Inlet Separator/Recovered Liquids Extraction

The inlet separator is a vacuum-rated vapor/liquid disengagement vessel. The vessel is designed for an operating range of 10 to 30 inches Hg. The nominal design conditions for the vessel have been established to prevent entrainment of free liquids into the vacuum pump suction under conditions of slug or mist tlow. The vessel is internally epoxy coated for corrosion protection.

A motor-driven transfer pump is provided for removal of recovered liquids. The pump is designed for low net positive suction head (NPSH) operation. Pump on/off controls are mounted on the inlet separator. The pump discharge is routed through a filter to remove entrained tine grain materials prior to treatment.

Since the recovered groundwater has been stripped of over 90% of the contaminant mass by the 2-Phase SVE process, granular activated carbon is used to remove low levels of residual contaminants from recovered groundwater prior to discharge to the sanitary sewer. Permits for this release will be obtained from Monroe County and the Town of Brighton.

Vacuum Pump/Seal Svstem

Deep-vacuum capability and high-volumetric efficiency are provided by the vacuum pump. Operating conditions are controlled to prevent accumulation of volatile compounds in the seal system.

The vacuum punip is a two-stage liquid ring type, capable of continuous operation at vacuums in excess of 26 inches Hg. Vacuums typically exceed 20 inches Hg in the well bore. The vacuum pump receives a continuous supply of seal tluid which is discharged with recovered contaminant vapors to a high efficiency separator. The separator assures that contaminant vapors only are discharged to treatment.

The discharge separator also serves as a seal tluid reservoir. Hot seal fluid is removed from the reservoir and circulated through the system using a sealed circulating pump. The fluid is passed through a heat exchanger to remove the heat of compression developed during vacuum pump operation.

Vapor Phase Pretreatment Equipment

Recovered vapors exiting the vacuum-pump discharge separator are routed through a vapor-phase pretreatment module. The vapor phase pretreatment module reduces the saturation temperature of the process stream, recovers condensate and free product (if present), and reduces the relative humidity prior to treatment.

Cooled process vapors, condensate. and free product (if present) pass through a separator for condensate and product recovery. Please note free product has never been observed during past investigations at this site. If. however, it is found during remediation, the condensate and product can be recovered concurrently or separately as required by the site treatment processes.

After removal of condensate, the vapor stream temperature is adjusted to control relative humidity. This step is necessary since vapor-phase treatment will be accomplished using carbon. The system is capable of delivering recovered vapors over a wide range of conditions in the event an alternative treatment process is required.

Final treatment for both the recovered soil vapor and groundwater will be accomplished with mobile activated-carbon units. The vapor-filtering carbon uses two 2.000 lb. units in series, capable of handling the typical expected tlows through the system. The groundwater is passed through two 200 lb. carbon units. also arranged in series. All carbon units will be regenerated off-site, and reactivated units returned to the site for further usage. The piping layout connecting both vapor and groundwater carbon units is provided with several sampling points for compliance monitoring.

The system components and specifications for their installation and operation are provided in Appendix B.

3.1.4 QA/QC of Design Product

During the vacuum unit construction. H&A of New York will communicate with the manufacturer regarding: 1) component engineering and unit design; 2) meeting of agreed upon schedule; 3) inspection during construction: and 4) factory startup and testing prior to shipment.

The unit will be specified for full inspection and testing at the factory prior to shipment. Operating hours shall be logged to adjust sensor setpoints and to determine all components are operating correctly. The unit has several safety shutdown mechanisms for equipment protection which include: 1) vacuum pump high temperature: 2) inlet separator low water level to protect the transfer pump: 3) inlet separator high water level to protect the vacuum pump from water ingestion; 4) seal oil reservoir high and low level sensors; *5)* pressure relief for the transfer pump: and 6) discharge pressure sensor to protect vapor carbon from overpressurization.

After unit installation, the manufacturer will perform final unit alignments and startup commissioning procedures to determine proper unit function prior to placing in service.

The unit will also be interconnected to other system sensor interlocks for personnel safety. These may include,but not be limited to: 1) exhaust fan flow switch which will shutdown the unit if room negative pressure is lost; 2) liquid pressure sensing switch to protect liquid carbon from overpressurization; and 3) Area drainage sump level switch to protect against piping system failures/area flooding. Design drawings do not yet show all of these systems.

All components located within the unit shall be covered by a limited manufacturers warranty.

3.1.5 General Arrangement

The general arrangement for the work plan described in section 3.1.3 includes the following drawings: Figure 6 shows the proposed well and trench layout recommended; Figure 10 contains the vacuum unit vapor and liquid piping systems with instrument sensor connections: and Figure 11 gives the general remedial equipment layout necessary to complete the clean-up objective. The design drawings and specifications package also includes detailed drawings and descriptions of these items.

3.1.6 Monitoring and Testing During Construction

The following is an explanation of parameters that are to be monitored during routine checks on the soil vapor extraction. The description below is presented according to each subsystem, followed by the subsystem component monitored. Each description includes the monitoring point, ID number. the range of variation for the component or parameter. normal readings and what the reading is intended to monitor.

Vacuum Pump/Vapor Conditioning Subsystem

Description	ID No.	Range	Normal
Vacuum Pump Hour Meter	HM	HOURS	AS READ

The hours meter is used to monitor operating time for the system. These readings are used to determined when a system shutdown occurs by subtracting clock time and the hours meter reading of the last data entry with the present time and hours reading. This meter is also used to determine mass removal rate since these readings are in pounds per hour or pounds per minute of operating time.

Vapor Inlet Temperature	TI-100	55-85°F	70°F

This is the temperature of the extracted vapors at the inlet to the inlet separator. Changes in this temperature may indicate venting of atmospheric air at the wellheads or seasonal temperature change. Exterior well piping should be heat traced and insulated.

Pressure at Inlet Separator	PI-100	21-29 in. Hg	27.0+

This gauge measures vacuum at the inlet separator. It is used to compare pressure drop between the inlet separator/demister and PI-I01 which is the pressure at the vacuum pump. This reading is also used to determine pressure drop from the individual wells to the inlet separator.

Vacuum Breaker Position		Variable	Closed

This is to indicate whether the unit is allowing air in at the vacuum pump to break vacuum on the system.

Pressure prior to Vacuum Pump	PI-101	21-29 in. Hg	27 in.±

This gauge measures vacuum at the vacuum pump inlet flange. This is used along with PI-100 as described above. It also is used to determine whether the vacuum pump is performing as specified.

Description	ID No.	Range	Normal
Vacuum Pump Discharge Temperature	TI-101	160-190°F	180°F

This is the vapor discharge temperature immediately after the pump. The unit operates at high temperature and has a temperature control valve which is used to maintain this set point. The unit has a high temperature trip set at approximately 200°F; this is monitored to avoid a shutdown.

Air Cooler In. Temp.	TI-102	100-170°F	155+°F

This is the vapor temperature between vapor/oil separator and inlet to the primary air cooler. This temperature indicates whether condensation is occurring in the oil system

Air Cooler Out. Temp.	TI-103	70-105°F	90°F

This is the outlet vapor temperature of the primary cooler. This is the tirst of two cooling steps prior to the condenser cooler. The objective of this device is to get the temperature as close to atmospheric temperature as possible.

Condenser Out. Temp.	TI-104	40-90°F	75°F

This is the outlet vapor temperature of the secondary cooler. The objective of this device is to remove moisture from the vapor stream.

Reheater Outlct Temperature	TI-105	100-120°F	110°F

This is the reheated temperature of the vapor stream leaving the unit. This temperature is modified using a flow control valve from the oil circulation system. The discharge temperature is set up to enhance the vapor treatment system's recovery potential and to assure that condensation does not occur in the discharge line or at the exhaust stack on the roof.

Pressure after Reheater	PI-102	0-2 psi	0-1 psi

This gauge measures the system back pressure which is exerted from the discharge point back to the unit. This pressure indicator has a shutdown device installed to protect the vacuum pump, the shutdown pressure is set at 2 psi.

Discharge Vapor Flow Meter	FM-100	10-120 scfm	AS READ

The vapor flow meter reads the current air mass discharge from the system and is used to assess extraction performance. The vapor flow rate is combined with analytical results to determine mass removal from the subsurface. This meter is also used to assess vacuum pump performance compared with the test curves generated at the factory.

Oil Circulation Subsystem

Description	ID No.	Range	Normal
Seal Oil Separator/Reservoir Level	LG-200	Inches	AS READ

The seal oil level should remain stable throughout the operation of the unit. The unit is designed by the manufacturer to have very low seal oil losses. consequently the oil level should level should remain relatively constant. The vacuum pump is protected from low and high oil levels by probes in the separator which are designed to shut the unit down.

Description	ID No.	Range	Normal
Seal Oil Separator/Reservoir Pressure	PI-200	0-4 psi	0-2 psi

This gauge measures the back pressure exerted on the vacuum pump at the seal oil separator/reservoir and prior to the vapor conditioning and treatment systems. This pressure can be compared with PI-102. which is the final unit discharge pressure. to determine pressure drops across the Air Cooler, Condenser and Reheater heat exchangers.

Seal Oil Pump Discharge Pressure	PI-201	20-30 psi	20 psi

This gauge indicates the seal oil pump supply pressure to the seal oil cooler and through the valves at the Reheater and Vacuum Pump. All oil which this pump discharges is routed through the vacuum pump, with a supply stream to the reheater, back to the seal oil reservoir.

Outlet Temperature Seal Oil Cooler	TI-200	120-180°F	160°F

This is the seal oil temperature feeding the vacuum pump and will be closely related to the vacuum pump discharge temperature. The 3-way control valve located adjacent to this temperature indicator adjusts the flow of oil through the cooler and will cause fluctuations in the vacuum pump discharge temperature.

Outlet Pressure of Seal Oil Cooler	PI-202	5 in. Hg	0

This gauge measures the seal oil supply pressure to the vacuum pump downstream from the vacuum pump seal oil supply gate valve. The manual throttling gate valve can be used to set this pressure. The normal pressure is held at 0 to optimize seal oil flow rates and vacuum pump performance. It is possible to reduce vacuum pump capacity by allowing too much seal oil to enter the pump (hydraulic) or to cause to little seal oil to enter the pump (cavitation). These valves normally do not require adjustment, but if pressure or vacuum become excessivc, the gate valve should be opened more to reduce vacuum and closed some to reduce pressure.

Water Circulation Subsystem

Description	ID No.	Range	Normal
Transfer Pump Suction Pressure	PI-300	22-29 in. Hg	<26 in. Hg

This gauge reads the pressure from the inlet separator, through the inline strainer to the transfer pump suction. This pressure would be used to indicate a fouling of the inline strainer and a need to clean the strainer element.

1st Cuno Filter In. Pressure	PI-301	0-60 psi	30 psi
2nd Cuno Filter In. Pressure	PI-302	0-60 psi	28 psi
2nd Cuno Filter Out. Pressure	PI-303	0-60 psi	26 psi

The first gauge reads the transfer pump discharge pressure and inlet pressure to the first filter. The second gauge measures the first filter outlet pressure and the second filter inlet pressure. The difference between these gauges. PI-301 & PI-302, represents the pressure drop across first filter. The third gauge measures the second filter outlet pressure and the supply pressure to the liquid treatment system. The difference between these gauges. PI-302 & PI-303. represents pressure drop across the second filter. These gauges are used to determine when filter replacement is necessary.

Pump Seal Flush Line	PI-304	0-60 psi	30 psi

This gauge measures the seal flush pressure to the bearings on the extraction pump. The desired pressure is slightly positive to assure that the pump bearings are getting filtered water fed to them.

Discharge Water Flow Meter	FM-300	Gallons	AS READ

This meter measures total groundwater production being drawn from the recovery wells. This is used along with the hours meter data to determine gallons produced per day.

1st Carbon Treatment Inlet Pressure	PI-305	0-10 psi	<10 psi

This gauge reads the pressure at the inlet of the first carbon treatment vessel. Each vessel has a 10 psi pressure limit. If the pressure approaches or exceeds 10 psi. the system should be shut down and the carbon beds changed.

Liquid Treatment Outlet .Pressure	PI-306	0-10 psi	0 psi

This gauge reads the discharge pressure of the second Carbon treatment vessel to the floor drain. This is used to monitor pressure drop across the two carbon vessels.

Extraction Well Subsystem

The intent of this system is to measure the vacuum on the well bore in the well annulus. This requires reading a vacuum gauge that indicates vacuum is being applied to the formation.

3.1.7 Operation and Maintenance

The following is a recommendation for Data Acquisition, Basic Operation & Maintenance, Preventative Maintenance and Special Maintenance activities suggested for maximum system uptime and reliability. The scope of services shall include but not be limited to the following items:

Data Acquisition - These services include routine visits Monday through Friday to record system operating data on prepared log sheets. note any unusual conditions or other observations which seem pertinent, and submit log sheets on a weekly basis to H&A project manager (see Example Log Sheet, Figure 12).

Basic Operations & Maintenance - These services will include reviewing the daily log sheets. making adjustments as needed to meet operating set points. noting these adjustments on the log sheets, and routine general maintenance required to keep the system running. Maintenance items include cleaning the liquid strainer prior to the transfer pump. changing particulate filters when pressure differential requires, noting transfer pump operation, and general housekeeping.

Preventative Maintenance - These services include any expected or upcoming maintenance activities, These items are summarized below with a projected date or time frame for the activity given (dependent on the uptime of the system).

Special Maintenance - These services include any unexpected maintenance activities preformed and will include system troubleshooting, materials procurement. and communication as needed between H&A and the Manufacturer for technical input. Some example items are listed below.

Following is a detailed schedule for maintenance items (note the following definitions for maintenance frequency: B = Basic, P = Preventative, S = Special).

Recovered Liquids System:

Type	Description	Frequency/Duration
P	Clean level probe column. flush with water and verify pump response to set points: pump on, pump off. unit shutdown.	every 2-3 wks/1/2 hr
P	Clean inlet separator. remove hand hole. tlush & drain	every 3 months/1 hr.

Transfer Pump:

B	Clean suction strainer. replace CUNO filter cartridge - average one housing change per week	as needed
B	Check pump flow rate and record	weekly
B	Visually inspect pump for leaking, unusual noises	daily

Seal Oil System

Type	Description	Frequency/Duration
P	Check for water in oil reservoir. drain if needed	every 2-4 weeks/1/4 hr.
P	Seal oil change-out, mist eliminator change	9 - 12 months13 hr
P	Clean suction strainer, inspect system for leaks	every 4 weeks/1/2 hr
P	Clean oil cooler fan grill and tins	every 4 weeks/1/4 hr

Vapor Conditioning System

P	Clean air cooler fan grill and fins	every 4 weeks/1/4 hr.
P	Drain condensate receiver, check tloat trap operation	every 2-3 weeks/1 hr

Vacuum Pump

P	Check oil suck-back line sight glass (runs to oil reservoir), should be wetted - not full, check for oil leaks at pump and unusual noises	every 2-3 weeks/1/2 hr.

3.1.8 Evaluation of Operation Data

Prior to starting the SVE system, a round of sampling will be performed to be used as pre-startup data, in addition to existing data. These samples, as presented on Table II, will consist of groundwater and soil samples from both the former degreaser room area and former drum storage area. Each newly installed well or trench will be sampled (groundwater and soil). Two soil samples will be laboratory analyzed from each boring or trench; the highest and lowest sample based on field head-space screening for VOCs of all collected samples.

One boring will be completed adjacent to the former degreaser area sump for the purpose of collecting a soil sample from the split spoon interval just below the bottom of the pit: this boring will not immediately be converted into a well. All of the remaining borings will be advanced using split spoon samplers. Two sets of samples will be taken from each split spoon: one for field head space screening and one for possible lab analysis. The lab set will be placed in a sample cooler. Table II describes the number and type of analyses to be performed. All cuttings will be drummed and spread over the former drum storage area remediation area.

Groundwater from selected locations will be sampled semi-annually during SVE operation to measure SVE effectiveness. Soil vapor will also bc analyzed monthly to evaluate VOC reductions in soil.

Groundwater from the following wells will bc sampled semi-annually during site monitoring: 201s & d. 104s &d. 106s &d. 103s & d. 102s & d. 204s & d. 203s & d. and 205. Soil samples from the SVE area of influence will bc collected and analyzed two times each year to track progress in reduction of VOCs. The air discharges will be sampled quarterly for air permit conditions compliance (or as specified in the permit). and the water discharge will be sampled monthly for sewer use permit compliance (or as specified in the permit). This sampling and analysis is described in Table II.

After 2-Phase SVE has been in operation for an extended period of time (one to three years or less) the soil vapor concentrations typically achieve an asymptotic or zero-slope condition. Once this condition is achieved, the SVE will be shut down. The procedure for determining when this condition has been met is described below.

The zero-slope condition occurs when the slope of the concentration vs. time plots for selected vacuum extraction wells within the area of capture of the vacuum system is determined to be zero. This determination will be based on plotting the results of four consecutive monthly vapor monitoring rounds vs. time and fitting a curve through the data.

If the curve which best fits the data is linear, then a straight line using a least squares regression will be fitted to the data and the slope of the fitted line will be computed and designated as the estimated slope. If the data points are non-linear, then an exponential curve will be fit using a least squares regression. The estimated slope will be the first derivative of the curve at a value of time halfway between the last two sample intervals. The slope will be determined to be zero if it is arithmetically greater than or equal to zero, or the yearly reduction in the total volatile organic concentration in the vacuum extraction well is less than the average overall precision of the analytical methods used for the analysis.

The average overall precision, S_A, is calculated as follows:

$$S_T = \sum (S_1)^2$$

where:

S_T = overall precision for the compounds in a single sampling episode

S_1 = overall precision for individual constituent in a single sampling episode

$$S_A = \frac{(\sum S_T / N)}{[\sum (X - \bar{X})^2]^{1/2}}$$

where:

$\sum S_T / N$ = ***arithmetic mean of precisions for all sampling episodes***

S_A = average overall precision

$$X = X/N$$

where:

X = sampling period
N = number of sampling periods

Upon determination of a zero slope condition, the SVE will be shut down and confirmatory soil sampling will be done. If the soil sample results are below the cleanup criteria, then samples will be collected for three more quarters to confirm the soil has stayed clean. If the soil samples are above the cleanup criteria? then the system will be restarted and run for four additional months. If the system returns to the above-described asymptotic conditions and target soil concentrations have been met, then the remediation will be completed. If not, system modifications (affecting both remediation areas) will be proposed as part of a focused feasibility plan.

The operational data evaluation process described above takes seasonal variations into account by requiring four consecutive monthly readings to reach the "zero slope" conclusion, and by requiring four quarters of post-shutdown soil monitoring.

3-02. SEDIMENT AND SOIL REMOVAL FROM THE POND AND SOIL AREAS

3.2.1 Description of Process and Media Addressed

These two removal activities are designed to address the soil or sediment in areas where testing of these materials has indicated exceedances to the site clean-up criteria.

Several samples have previously been collected from these areas and analyzed: additional characterization samples will be taken and provided to the contractor responsible for the transportation and disposal of the materials. Following the characterization sampling, the removal areas will be delineated in the field using stakes and flagging.

As requested by the Dcpartnient. soil and sediment samples to be analyzed for VOCs will be collected in soil jars (2 to 4 ounce) with teflon-lined lids.

Removal of the soil will be done from the area shown in Figure 3. Following this removal of the upper six inches, and any additional removals indicated by confirmational sampling. the area will be backfilled as is described in Appendix A using a bentonite clay mat.

The sediment removal area is shown in Figure 3. At this time it is proposed that this removal be done at a time of low water in the pond. A temporary pipe from the discharge outlet pipe to the streani will be installed to handle the flow into the pond. Pond water will be pumped from the removal area into the outlet stream. In order to enhance the long term viability of the pond. and provide a good base for plant and animal re-colonization. no backfilling will be performed.

3.2.2 Design Drawings, Specifications. and Initial Analytical Testing

The remediation will involve excavation of affected sediments from the pond. removal from the site, and off-site treatment/disposal. It is currently anticipated thnt pond excavation will take place to an approximate depth of up to 1.0 foot in places below the existing pond bottom (based on RI sampling results and on a recent grid of 15 samples collected) and will include the area delineated on Figure 13. The type of disposal that will be required will be based on samples obtained during the RI and from the recent

grid sampling event. It is estimated that approximately 170 cubic yards of sediment will require removal. Additional confirmatory sampling, to verify adequate removal, will be performed following completion of the excavation effort. Once the sediments have been excavated, they will be loaded onto luggers or placed in 10-millimeter polyvinylchloride sheeting-lined berms and covered with same for temporary site staging until off-site disposal is approved or, if approval is obtained in advance, sediments will be loaded directly to trucks for transport to an off-site treatment/disposal facility. At this time off-site disposal is anticipated. If pre-removal sampling indicates a potential difficulty in off-site disposal of sediments based on compounds present, stabilization prior to disposal or stabilization and on-site use as fill (not in the pond) will be evaluated.

Work Description

1. Pond sediment removal and disposal shall be performed as follows:

   - H&A of New York to notify NYSDEC no less than 10 days prior to initiation of the work described below. At this time no pre-bid or pre-construction meetings are planned. If such meetings are needed. the Department will be notified and invited to attend.

   - Establish a work zone and fenced zone as required by H&A personnel and H&A Health and Safety Plan.

   - Remove excessive vegetation from the proposed removal area so that the previously performed sampling grid can be clearly observed, and the materials can be disposed of separately from the sediment.

   - Establish a gridded sediment removal pattern covering the identified removal area to evaluate depth and areal extent of sediment in excess of clean-up criteria. Stakes have been placed in sample areas. See Figure 13 for plan showing sampling grid.

   - Establish a temporary storm water management system that will convey storm water discharged by the storm sewer line into a temporary flexible corrugated rubber pipe, across the pond area and into the downstream drainage swale (see Figure 14). Flow through piping will be sized at 12 inch diameter, to convey flow from the existing pipe through the excavation area and sized to match the downstream drainage swale. The drainage stream will also be piped, in 18 inch diameter pipe of similar construction. Prior to construction. it will be verified that this temporary system is acceptable to Town of Brighton personnel.

     To monitor for and control possible "sediment plume". the following measures will be used:

     - site personnel will observe the stream for visible sediment plume during work.
     - the downstream berm will be installed first so that any sediment

disturbed during the placement of the upstream berm will not be released to the stream,

- pond water pumping (pumped water will be discharged to the stream immediately downstream of the berm) will be done in such a manner as to minimize disturbance of sediment,
- if, during pond water pumping, a sediment plume is observed. pumping will be temporarily stopped and additional measures such as a filter cloth over the intake, or an in-line filter will be attempted,
- if the plume continues to be evident, the pond water will be pumped to drums, the sediment allowed to settle, and the water pumped from the drums into the stream,
- once the pond has been dewatered and the sediment removal completed, the stream berms will be removed, the downstream berm first.

- Place stakes to delineate removal area areal extent and depths.

- Excavate up to a foot in depth from the pond sediment in a manner that will not cause intermixing with underlying soils. All excavations shall be conducted using a track-mounted hydraulic backhoe equipped with a smooth-edged bucket. Excavation shall be conducted from the edge of the pond, and no equipment shall be driven into the pond limits. Sediment is to be staged on bermed 10 ml plastic or in lined luggers. Materials may be staged on plastic next to the pond to allow gravity drainage of excess moisture. If sampling indicates, sediments may be stockpiled separately for different types of disposal (solid waste landfill. hazardous waste landfill and incineration are the current disposal possibilities being finalized from the characterization samples obtained). If necessary. it will also be covered (if left over night or if raining).

- Maintain the temporary storm water management system (flexible piping and berms) during analytical testing to be performed on underlying sediments. Sampling and testing will be coordinated by H&A of New York. Up to six samples will be collected for this confirniational sampling (see Table II).

- If necessary. based on the results of analytical testing. conduct additional excavation to a depth and extent indicated by the confirmation sample results.

- Remove the temporary storm water management system and restore the site to original condition.

- Disposal will be arranged and performed by the removal contractor. The necessary waste transporter permits, hazardous waste manifests and other disposal requirements to be confirmed may include; 6NYCRR Pt. 364

Waste Transporter Permits, 6NYCRR Pt. 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities, and 6NYCRR Subpart 373-1,2,3 Hazardous Waste TSDS.

2. Removal of shallow soils from the area adjacent to the degreaser room (surrounding grid sample point GS-A8), and disposal shall be performed as follows:

- H&A of New York to notify NYSDEC no less than 10 days prior to the initiation of the work described below. At this time no pre-bid or pre-construction meetings are planned. If such meetings are needed, the Department will be notified and invited to attend.

- Establish a fenced work zone as required by H&A personnel and as discussed in the H&A Health and Safety Plan.

- Excavate the upper six-inch thickness of soil from an approximate 12.5 ft. by 33 ft. area designated by H&A of New York (Figure 3). All excavation shall be conducted in a manner that will not cause intermixing with underlying soils using a hydraulic backhoe equipped with a smooth-edged bucket.

- Soil will be staged on and covered by 10 ml plastic to psevcnt contact with site personnel. or the weather.

- Work will be interrupted for a short period to permit confirmational analytical testing on underlying soils and soils located horizontally beyond the excavated area. Sampling and testing will bc coordinated by H&A of New York. Three samples will be collected and analyzed (see Table II).

- Following soil removal. this area and the adjacent areas to be addressed using 2-Phase SVE (located outside of the building adjacent to the degreaser room) will be covered with a bentonite clay mat or urethane coated geotextile as proposed for the trench area and described in Appendix A.

- Disposal will be arranged and performed by the removal contractor. The necessary waste transporter permits, hazardous waste manifests and other disposal requirements to bc obtained may include: 6NYCRR Pt. 364 Waste Transporter Permits. 6NYCRR Pt. 372 Hazardous Waste Manifest System and Related Standards for Generators. Transporters and Facilities and 6NYCRR Subpart 373-1,2,3 Hazardous Waste TSDS.

3.2.3 QA/QC During Work Activities

The QA/QC procedures described below are intended to provide a means of evaluating the completeness of work performed. They describe measures to be taken to evaiuate the site before, during. and after the removal effort to confirm that the extent of the

materials to be removed has been defined and that no remaining material in these removal areas exceed the site specific quality criteria. Table II details the sampling described below and in the previous specifications.

Additional confirmational samples will be collected from the adjacent, remaining sediments and laboratory analyzed. Some groundwater and/or surface water will likely be encountered during this operation; means to handle it have been described in the specifications.

Prior to soil removal, a sample will be taken to be used to characterize the soil for disposal and comparison to soil criteria. Once the proposed extent of the soil removal area has been excavated, samples of the remaining soil will be collected and screened for VOCs. A portion of these samples will be submitted to a laboratory for confirmational analysis. It is not anticipated that surface water or groundwater will be encountered during this activity.

3.2.4 Monitorino, and Testing During Removal

Health and safety monitoring will be performed during the removal efforts as described in Appendix C, Health and Safety Plan. Removal testing will consist of the confirmatory testing done to evaluate extent of removal effort and need for additional removals.

3.2.5 Post Removal/Sampling and Restoration

Both areas excavated will be restorcd by backfilling with the materials described in the specifications. If confirmational sampling indicates additional removal is required to meet remedial objectives, then confirmational sampling will be done after the additional removal occurs.

3-03. BENTONITE COLLAR INSTALLATION

3.3.1 Description of Process and Media Addressed

Another element of remediation will address the storm sewer line which runs past the former degreaser and former drum storage source areas and discharges into the pond. Remediation of this line will consist of the placement of bentonitc-cement collars around the storm sewer line to prevent migration of VOCs along bedding material surrounding the storm sewer line, and to prevent buildup of hydraulic head along segments of the line which could result in the forcing of VOCs into the storm sewer pipe. Four collars will be installed: one immediately upgradient of the drum storage area, a second immediately downgradient of the drum storage area, a third downgradient of both source areas. and a fourth collar at the storm water pipe discharge to the pond. The collars will consist of a cementbentonite mix placed around the storm sewer pipe up to 2 feet in thickness and 3 feet in length along the pipe. Monitoring will be performed following installation of the cement/bentonite collars to determine their effectiveness in cutting off migration of VOCs to the pond. If samples subsequent to the bentonite collar installation show that concentrations of VOCs in the pond exceed applicable NYSDEC criteria, the second phase of remediation of the storm sewer line will be performed. This will consist of a

flexible impervious liner which would be "slipped" and sealed inside the section of storm sewer pipe which runs past the source areas. The liner will extend from just upgradient (east) of first collar to just downgradient (west) of third collar.

The proposed bentonite collars are to be installed in four locations, as shown on Figure **3.** If there is subsurface transport of VOCs in groundwater along the granular bedding, these collars are designed to intercept this tlow and prevent it from reaching the surface water pond. If necessary, slip lining of the sewer pipe will also be done to prevent leaks from the surrounding bedding into the pipe.

Slip lining will involve excavation to the sanitary sewer line, cutting open the pipc, and installing a plastic tlexible liner. This will be done where the pipe passes through the drum storage area.

3.3.2 Design Drawings and Specifications

Figure 15. Cement-Bentonite Collar Plan and Profile. shows the details of collar placement. The specifications for this work are presented below.

1. The work area is to be fenced as described in the H&A Health and Safety Plan and as required by the on-site H&A personnel.

2. Excavate to pipe crown providing a minimum 6 in. key-in beyond bedding material limits into adjacent undisturbed soils. Expose a minimum 3-ft. pipe length. Excavated materials are to be placed on and covered with plastic.

3. Excavate soils adjacent to pipc. Advance excavation to provide a minimum 6 in. key-in below bedding material into underlying undisturbed soils.

4. Hand excavate material beneath pipe to provide minimum 6-in. key-in into underlying undisturbed soils.

5. All excavation shall be performed in accordance with applicable OSHA regulations. Maintenance of safe and stable excavation sideslopes shall be responsibility of the contractor.

6. Clean all materials from the pipe exterior. and inspect pipe for cracks. bad joints. and other openings that may allow cement-bentonite grout to enter the pipc. All openings shall be sealed as necessary.

7. Mix cement-bentonite backfill to the following proportions by weight:

Dry bentonite powder	5%
Portland Cement-Type I	15%
H_2O	80%

Bentonite and water shall be mixed in a container which is free of dry cement. Allow bentonite to hydrate for a minimum of 12 hrs. before adding cement. This proposed mixture is commonly used for construction of self-hardening, cement-bentonite cutoff walls.

8. Place cement-bentonite backfill to 6-in. below the ground surface in a manner that will eliminate voids and gaps.

9. Place a 6-in. topsoil thickness above cement-bentonite backfill and seed. Allow cement-bentonite backfill to set for a minimum of 24 hrs. prior to placing overlying topsoil backfill.

3.3.3 QA/QC During Installation

During excavation of the collar areas the breathing zone and selected soil samples will be screened for VOCs. The soil excavated will be temporarily stored on site on plastic. adjacent to the excavation, and used as backfill once the collar installation is completed. Any excess soil will be drummed and kept on site for subsequent off-site disposal or on-site treatment by the SVE system. Drummed materials are to be kept in the former degreaser room.

3.3.4 General Arrangement

The collars will be placed in four locations; upstream of the former drum storage area. downstream of the former drum storage area, downstream of the former degreaser area, and immediately before the pipe ends at the pond.

3.3.5 Construction Inspection

The excavated section of the pipe will be visually inspected for absence of excess soil and for the presence of cracks. bad joints or other openings. Soil will be cleaned from the collar area as required and openings in the pipe will be sealed.

3.3.6 Long Rang Monitoring

Routine surface water sampling will take place semi-annually within the one year period following collar installation. When groundwater elevation measurements on site show groundwater levels to be above the invert of the storm sewer (as determined by wells adjacent to the storm sewer) two surface water samples. taken one month apart, will be collected. These samples. taken from the vicinity of the SW-201 samples, will be analyzed for VOCs by USEPA method 8010. If the results of both of these sample analyses shown VOCs to be present in the pond at concentrations above the surface water cleanup goals, the storm sewer would be slip-lined as described on Section 3.3.1. The cleanup goals to be met are 11 ppb for TCE and 20 ppb for each other chlorinated VOC. Semi-annual surface water sampling will continue until two successive events have shown concentrations below the cleanup goals. Sampling would then cease until completion of the SVE remediation, at which time a final confirmational sample would be obtained and analyzed for VOCs. This sampling is listed on Table II.

IV. HEALTH AND SAFETY PLAN

The Health and safety plan presented in Appendix C addresses health and safety issues related to proposed remediation activities at the American Filtrona Corporation Dollinger Site. These detailed health and safety procedures will help to prevent injury, illness and accidents by avoiding unnecessary risks while maintaining an efficient work environment.

This health and safety plan was developed for the American Filtrona Corporation-Dollinger Site and is intended for use during field investigations and remediation activities including water and soil sampling, soil and sediment removal, and installation and operation of the 2-Phase soil vapor extraction (SVE). The plan was originally prepared by a Certified Safety Professional (CSP issued by the World Health Organization) on H&A's staff, and approved for the Remedial Investigations performed. The version presented herein has been modified to address additional work activities and potential exposures (worker, building tenant, and community). All contractors working on the site are required to adopt their own Health and Safety Plans which must, as a minimum. contain the requirements of this plan.

V. CITIZEN PARTICIPATION PLAN

The NYSDEC will prepare and implement a citizen participation plan for this project. H&A will assist in the preparation of this plan that is, at a minimum, consistent with the Department's publication, "New York State Inactive Hazardous Waste Site Citizen Participation Plan," dated 30 August 1988, and any subsequent revisions there to, and 6 NYCRR Part 375.

H&A's past assistance with such efforts for this project, on behalf of Dollinger, have included our presence and participation at public informational meetings and, the preparation of tables and figures to be used at such meetings. It is assumed that citizen participation assistance expected would be similar.

VI. SITE WORK SCHEDULE

Remediation tasks to be performed are presented on the attached schedule. This schedule shows projected start dates and durations of tasks, but also how tasks are to be timed with respect to one another. The duration of each task is based on an estimate to perform the work and does not include allowances due to delays caused by weather, contractors, site access, mechanical failure or other unpredictable occurrences. Since many of the tasks are interdependent, if one task is delayed or goes for longer than originally expected, it will affect the rest of the schedule by at least the amount of time created by the original delay. Figure 16 shows task duration and proposed start dates.

VII. EFFECTIVENESS OF REMEDIAL DESIGN

The effectiveness of the remediation efforts will be measured by several means. During operation of each system the equipment will be monitored: during and after system operation site sampling will be used to measure the change in concentrations of site compounds of concern in selected media; and after the remediation is completed, the site will be monitored for a period of time in order to track the concentrations of site compounds.

7-01. PARAMETERS, CONDITIONS, PROCEDURES. AND PROTOCOLS TO DETERMINE EFFECTIVENESS

To evaluate the effectiveness of the SVE. soil vapor will be analyzed monthly, and groundwater will be semi-annually sampled and analyzed. The results will be used to determine what level of remediation effort is continued. Once remediation is achieved, confirmational coil samples will be collected. Three soil sampling locations will be established (based on input from NYSDEC) in both the former degreaser area and the former drum storage area. Samples at ihese locations. down to the specified remediation depths (3.5 feet [or 6 inches deeper than the trench, whichever is deeper] in the drum storage area and 14 feet in the degreaser room area), will be collected and analyzed for VOCs. Soil sample containing the concentration highest of the VOCs. based on field screening will be analyzed. If operational data indicates additional soil sampling is needed in other areas, it will be considered and locations will be selected based on Dollinger's opinion and NYSDEC's input. Groundwater from wells within or immediately adjacent to the remediation areas. will also be samples. Figure 6 shows the proposed approximate soil sampling locations. When acceptable concentrations are measured at these locations, locations at the perimeter of the remediation area will bc sampled.

For the soil and sediment removal activity the effectiveness will be measured by the results of confirmational sampling conducted on the materials that remain in place. The purpose of this sampling will be to evaluate if further removal efforts are necessary.

The effectiveness of the bentonite collars will be measured based on pond sampling as described in Section 3.3.6.

7-02. SCHEDULE FOR POST-IMPLEMENTATION SAMPLING

Once the SVE system is in place and running, the system effectiveness will be measured by periodic sampling and analysis of the groundwater and air removed from the subsurface. These samples will be taken from the cxtractinn wells and from the pre- and post-treatment discharges. The schedule for this sampling is included in Section 3-01 and on Table II.

The sampling of sediment and soil from the removal areas will occur once removal has been completed. Sampling will occur after the materials have been excavated but before they've been removed from the site so that if additional removals are necessary they can be combined with the other materials for disposal (see Table II).

The long term sampling and analysis of surface water consists of a sample to be collected and analyzed after the SVE has been turned off. This sampling effort is described in Section 3.3.6 and on Table II.

VIII. CONTINGENCY PLAN

8-01. PROCESS RELATED CONTINGENCIES

In the event that there is a process related failure such as a mechanical breakdown, loss of power, vapor or liquid leak or other related incident, the SVE specifications and design documents have been developed to address these possibilities. See Section 3.1.3 for a description of these systems.

Installation of the bentonite collars and excavation of the site sediment and soil do not require on-going mechanical operations like the SVE does. Excavation equipment failures will be corrected simply by repair or replacement of the part or machine. and would not impact the final work product.

8-02. WEATHER RELATED CONTINGENCIES

In the event a failure occurs as a result of weather conditions. several contingencies are in place. The SVE has audible power failure alarms, freeze and tlood alarms. During any excavations, efforts will be made to avoid leaving excavations open over night. so as to avoid tlooding and safety hazards. The sediment removal is designed so that the temporary water pipe will be sufficient to accommodate a volume of water such as might occur if a storm were to take place during the removal effort. This has been designed to match existing pipe flow capacity, at a minimum.

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TABLE I

SEDIMENT CLEANUP CRITERIA

AFC-DOLLINCER SITE
Brighton, New York

CONTAMINANT	RECOMMENDED SEDIMENT CLEANUP OBJECTIVE (ppm)
1,1,1-trichloroethane	0.007
toluene	0.005
acetone	0.14
2-butanone	0.069
methylene chloride	0.015
di-n-butylphthalate	5.5
bis(2-ethylhexyl)phthalate	4.2
butylbenzylphthalate	0.48
acenapthene	0.13
anthracene	0.68
benzo(a)anthracene	3.5
benzo(b)fluoranthene	6.0
benzo(k)fluoranthene	2.5
benzo(g,h,i,)perylene	1.6
benzo(a)pyrene	3.7
chrysene	4.2
dibenz(a,h)anthracene	.43
fluoranthene	10.0
indeno(1,2,3-cd)pyrene	2.8
phenanthrene	3.8
pyrene	7.2
arsenic	6.0
chromium	23.0
copper	24.0
lead	55.0
nickel	24.0
zinc	214

Notes:
1. Sediment cleanup objectives represent "background" detections at sediment sample location SS-202s; as agreed upon by NYSDEC.

TABLE I (Continued)

SOIL CLEANUP CRITERIA
ORGANIC CONTAMINANTS

AFC-DOLLINGER SITE
BRIGHTON, NEW YORK

CONTAMINANT	RECOMMENDED SOIL CLEANUP OBJECTIVE (ppm)
xylenes	1.2
trichloroethene	1.0
1,2-dichloroethenes	0.5
vinyl chloride	0.15
benzo(a)pyrene	0.330 or MDL
benzo(a)anthracene	0.330 or MDL

1. MDL = Method Detection Limit

SURFACE WATER CLEANUP CRITERIA
ORGANIC CONTAMINANTS

AFC-DOLLINGER SITE
BRIGHTON, NEW YORK

CONTAMINANT	RECOMMENDED SURFACE WATER CLEANUP OBJECTIVE (ppm)
trichloroethene	0.011
all other site VOCs	$\leq$ 0.02 each

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TABLE II
PROPOSED SAMPLING
AFC-DOLLINGER SITE
BRIGHTON, NEW YORK

Remediation Effort	Sample Purpose	Sample Type (Media)	Number/Time of Sampling	Analytical Procedure	Comments
Shallow Soil removal by degreaser room	Characterize for disposal	Soil	One-before removal	TCLP	Analytical procedures to be determined by the removal/disposal contractor.
Shallow Soil removal by degreaser room	Confirm that complete removal occurred	Soil	Three samples after removal	Volatiles & semi-volatiles	If hits detected, then more removal and another sample should occur.
Pond sediment removal	Characterize for disposal	Sediment	A grid of approximately fifteen locations - before removal	TCLP-Volatiles, Semi-volatiles and Metals	Analytical procedures to be determined by the removal/disposal contractor.
Pond sediment removal	Confirm that complete removal occurred	Sediment	Six samples - after removal	Volatiles, semi-volatiles and metals	If hits detected. then more removal and another sample round should occur.
Bentonite Collars	Evaluate success of collars	Surface Water	Two-one month apart when groundwater is above invert	Volatiles and metals	These samples, if not clean, would be followed by slip lining of sewer. If clean, then no more sampling.
Surface Water Monitoring	Continued evaluation	Surface Water	Semi-annually until two successive clean samples	Volatiles & semi-Volatiles	Sampling will he done once more after the VES effort is completed
Surface Water Monitoring	Final evaluation	Surface Water	One-after VES completed	Volatiles	Sample to confirm volatiles were not released by VES.
VES	Monitor System influence	Groundwater	Monthly Measurement	Groundwater Elevation	Evaluate influence of VES system on groundwater elevations at 13 selected wells.
VES	Monitor Groundwater	Groundwater	Semi-annually	Select site volatiles	Groundwater collected from cleanup areas to track progress of VES.
VES	Monitor water discharge	Water	Monthly sampling	Select site voltiles	Evaluate water (after carbon) being released to POTW. Possibly do at H&A with GC.
VES	Monitor soil cleanup	Soil Vapor	Monthly	Select site volatiles	Soil vapor collected front cleanup areas to track progress of VES.
VES	Monitor air discharge	Air	Monthly	Select site volatiles	Evaluate air (post carbon) at H&A with GC; also used to check carbon use.
VES	Monitor initial soil concentrations at wells/trench	Soil	Two per well/trench	Select site volatiles	Two soil samples from each new extraction well to get starting concentrations. Will select high and low sample based on field screening.
VES	Monitor groundwater at wells/trench	Groundwater	One per well/trench	Select site volatiles	GW sample from new extraction wells to get starting concentrations.
VES	Monitor SVE progress	Soil	Semi-annually, one per remediation area	Select site volatiles	One soil sample from each of the two selected remediation areas to measure VOC reduction.

TABLE II (Continued)
PROPOSED SAMPLING
AFC-DOLLINGER SITE
BRIGHTON, NEW YORK

Remediation Effort	Sample Purpose	Sample Type (Media)	Number/Time of Sampling	Analytical Procedure	Comments
VES	evaluate shut-down conditions	Soil	Sample upon reaching soil vapor asymptote; if below criteria, perform three more quarters, if above then restart SVE and run for four months.	Select site volatiles	Three soil samples from each of the two remediation areas at locations agreed upon by Dollinger and NYSDEC.
OVERALL	Semi-annually monitoring	Groundwater	Each of 13 wells (see text for well numbers)	Select site volatiles	Monitor groundwater levels and concentrations.

Analytical QA/QC -

For each sample delivery group (consisting of no more than *20* samples delivered over not more than 7 days) a matrix spike (MS) sample and a matrix spike duplicate (MSD) sample will be analyzed for each media represented in the sample delivery group. Trip blanks will be analyzed for VOCs each sample delivery group that contains aqueous samples. For each phase of site work that involves using sampling equipment at more than one sample location (with decontamination between locations), an equipment blank, consisting of decontamination rinse water, will he analyzed for the compounds being sampled for in that phase.

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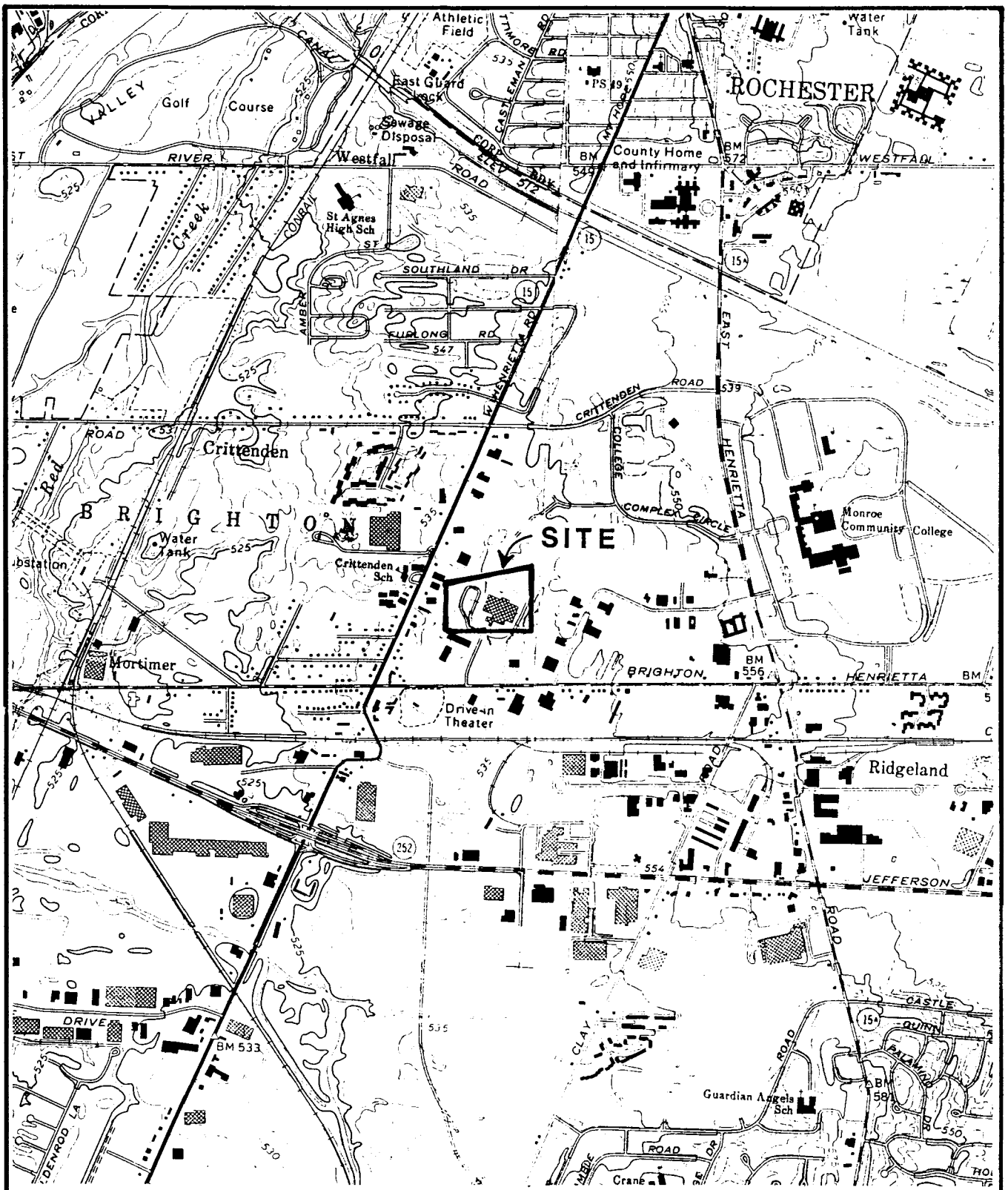

LATITUDE: 43° 05' 49"N LONGITUDE: 77° 37' 38"W

QUADRANGLE LOCATION

USGS QUADRANGLE WEST HENRIETTA AND PITTSFORD, NY

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BRIGHTON, NEW YORK

PROJECT LOCUS

SCALE: 1 IN. = 2000 FT.

JULY 1993

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CHARRETTE

FIGURE 1

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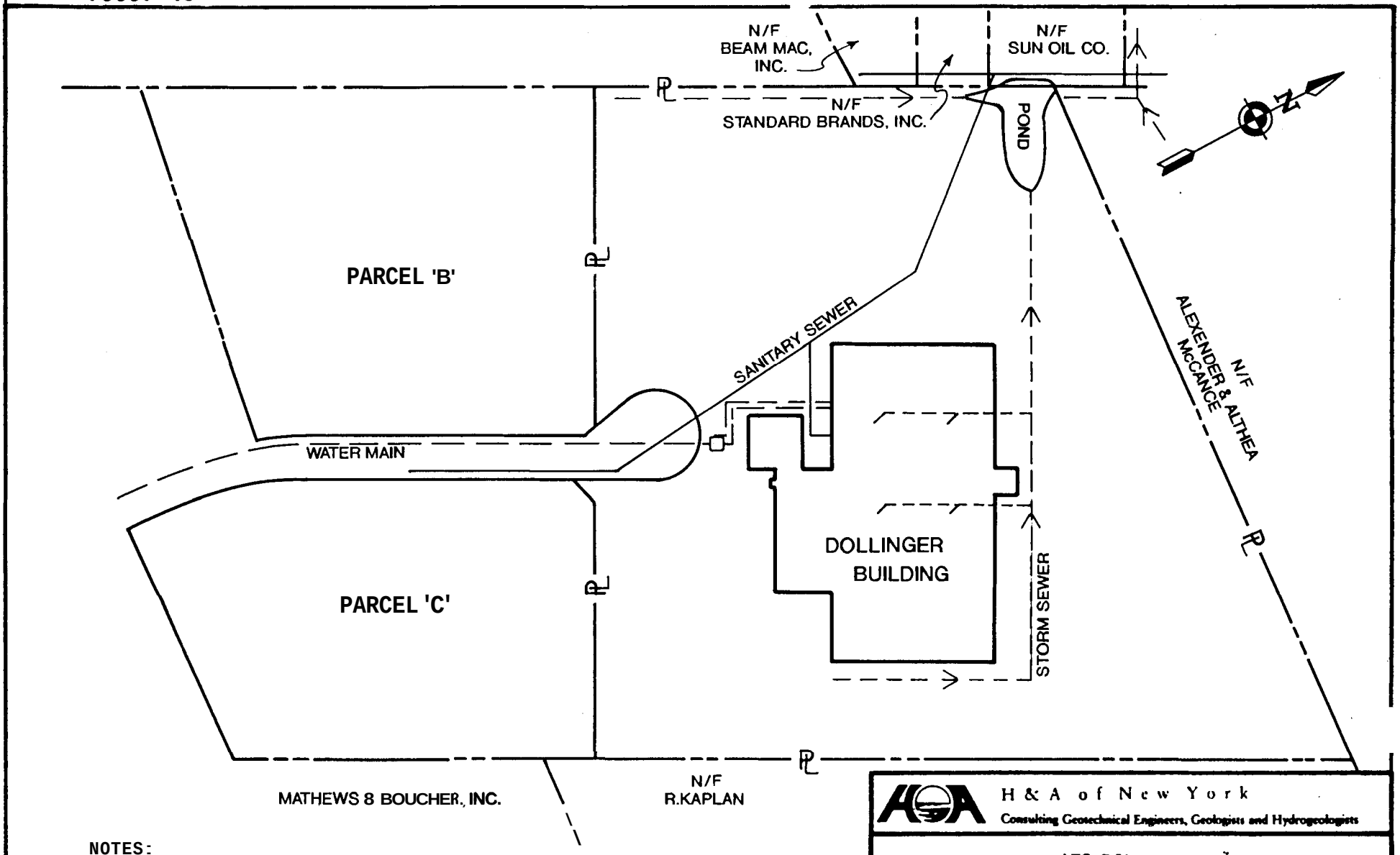

NOTES:

1. Figure based on plan entitled "Dollinger Property, Site and Utility Plan" prepared by Sear Brown, Schoenberger & Costich dated 2 February 1968.

2. See accompanying text for additional information.

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AFC-DOLLINGER
BRIGHTON, NEW YORK

SITE AREA PLAN

SCALE: 1 IN. = 200 FT.

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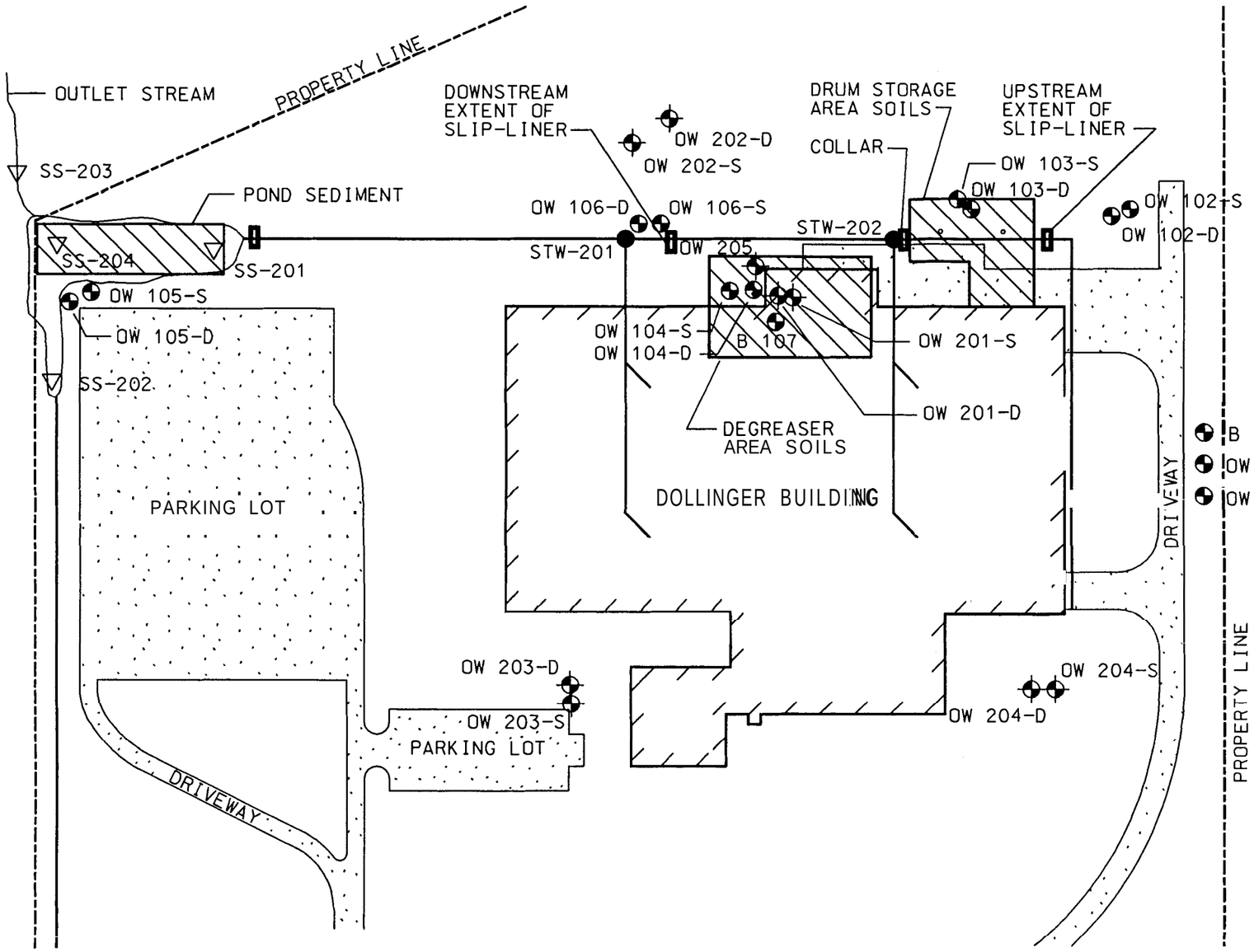
FIGURE 2



LEGEND:

- ESTIMATED AREAL EXTENT OF AREAS TARGETED FOR REMEDIATION. SEE TEXT FOR EXPLANATION.
- SS-202 — REMEDIAL INVESTIGATION, SHALLOW SEDIMENT AND DEEP SEDIMENT SAMPLE LOCATION AND NUMBER
- STW-202 — REMEDIAL INVESTIGATION STORM SEWER SEDIMENT AND WATER SAMPLE LOCATION AND NUMBER
- 8 / OW 101-D — PREVIOUS TEST BORING/OBSERVATION WELL LOCATION AND NUMBER. OW INDICATES OBSERVATION WELL INSTALLED IN TEST BORING
- OW 201-S — REMEDIAL INVESTIGATION TEST BORING/ OBSERVATION WELL LOCATION AND NUMBER
- ° — SOIL GRID SCREENING AND SAMPLING LOCATION
- LOCATION OF PROPOSED BENTONITE COLLAR

NOTES:

1. FIGURE BASED ON PLAN ENTITLED "DOLLINGER PROPERTY, SITE AND UTILITY PLAN" PREPARED BY SEAR-BROWN, SCHOENBERGER & COSTICH DATED 2 FEBRUARY 1968 AND REVISED 28 JUNE 1968.
2. SEE ACCOMPANYING TEXT FOR ADDITIONAL INFORMATION.

N

50 0 100
SCALE IN FEET

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REVISED SOIL AND SEDIMENT REMEDIATION AREAS PLAN

SCALE: AS SHOWN JULY 1993

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FIGURE 3

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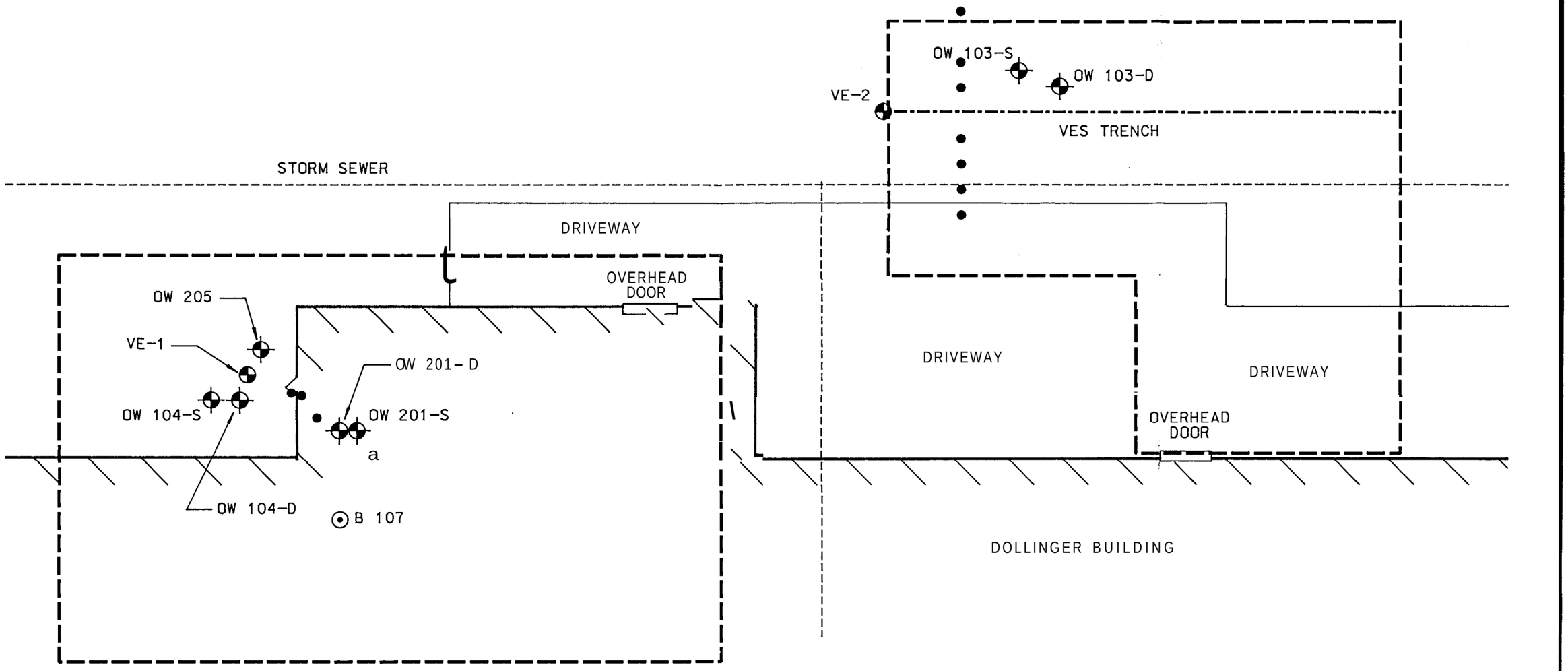

LEGEND:

- VACUUM EXTRACTION WELL
- MONITORING WELL
- BORING LOCATION
- SHIELD POINT
- PROJECTED LIMIT OF CONTAMINATION

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PILOT TEST SITE LAYOUT

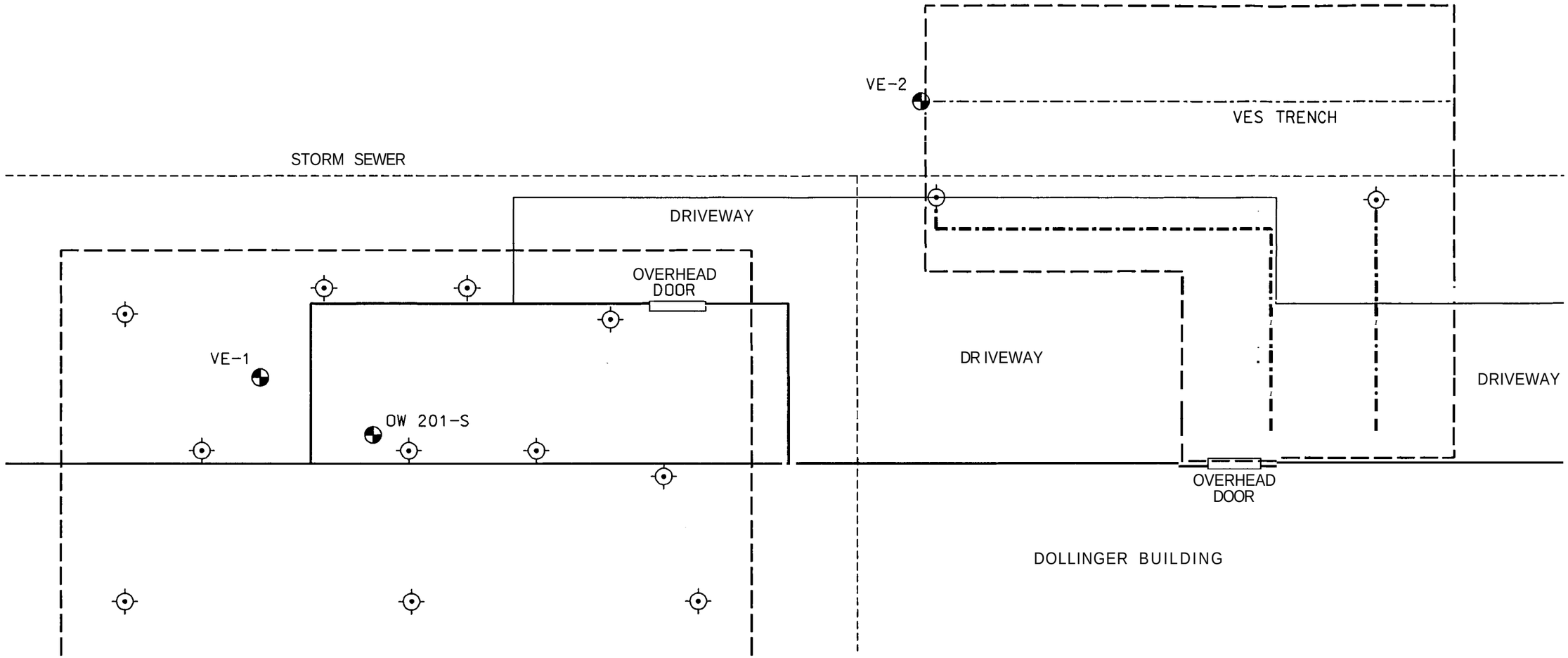
SCALE: 1" = 20'

JULY 1993

FILENAME: .DGN

FILE No. 70007-43

FIGURE 4



NOTES:

1. WELL LOCATIONS ARE APPROXIMATE.
2. WELL PIPING IS SHOWN ON THE FINAL DESIGN*
3. THREE SOIL CONFIRMATIONAL SAMPLING LOCATIONS WILL BE SELECTED IN EACH OF THE TWO DELINEATED REMEDIATION AREAS BASED ON INPUT FROM H&A AND NYSDEC.

LEGEND:

- EXIST. VACUUM EXTRACTION WELL
- PROPOSED VACUUM EXTRACTION WELL
- PROPOSED VACUUM TRENCH LOCATION
- PROJECTED LIMIT OF CONTAMINATION

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BRIGHTON, NEW YORK

REMEDIAL DESIGN

SITE LAYOUT

SCALE: 1" = 20'

SEPTEMBER 1993

93 FILENAME: FIG6.DGN

FIGURE 6

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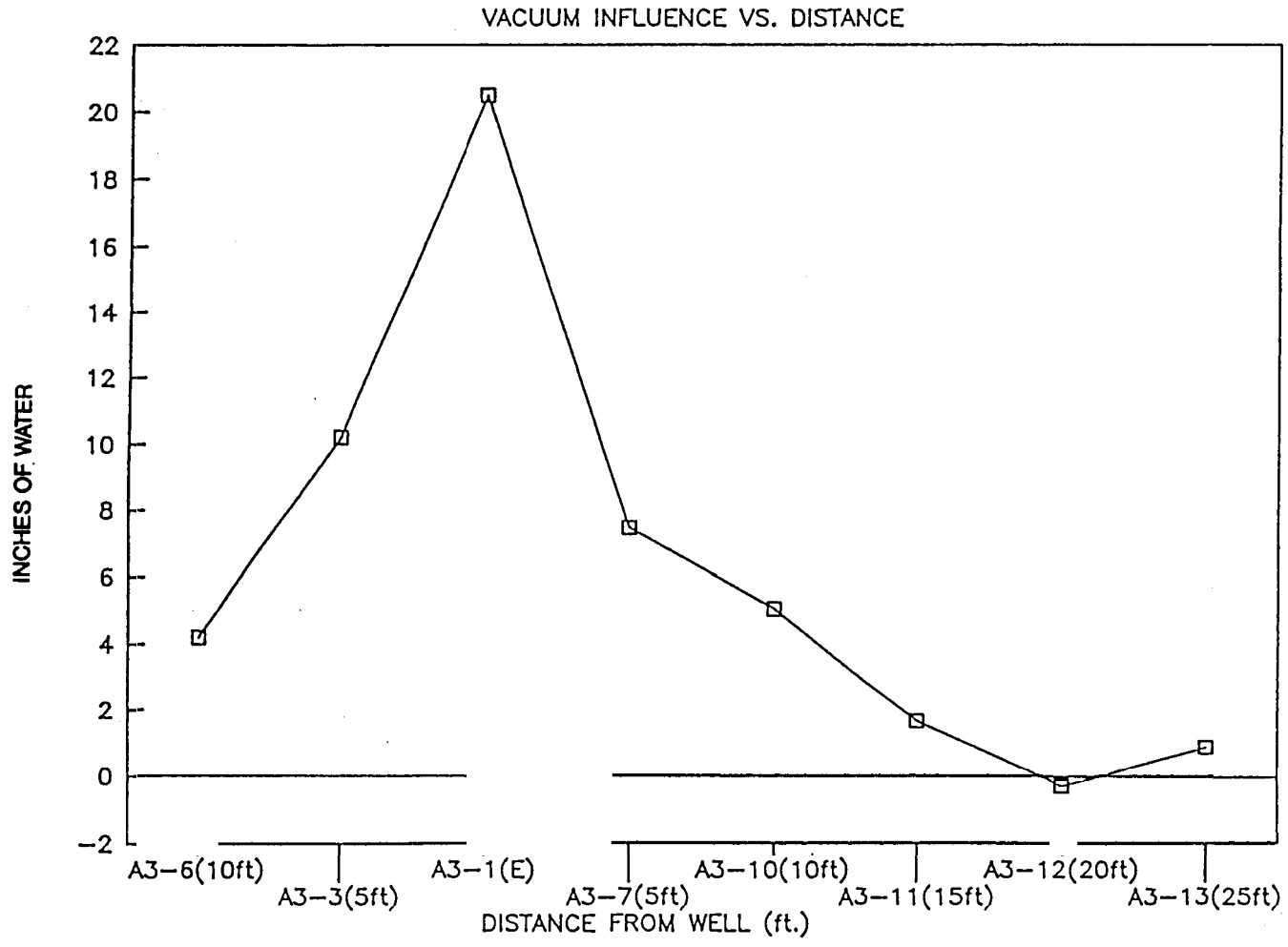
169669

MAKEPEACE



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VACUUM INFLUENCE VS. DISTANCE

JULY 1993

FIGURE 5

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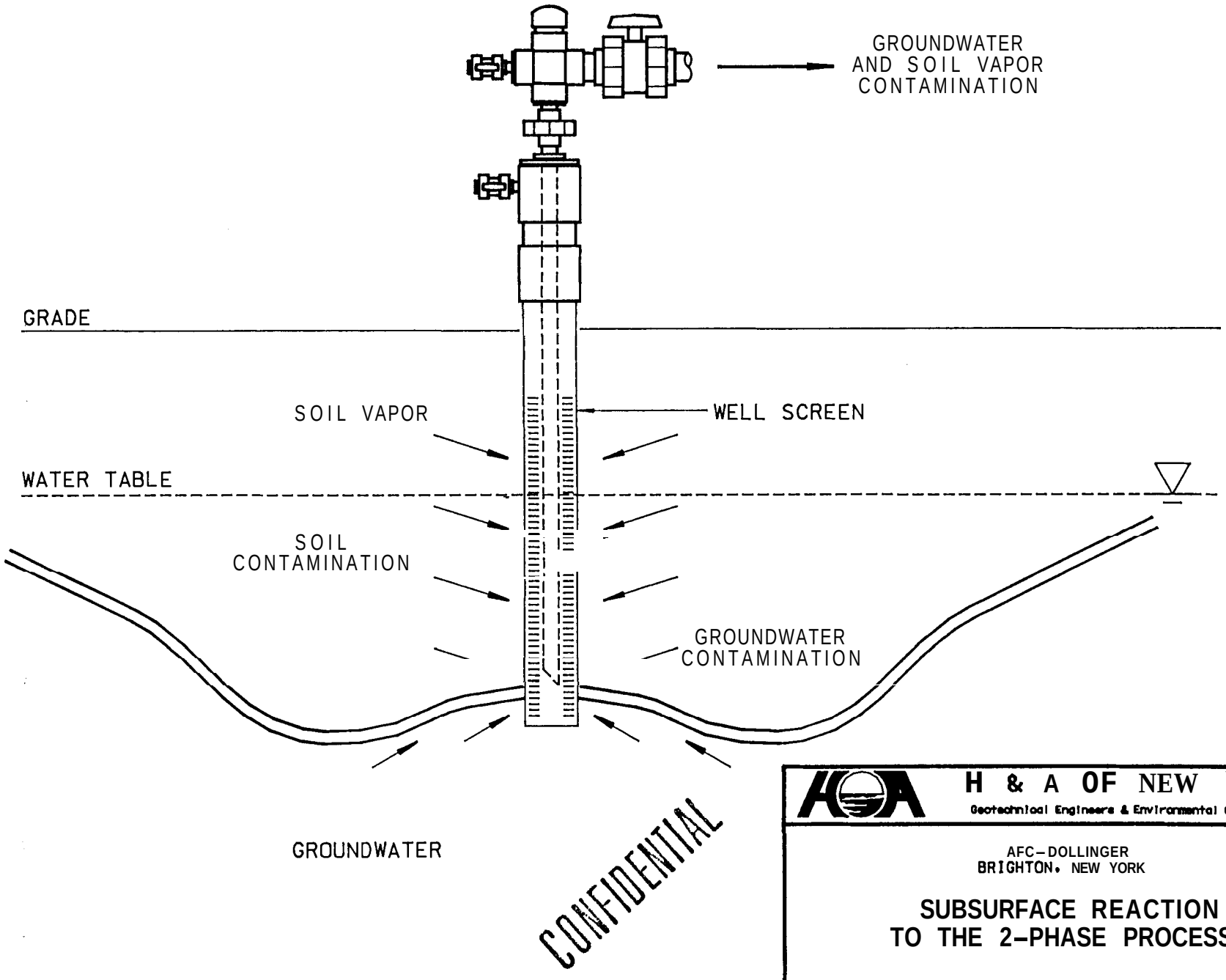

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BRIGHTON, NEW YORK

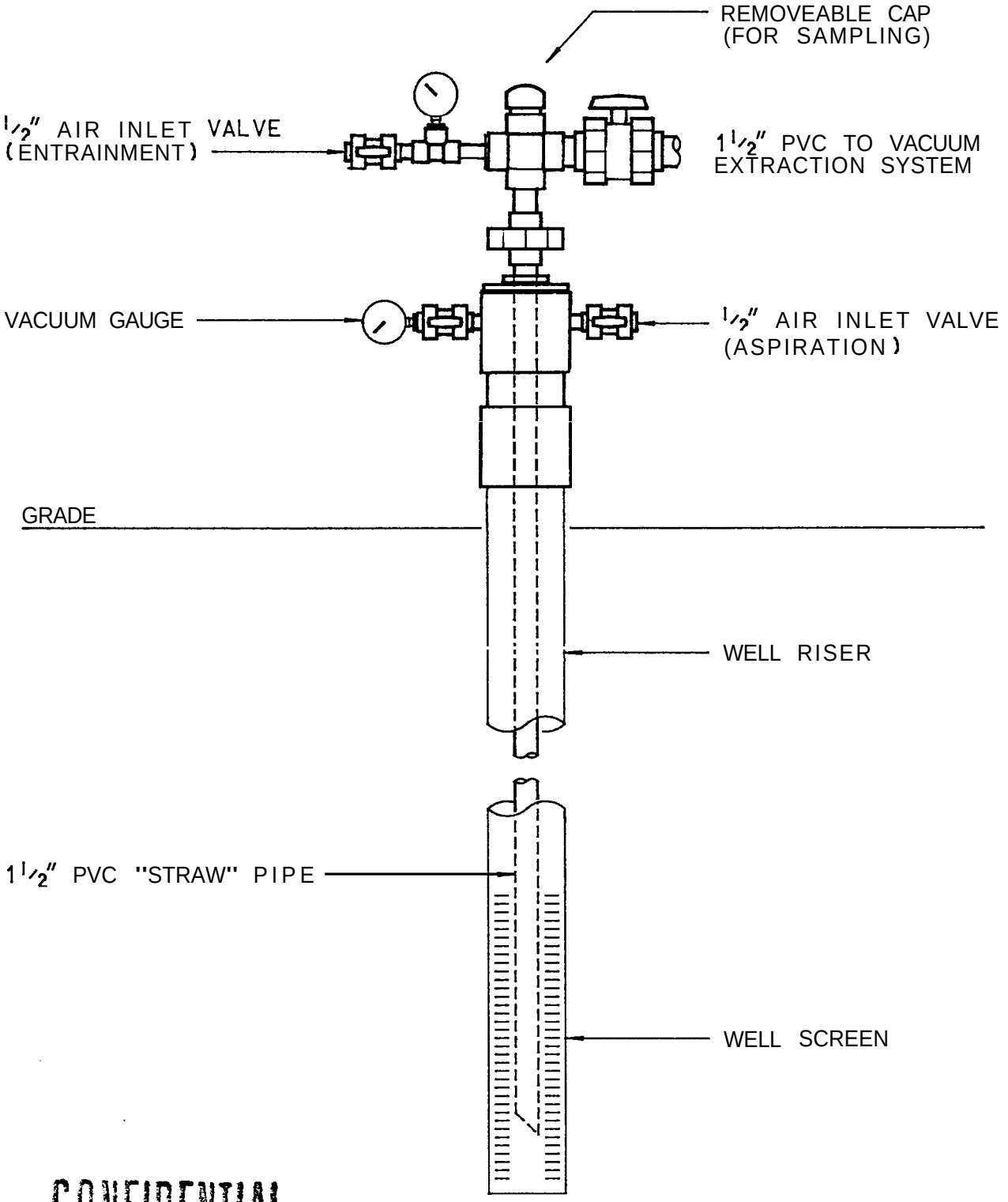
SUBSURFACE REACTION TO THE 2-PHASE PROCESS

SCALE: NONE

JULY 1993

FILENAME: FIG7.DGN

FIGURE 7



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2 PHASE WELL DETAIL

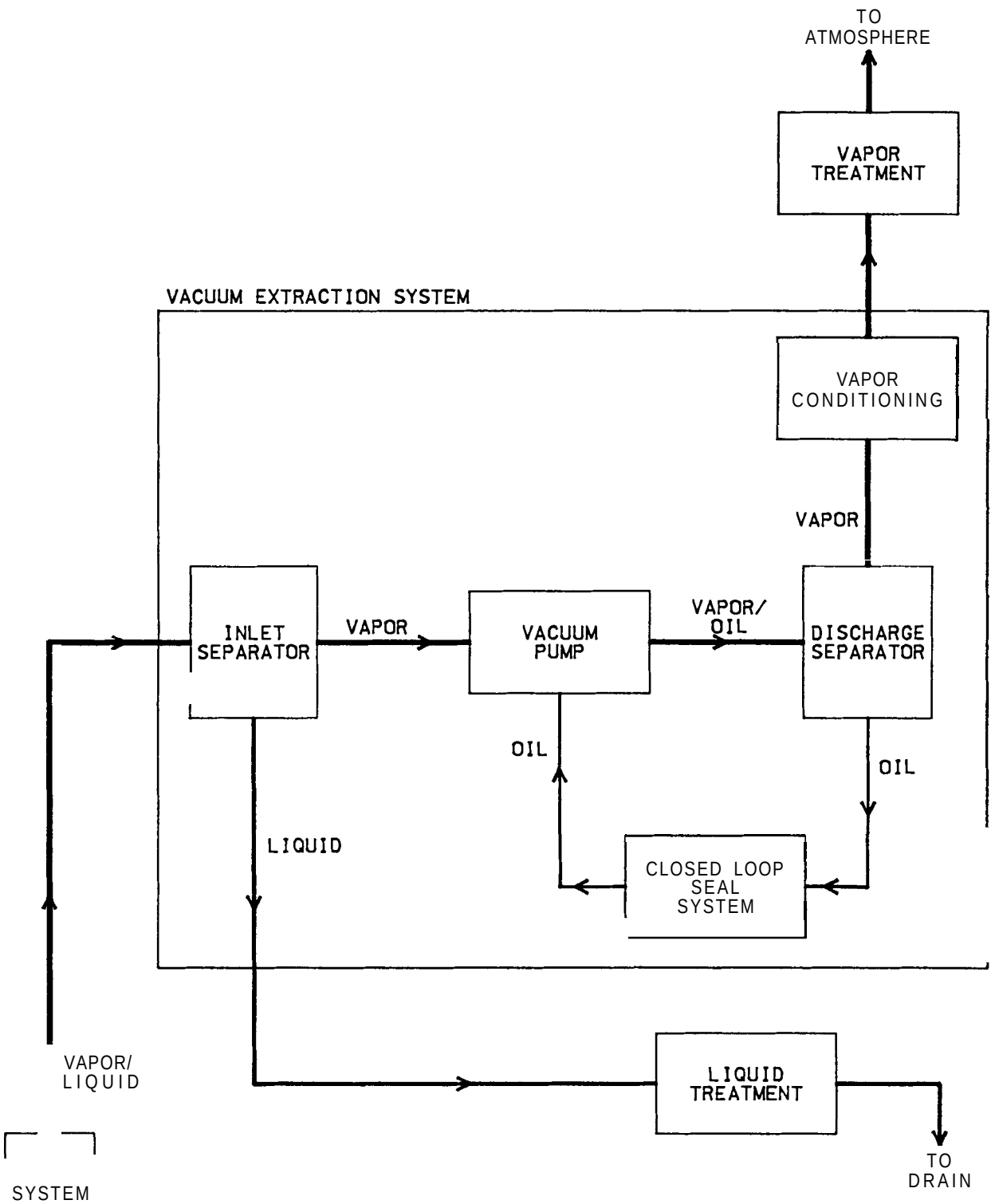
SCALE: NONE

JULY 1993

FILENAME: .DGN

FIGURE 8

FILE No. 70007-43



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BRIGHTON, NEW YORK

REMEDIAL SYSTEM
BLOCK DIAGRAM

SCALE: NONE

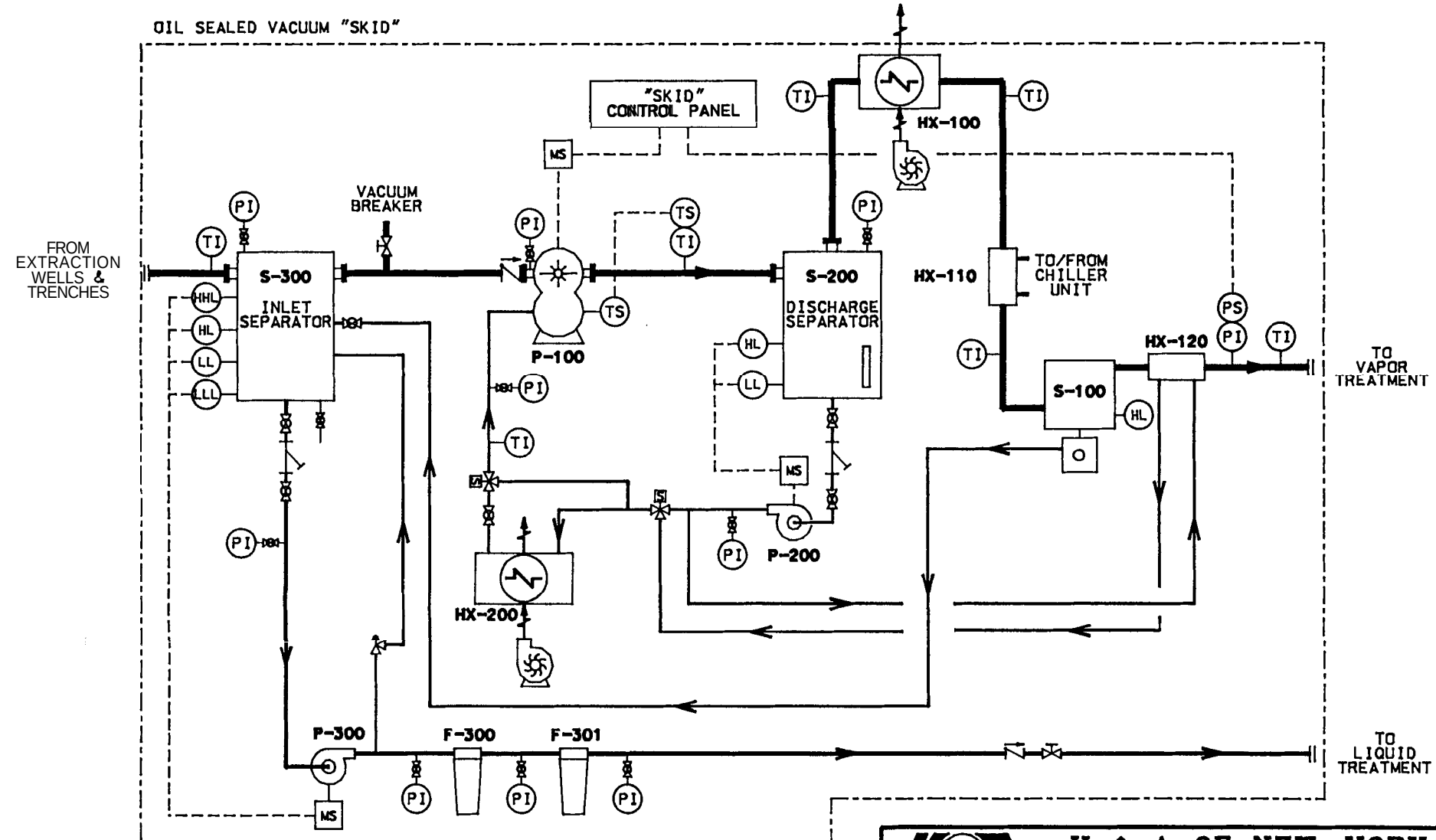
JULY 1993

FILE No. 0007-43

FILENAME: FIG9.DGN

FIGURE 9

FILE No. 70007-43



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BRIGHTON, NEW YORK

PROCESS & INSTRUMENTATION DIAGRAM

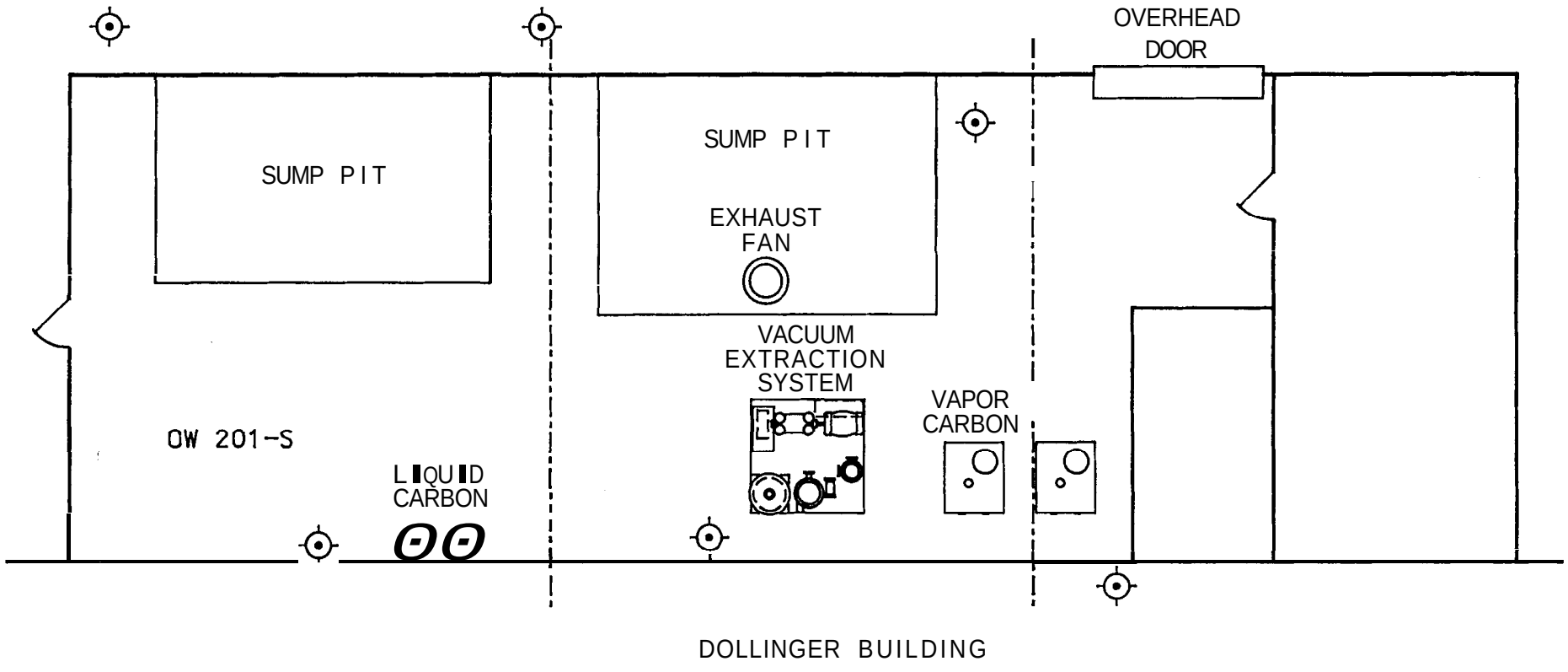
SCALE: NONE

JULY 1993

FILENAME: FIG10.DGN

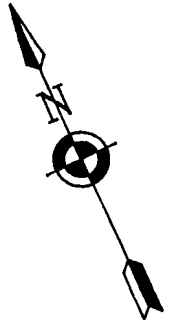
FIGURE 10

FILE No. 70007-43



NOTES:

1. WELL LOCATIONS ARE APPROXIMATE.
2. WELL PIPING IS NOT SHOWN BUT WILL BE DEVELOPED FOR THE FINAL DESIGN.



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AFC-DOLLINGER
BRIGHTON, NEW YORK

REMEDIAL DESIGN
EQUIPMENT LAYOUT

SCALE: 1" = 10'

JULY 1993

FILENAME: FIG11.DGN

FIGURE 11

169669

ATC - DOLLINGER
VACUUM EXTRACTION SYSTEM
OPERATIONS LOG SHEET

			DATE:								
			TIME:								
			BY:								
DESCRIPTION	ID #	RANGE	NORMAL	DATA	DATA	DATA	DATA	DATA	DATA	DATA	DATA
OIL CIRCULATION:											
SEAL OIL **SEPARATOR/RESERVOIR** LEVEL	LQ-200	INCHES	READ	in	in	In	in	in	in	in	in
SEAL OIL **SEPARATOR/RESERVIOR** PRESSURE	PI-200	0-4 psi	1.5 psi	psi	psi	psi	psi	psi	psi	psi	
SEAL OIL PUMP **DISCHARGE** PRESSURE	PI-201	20-30 psi	16 psi	psi	psi	psi	psi	psi	psi	psi	psi
OUTLETTEMPERATURE OF SEAL OIL COOLER	TI-200	120-180 F	160 F	F	F	F	F	F	F	F	F
OUTLET PRESSURE OF SEAL OIL COOLER	PI-202	5' - 5 psi	3'								
WATER CIRCULATION:											
TRANSFER PUMP SUCTION PRESSURE	PI-300	26-30" Hg	25'	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg
1st CUNO FILTER INLET PRESSURE	PI-301	0-60 psi	36 psi	psi	psi	psi	psi	psi	psi	psi	psi
2nd CUNO FILTER INLET PRESSURE	PI-302	0-60 psi	34 pal	psi	psi	psi	psi	psi	psi	psi	psi
2nd CUNO FILTER OUTLET PRESSURE	PI-303	0-60 pal	34 pal	psi	psi	psi	psi	psi	psi	psi	pal
PUMP SEAL FLUSH **LINE** PRESSURE	PI-304	0-60 psi	34 psi	psi	psi	psi	psi	psi	psi	psi	psi
DISCHARGE WATER FLOW METER (TOTAL)	FM-300	GALLONS	READ								
1st CARBON TREATMENT INLET PRESSURE	PI-305	0-10 pal	<10 psi	psi	psi	psi	psi	psi	psi	psi	psi
LIQUID TREATMENT OUTLET PRESSURE	PI-306	0-10 psi	0 psi	psi	psi	psi	psi	psi	psi	psi	psi
EXTRACTION WELL VACUUMS:											
		15-26" Hg									
		•									
		•									
DESCRIPTION	ID #	RANGE	NORMAL	DATA	DATA	DATA	DATA	DATA	DATA	DATA	DATA
VACUUM PUMP HOUR METER	HM	HOURS	READ	HR	HR	HR	HR	HR	HR	HR	HR
VAPOR INLET TEMPERATURE	TI-100	55 - 85 F	70 F	F	F	F	F	F	F	F	F
PRESSURE AT INLET SEPARATOR	PI-100	21-29" Hg	27"	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg
VACUUM BREAKER POSITION			Closed								
PRESSURE PRIOR TO VACUUM PUMP	PI-101	21-29"Hg	27"	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg	"Hg
VACUUM PUMP **DISCHARGE** TEMPERATURE	TI-101	160-100 F	180 F	F	F	F	F	F	F	F	F
AIR COOLER INLET TEMPERATURE	TI-102	100-170 F	170 F	F	F	F	F	F	F	F	F
AIR COOLER OUTLET TEMPERATURE	TI-103	70-120 F	100 F	F	F	F	F	F	F	F	F
CONDENSER OUTLET TEMPERATURE	TI-104	40-60 F	95 F	F	F	F	F	F	F	F	F
REHEATER OUTLET TEMPERATURE	TI-105	100-120 F	115 F	F	F	F	F	F	F	F	F
PRESSURE AFTER **REHEATER**	PI-102	0-2 psi	1 pal	psi	psi	psi	psi	psi	psi	psi	psi
DISCHARGE VAPOR FLOW METER	FM-100	10-120	SCFM								
				ERR g/hr	ERR g/hr	ERR g/hr	ERR g/hr	ERR g/hr	ERR g/hr	ERR g/hr	ERR g/hr

REMARKS:

Normal readings are averages from previous data

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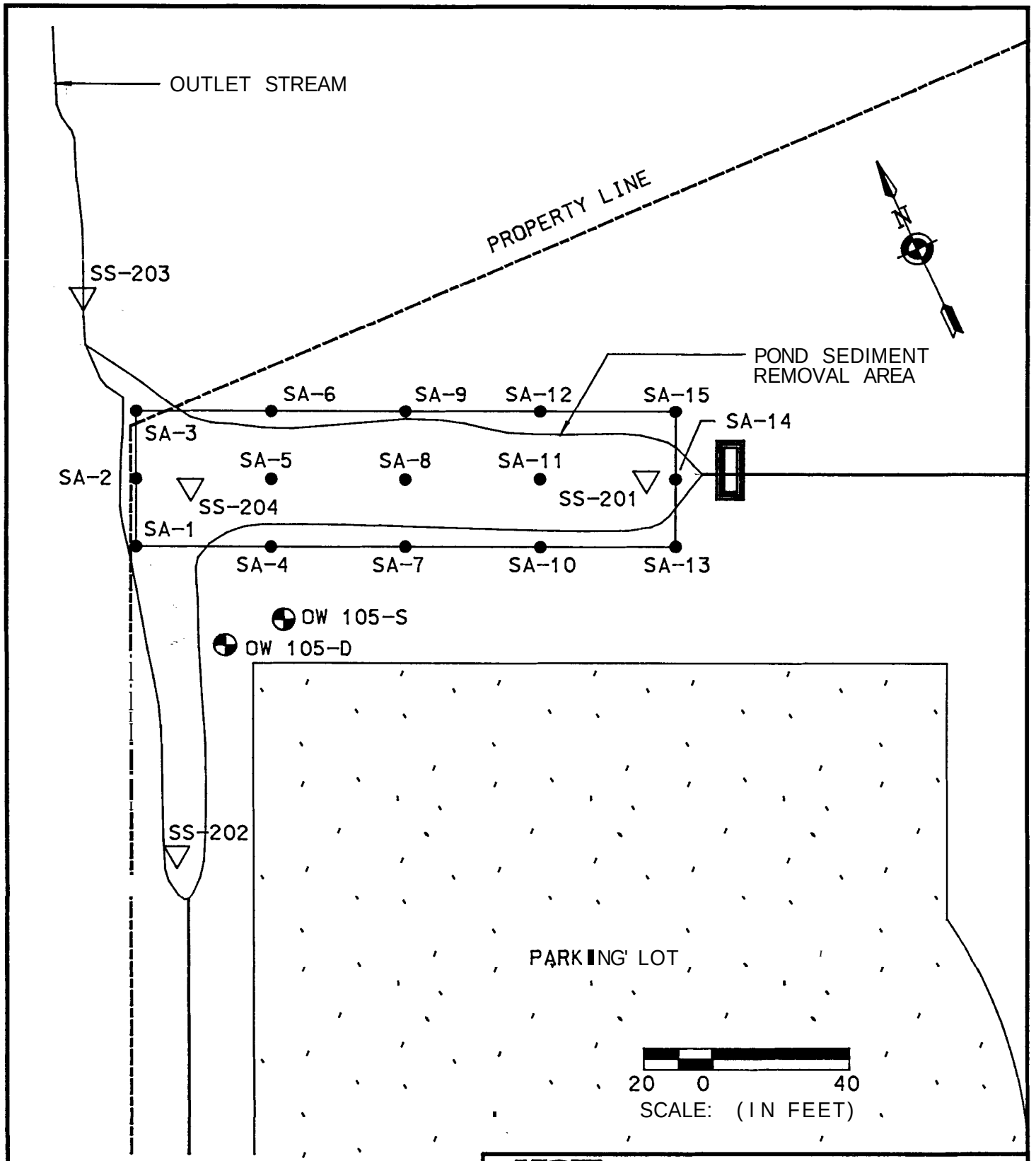
VACUUM EXTRACTION SYSTEM
OPERATIONS LOG SHEET

JULY 1993

FILE NO. 7X007-43

MAKEPEACE

FIGURE 12



NOTE:

1. SEE ACCOMPANYING TEXT FOR ADDITIONAL INFORMATION.

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SEDIMENT CHARACTERIZATION SAMPLING GRID

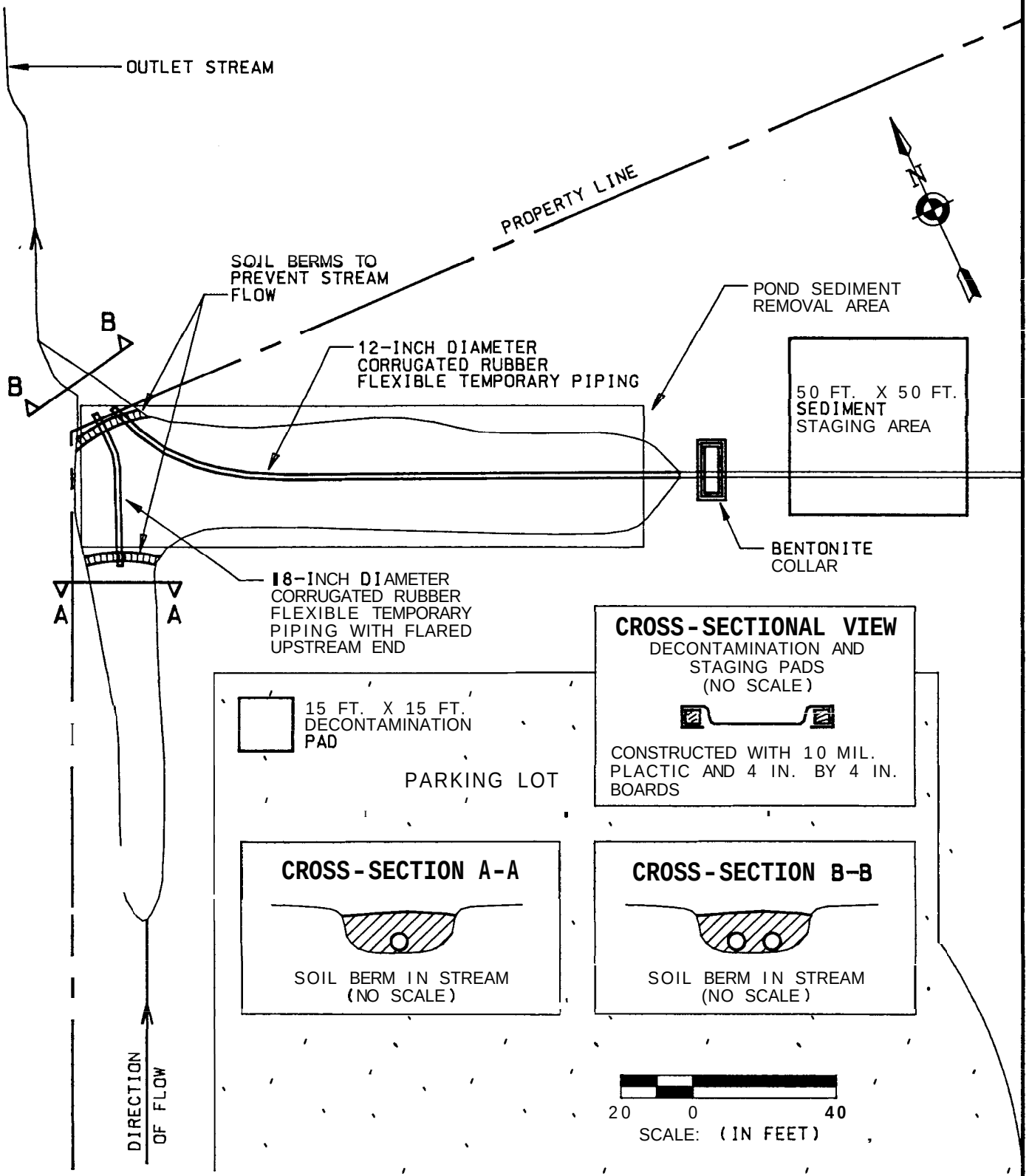
SCALE: AS SHOWN

SEPTEMBER 1993

FILE No. 70007-43

FILENAME: FIG13.DGN

FIGURE 13



NOTE:

1. SEE ACCOMPANYING TEXT FOR ADDITIONAL INFORMATION.
2. SOIL BERMS IN STREAM WILL BE APPROXIMATELY SIX' FEET WIDE AND 2 FEET HIGH. ACTUAL DIMENSIONS WILL BE DETERMINED IN THE FIELD.

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TEMPORARY STORMWATER MANAGEMENT* SEDIMENT STAGING* AND EOUIPMENT DECONTAMINATION PLAN

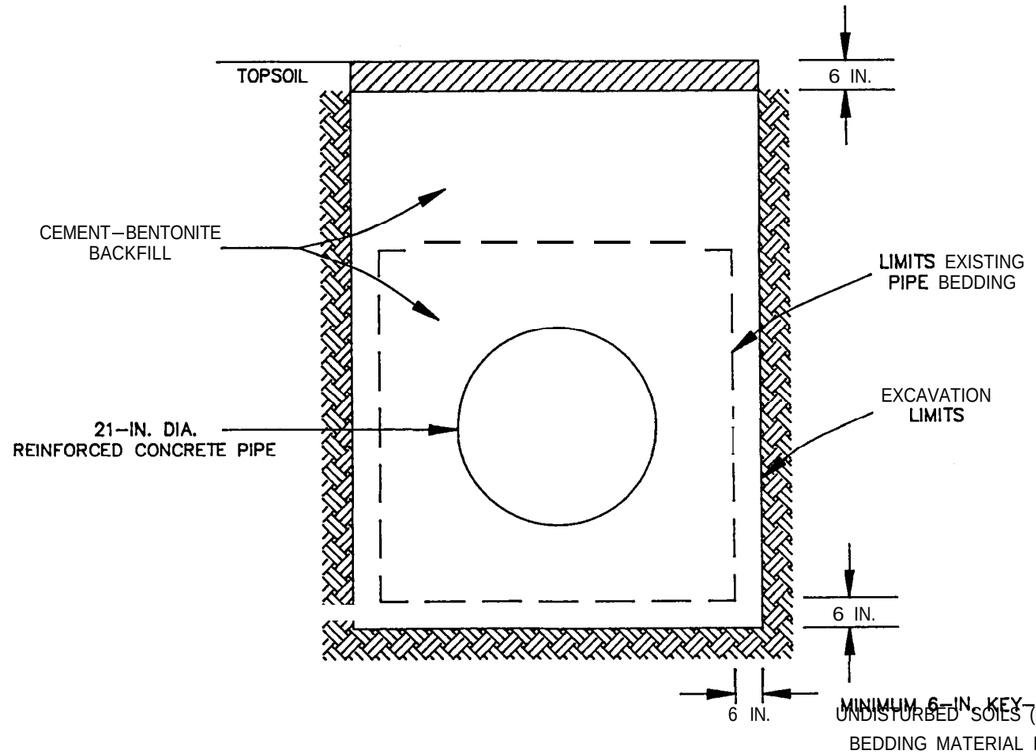
SCALE: AS SHOWN

NOVEMBER 1993

FILENAME: FIG14.DGN

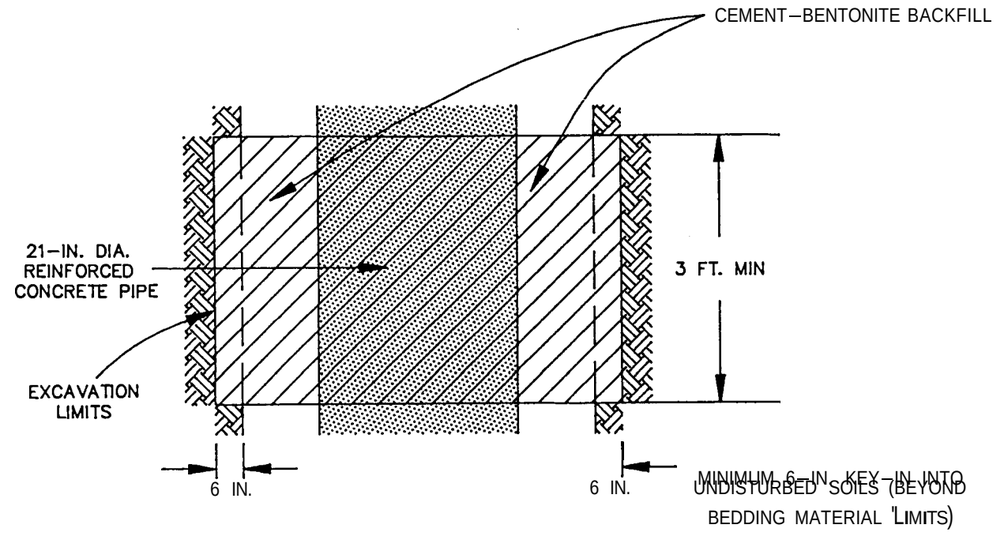
FIGURE 14

FILE No. 70007-43



PROFILE

(NOT TO SCALE)



PLAN VIEW

(NOT TO SCALE)

NOTE:

1. REFER TO WORK SCOPE FOR ADDITIONAL INFORMATION.

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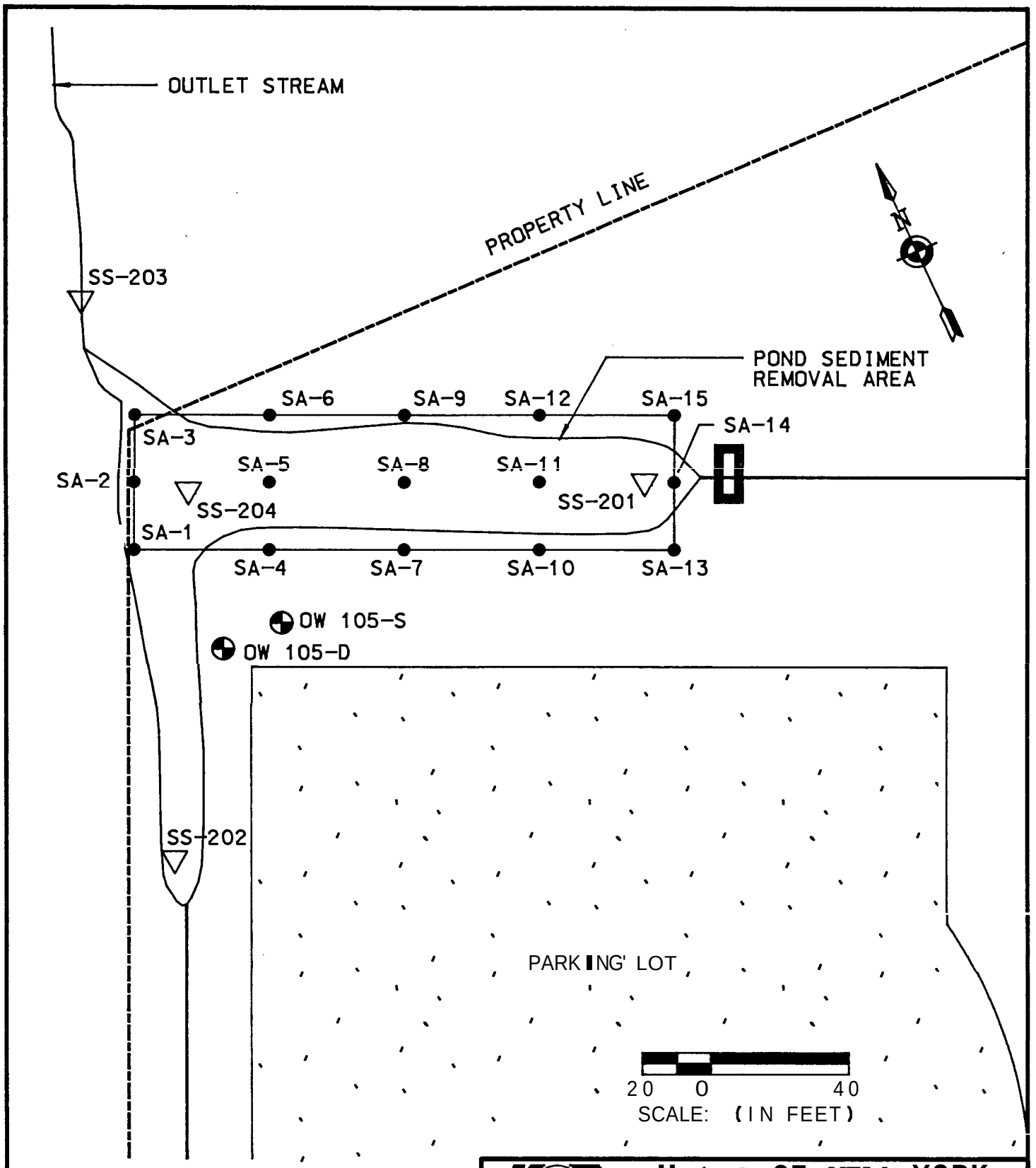
AFRIGHDOLLINGER FACILITY

CEMENT-BENTONITE COLLAR PLAN AND PROFILE

NOT TO **SCALE** NOVEMBER 1993

FILE NO. 70007-43

FIGURE 15



NOTE:

1. SEE ACCOMPANYING TEXT FOR ADDITIONAL INFORMATION.

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SEDIMENT CHARACTERIZATION SAMPLING GRID

SCALE: AS SHOWN

SEPTEMBER 1993

FILE No. 70007-43

FILENAME: FIG16.DGN

FIGURE 16

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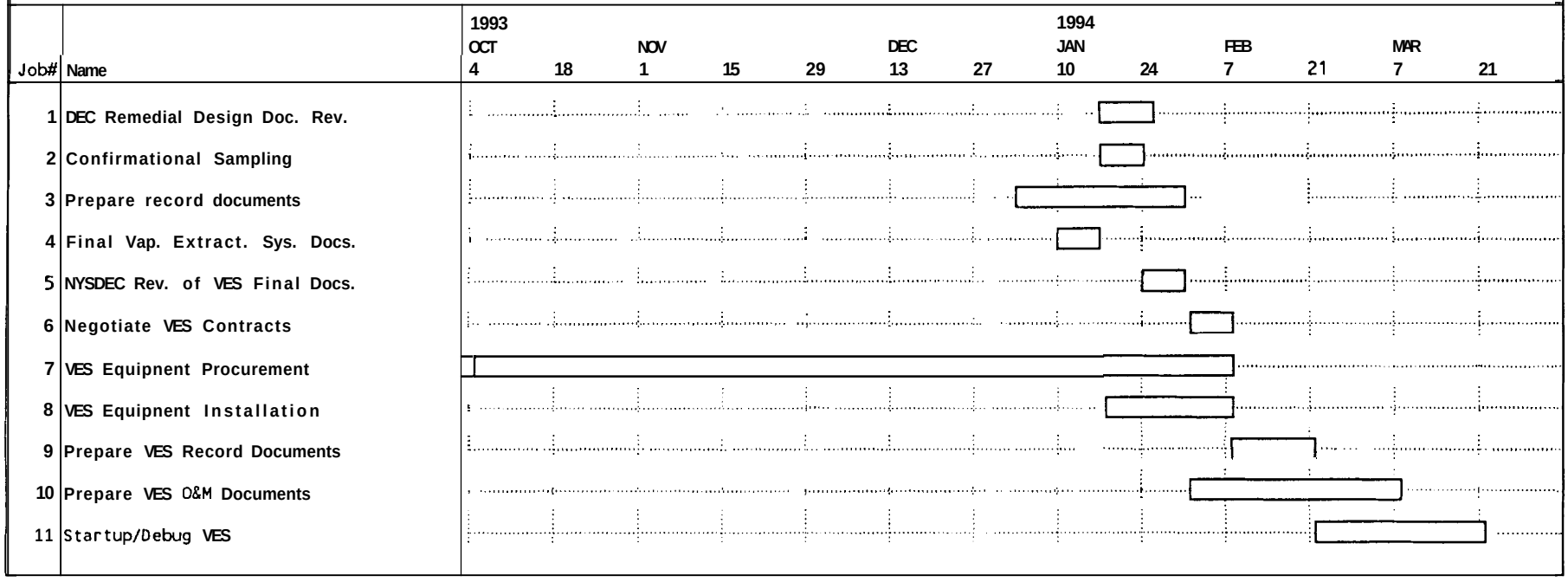
SITE WORK SCHEDULE

AFC-DOLLINGER



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BRIGHTON. NEW YORK

SITE WORK SCHEDULE

JANUARY 1994

FILE NO. 70007-43

FIGURE 17

APPENDIX A

Vacuum Extraction System
Trench Specifications
AFC - Dollinger Facility
Brighton, New York

SEE ACCOMPANYING DESIGN DRAWINGS FOR DETAILS.

SECTION 1 - MATERIALS

1.1 Vacuum Pipe - shall consist of coupled 4-in. diameter schedule 80 PVC well screen with 0.010-in. slotted openings.

1.2 Riser Pipe - shall consist of coupled 4-in. diameter schedule 80 PVC solid pipe.

1.3 Non-Woven Geotextile - shall consist of Mirafi 14ONS or approved equal.

1.4 Coarse Gravel Fill - shall consist of a washed gravel conforming to the following gradational limits:

Sieve Size	Percent Finer by Weight
1-1/2 in.	100
1 in.	90 - 100
1/2 in.	0 - 5

1.5 Processed Stone - shall consist of a clean, non-angular, sound processed stone or bank run gravel product conforming to the following gradational limits:

Sieve Size	Percent Finer by Weight
1/2 in.	100
1/4 in.	25 - 60
No. 40	5 - 40
No. 200	0 - 10

1.6 Common Fill - shall consist of on-site inorganic soil (excavated from trench) conforming to the following gradational limits:

Sieve Size	Percent Finer by Weight
3 in.	100
3/4 in.	70 - 100
No. 4	30 - 100
No. 40	10 - 100

1.7 Sand Cover - shall consist of a clean, well-graded sand with a minimum of 95 percent by weight passing the No. 4 sieve.

1.8 Topsoil - shall meet the requirements of NYSDOT specification 713-01.

1.9 Cover - shall consist of one layer of a urethane coated geotextile (CIM or equivalent) a sample of which shall be submitted before construction. The urethane thickness shall be a minimum of 60 mil.

SECTION 2 - TRENCH CONSTRUCTION

2.1 The contractor shall excavate additional trenches to a minimum depth of 3.5 feet below existing grade at the locations shown on Figure 6. Any soft or weaving areas in the excavation bottom shall be overexcavated. (Note: Asphalt and underlying materials in existing paved areas should be removed to a depth of 12 inches within proposed cover limits. Trench depths should be measured from existing grades. See Section 3.2 for additional discussion of surface preparation). Excavated soils shall be mounded within the cover limits shown in the design drawings and specifications package, in conjunction with surface preparation described in Section 3.2.

2.2 The contractor shall be responsible for maintenance of safe and stable excavation slopes, and shall conduct all excavation in accordance with OSHA regulations.

2.3 Installation of the vacuum extraction piping shall be performed by the contractor as follows:

2.3.1 Place non-woven geotextile along the sides and ends of the excavation such that the coarse gravel fill will be completely enveloped. The geotextile shall be placed with a minimum overlap of 12 inches.

2.3.2 Place a 6-in. thickness of coarse gravel fill on the excavation bottom.

2.3.3 Install slotted well screen and solid riser above the gravel fill. All well screen and riser pipe shall be joined using PVC couples and cement.

2.3.4 Place coarse gravel fill to 6 inches above the pipe, as shown on Figure 9. The gravel shall be placed in a manner that will not damage the pipe or cause separation at pipe connections.

2.3.5 Place non-woven geotextile above the gravel backfill as described in 2.3.1.

2.3.6 In paved areas, place crusher run stone above the woven geotextile to the cover subgrade. In vegetated areas, place common fill above the non-woven geotextile to the ground surface. Remaining excavated materials shall be gently mounded within the cover limits shown on Figure 6.

2.4 All work shall be performed in-the-dry. The contractor shall be responsible for selection and design of specific methods to control groundwater and surface water. Water pumped from the trench excavation shall be contained in drum(s) or tank(s) for subsequent analysis and disposal. The contractor shall prevent surface water from entering excavations.

2.5 Based on pilot test results and/or conditions observed during installation, measures to increase permeability will be performed. These will include the use of a ripper to break up the soil in the trench area, and roughening the sides of the trench with the backhoe bucket teeth. Ripping will be performed to a maximum depth of 3.5 feet at spacing of 3 to 5 feet.

SECTION 3 - COVER INSTALLATION

3.1 The contractor shall remove the existing polyethylene plastic cover as follows:

3.1.1 Remove existing sand piles and plywood from cover.

3.1.2 Excavate soil backfill placed in anchor trenches constructed during initial cover placement.

3.1.3 Remove polyethylene plastic cover including cover material previously buried in anchor trenches.

3.2 The contractor shall prepare the ground surface within the cover area as follows:

3.2.1 Clear and grub any vegetation within the cover area.

3.2.2 Mound soils excavated during trench construction in vegetated area.

3.2.3 Excavate existing asphalt and underlying materials to a depth of 12 inches below existing grade. Also excavate upper 12 in. of soil from 20 by 30 ft. vegetated area shown in design drawings and specifications package. Mound excavated soils within cover limits.

3.2.4 Rip surficial soils to a maximum depth of 3.5 feet along parallel lines spaced 3 to 5 feet apart.

3.2.5 Grade to provide a smooth surface. The area shall be graded in a manner that will promote drainage of storm water run-off away from the cover and will not result in surface-water ponding at any locations. See drawings for further drainage details.

3.2.6 Remove debris, roots, sharp stones larger than 1 inch, and other objects that may puncture or damage the cover.

3.3 Place geotextile for CIM cover system on the ground surface. Overlaps between adjacent geotextile sections shall be prepared as recommended by the manufacturer.

3.4 Apply urethane coating in accordance with manufacturer recommendations to provide a minimum thickness of 60 mil.

3.5 Penetrations shall be sealed in accordance with manufacturer recommendations for sealing pipe penetrations.

3.6 In vegetated areas, spread a 3-in. thick sand layer above the cover in a single lift using a rubber-tired backhoe. No equipment shall be driven directly on the cover. Equipment shall be operated in a manner that will not damage the cover during spreading. Spread a 3-inch thick Topsoil layer above the sand and hydroseed.

3.7 In paved areas, spread a 3-in. thick layer of Processed Stone above the cover in a single lift using a rubber-tired backhoe and compact lightly. No equipment shall be driven directly on the cover. Equipment shall be operated in a manner that will not damage the cover during spreading. Place asphalt pavement above the Processed Stone to provide a thickness equal to the existing asphalt thickness or 3 in., whichever is greater.

SBW:gmc
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APPENDIX B

VACUUM EXTRACTION UNIT SPECIFICATIONS

SEE ACCOMPANYING DESIGN DRAWINGS FOR DETAILS.

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General System

B. Recovered Liquid System

C. Vacuum Pump/Seal System

D. Vapor Conditioning System

E. Control Panel/Instrumentation

1.02 SUBMITTALS

A. Shop Drawings:

1. General Arrangement: Scale drawings of plan and elevations. Indicate components, piping, supports and access required for complete system operational maintenance.

2. P&ID: Schematic indicating components. capacities. ratings, controls and safeties.

B. Product Data: All equipment data sheets indicating ratings, construction and performance charts/curves, include manufacturer's address and phone number.

C. Certify that components of package. not furnished by manufacturer have been selected in accordance with manufacturer's requirements.

D. Operating and Maintenance Instructions: Include relevant instructions. Provide a written recommended preventive maintenance program outline and a written schedule of recommended manufacturer inspections. Provide a suggested spare parts list and price sheet.

E. Furnish two sets of filters and one gallon of seal oil.

1.03 WARRANTY

A. Provide manufacturer's warranty for all parts and materials of skid including coverage for vacuum pump.

PART 2 - PRODUCTS

2.01 GENERAL

A. Factory assembled and tested, skid-mounted, vacuum extraction unit consisting of inlet separator, vacuum pump, seal system, recovered liquids system and controls, prepiped and prewired.

B. Operating Conditions: The equipment described in this specification will be used on Two Phase Vacuum Extraction applications. The two phase process simultaneously recovers contaminated groundwater and soil vapor from a well or series of wells. Specific care and provisions are required in the system design and construction to accommodate the following conditions:

1. Possible high liquid loadings (water, dissolved and free phase contamination).

2. Chlorinated solvents. mineral spirits, and/or hydrocarbon contaminants will be contained in the vapor phase at concentrations up to 10,000 PPMV.

3. Free product may be contained in the liquid phase and can be condensed out of the vapor phase.

4. Operating vacuum ranges vary significantly from initial start up through normal operation (from 15 - 29" Hg).

5. The equipment package is to be designed and constructed for outdoor unprotected installation.

C. Guarantee Point: The vacuum unit will be expected to operate over a range of actual vapor flows and vacuums. The equipment guarantee point will be as follows:

Inlet tlow:	400 ACFM
Inlet vacuum:	26" Hg.
Discharge pressure:	1 psig

D. Equipment and piping to be mounted on structural steel skid designed for handling by forklift.

E. Equipment and piping to be supported to eliminate vibration.

F. Exposed surfaces shall be primed and painted.

G. Equipment layout to accommodate periodic maintenance and provide access to major components (including instruments. control elements, hand holes, valves) for ease of replacement/repair.

H. All piping shall include labels of service and tlow direction.

I. All components and devices shall be tagged in accordance with P & ID.

2.02 RECOVERED LIQUIDS SYSTEM

A. General: Piping inlet separator to remove entrained moisture from the intluent stream. The separator is to be designed for full vacuum service and capable of removing all entrained liquid (mists or slugs) so that vapor flow to the vacuum pump has no free water. This system shall also provide a means to transport all recovered liquids to treatment.

B. Inlet separator is to be equipped as follows:

1. Range of vacuum operation: 400 ACFM @ 15" - 29" Hg.

2. Inlet tlow conditions:
   a. Vapor flow - 110% of maximum rated vacuum pump flow
   b. Liquid tlow - Up to 10 gallons per minute, entrained and slug tlow

3. Site Glass: Vacuum rated. installed across full operating level range, include a graduated measuring device (in gallons).

4. Let-el Switches/Controls: Ultrasonic or Capacitance type for the following conditions:

   a. Extraction Pump on
   b. Extraction Pump off
   c. High liquid level/system trip: This device is to protect the vacuum pump and vapor treatment system from the ingestion of water. The level switch to be located within the knockout pot to provide a minimum of 1 minute hold up volume to assure continuous system operation after the "pump on" level is achieved and prior to pump priming at design flow rates.
   d. Low liquid level/system trip: This device is to protect the extraction pump from running dry. The level switch shall be located below "pump off' and above the inlet to pump.

5. Mechanical Float Switches: Redundant for high and low level system trips.

C. Extraction Pump: Provide pump capable of meeting 10 GPM 80' TDH with 5' NPSHA. Specific requirements include:

1. Provide "Y" strainer on suction side of pump. include block valves on both sides.

2. Provide vacuum gauge on pump side of " Y strainer.

3. Provide adjustable pressure relief valve on discharge side of pump. piped back to inlet separator.

4. Provide check valve on discharge side of pump.

D. Particle Filter: Provide 4 cartridge stainless steel filter housing with cartridges.

1. Manufacturer: Cuno Model 4dc1 or approved equal using Cuno Micro-Klean III filter cartridges.

2. Provide pressure gauges on inlet and outlet of filter.

3. Provide block valves on inlet and outlet of filter

4. Provide check valve on discharge side of filter.

E. Provide a city water make-up connection with block valve.

2.03 VACUUM PUMP/SEAL SYSTEM

A. General: Vacuum pump/seal system includes all components necessary to apply vacuum to the inlet separator. circulate and condition seal tluid, recover and prevent loss of seal tluid to the vapor phase treatment package.

B. Oil Sealed Vacuum Pump: Direct Driven/coupled, capable of 400 ACFM @ 15" - 29" Hg.

1. Provide a manual vacuum breaker/vent valve and silencer capable of relieving system vacuum under full tlow.

2. Provide an inlet check valve to vacuum pump.

3. Provide a high operating temperature shutdown switch.

C. Seal Fluid Reservoir:

1. Provide high efficiency discharge separator to hold seal tluid loss at <10 PPM at maximum tlow rates. Higher efticiencies would be expected at lower tlow rates.

2. Provide seal tluid compatible with intluent contaminants and concentrations.

3. Provide sensors and interlocks to shut unit down on:
   a. Low fluid level
   b. High tluid level

4. Provide a water removal/drain valve on the seal tluid reservoir and a seal tluid addition port to allow excess liquid to be drained. or seal tluid addition without shutdown of the vacuum package.

5. Provide insulation for vessel and vapor discharge piping to cooler.

D. Circulation Pump: Provide properly sized pump to circulate seal tluid through system.

1. Provide "Y" strainer on suction side of pump, include block valves on both sides.

2. Provide pressure gauge on discharge side of pump.

E. Seal Fluid Cooler: Provide properly sized cooler to maintain normal operating temperatures of seal tluid at 100°F ambient conditions. Cooler to overcome 1/2" external static pressure and to provide flange for duct connection.

F. Modulating Temperature Control Valves: Provide adjustable temperature control valves for proper operation of tluid cooler and for vapor conditioning. See Vapor Conditioning System Section.

G. Provide pressure, temperature and level indicators sufficient to monitor seal system performance. Level indicators to determine tluid usage in pints.

2.04 VAPOR CONDITIONING SYSTEM

A. Air Cooler: Provide cooler to decrease operating temperature of vapor stream from 180°F to 100°F at 100°F ambient conditions. Cooler to overcome 1/2" external static pressure and provide flange for duct connection and a drain.

B. Condenser: Provide heat exchanger to decrease temperature of vapor stream from 100°F to 75°F using the 60°F temperature of the recovered liquids.

C. Condensate Separator: Provide separator to collect condensate from vapor stream include a ball float trap discharged to the inlet separator and a side draw connection for free product removal.

D. Reheater: Provide heat exchanger to increase temperature of vapor stream from 75°F to 120°F using the 160°F temperature of the seal tluid. Provide adjustable vapor discharge range of 80°F to 120°F.

E. Provide pressure and temperature gauges to properly monitor the vapor conditioning system performance. including inlet/outlet temperature gauges for each component of system.

F. Options:

1. Chiller: Provide properly sized chiller to decrease temperature of vapor stream from 100°F to 75°F in lieu of using the recovered liquid loop. capable of adjustable reheater discharge temperature range of 40°F to 90°F.

2. Chiller: Provide properly sized chiller to decrease temperature of vapor stream from 180°F to 75°F in lieu of using the air cooler and the recovered liquid loop, capable of adjustable reheater discharge temperature range of 40°F to 90°F.

2.05 CONTROL PANEL/INSTRUMENTATION

A. Power and controls are to be mounted in a panel integral to the unit. All wiring to comply with the National Electric Code (latest edition) and any Facilities Operations Standards. In the event of a conflict between the standards, the more stringent shall apply.

B. Power supply to be 480 Volt **3** Phase. Transformers for instrumentation and other devices to be supplied with and included in the panel. A 15 Amp 110 Volt GFI convenience outlet to be provided on the panel exterior.

C. Status indicator(s) are to be provided for all operating conditions and alarms with "first out capability". All indicated conditions to be wired in parallel to a terminal strip for future connection to a remote alarm module. Indicated conditions and alarms are summarized as follows:

Condition	Lamp Color	Remarks
System running "OK"	green	normal operation
Extraction Pump "hand/off/auto"	white red green	hand operation off auto operation
Extraction pump "running"	green	normal operation
Inlet Separator "High Level"	red	emergency shutdown
Seal Reservoir "Low Level"	red	emergency shutdown
Seal Reservoir "High Level"	red	emergency shutdown
Vacuum Pump "High Temperature"	red	emergency shutdown

D. All pump and any devices capable of automatic operation to be equipped with "hand-off-auto" selector switches.

E. Shutdown interlocks will be manually cleared with a common reset on the front panel.

F. Operating instrumentation to be provided as follows:

Item	Sensor Location	Indicator Location	Type
Hour meter	Panel	Panel	Totalizer

G. Provide starter complete with lockable fused disconnect, pilot relays, overloads. power factor correction to .95 and two auxiliary contacts (one NO, one NC).

H. All equipment to be suitable for outdoor installation.

I. All electric motors to be a minimum of 1.15 Service Factor.

J. All driven equipment 1/2 HP or greater to be 480 Volt, 3 Phase.

2.06 GENERAL VESSEL REQUIREMENTS

A. All vessels in vacuum service to be rated for maximum vacuum.

B. All vessels in pressure service to be rated for 150% of anticipated maximum operating pressure or 15 psig, whichever is greater.

C. All vessels to be equipped with a valved drain connection at all low points.

D. All vessels to be equipped with removable heads and/or sufficient access openings to allow cleaning in place.

E. All vessels to be equipped with a valved vacuum/pressure gauge.

F. All vessels internals to be coated for corrosion resistance or constructed from corrosion resistant materials.

G. All vessels to be equipped with a mininium of 2 extra 1" threaded connections with plugs for future use. Connections are to be located above any normal operating level.

2.07 GENERAL PIPING REQUIREMENTS

A. All piping materials and ratings to be suitable for the service conditions including pressure. temperature and pumped tluids.

B. All block valves to be ball valves. same manufacturer

C. All piping to comply with the applicable Facilities Operations Standards.

D. Piping is to be installed with adequate unions for field disassembly to facilitate servicing of equipment.

E. All piping low points to be equipped with valved drains to allow draining of the

system for freeze protection.

PART 3 - EXECUTION

3.01 DESIGN REVIEW

A. Provide all shop drawings, as specified in previous section, prior to fabrication, to the Engineer.

B. Provide all product data, as specified in previous section, prior to fabrication, to the Engineer.

C. Provide operating and maintenance manual, as specified in previous section. prior to fabrication, to the H&A engineer.

D. A design review meeting between client, engineer, supplier(s) and fabricator shall be scheduled prior to fabrication.

3.02 FACTORY TEST

A. Factory test vacuum extraction unit at design, high vacuum and low vacuum conditions. Verify performance of all control and interlock systems by physically activating sensors.

B. Notify H&A engineer seven (7) days in advance of factory test. H&A engineer will witness the performance test.

3.03 INSTALLATION SERVICE (OPTION)

A. Install in accordance with manufacturer's instructions.

B. Align unit on foundation. level. grout and bolt in place.

C. Connect inlet piping. vacuum discharge and water discharge piping.

3.04 STARTUP SERVICE (OPTION)

A. Furnish factory trained representative for two (2) days to test, startup and calibrate system.

B. Provide instruction on operation and maintenance.

3.05 PROCESS & INSTRUMENT DIAGRAM

A. Refer to the process & instrument diagram (P&ID) included in this specification.

The preceding described components have been designed and manufactured as an integrated equipment package. This package is delivered pre-piped and wired with all components interconnected and ready for operation.

These operating instructions are intended to provide standard guidelines for normal operation of the Vacuum Extraction System. This document provides normal start up, shut down and routine operating conditions. The instructions are intended to supplement the individual component information provided by the extraction unit manufacturer at the time of shipment. Please refer to the manufacturer's recommendations for routine servicing of equipment components.

PRE START UP COMMISSIONING

Prior to initial unit start up, all components in the system should be checked to confirm the unit is ready for service. The following checks are required prior to initial operation of the unit:

1. If any components were disassembled for shipment, recheck the assembly with the drawings provided.

2. Make sure the unit is level and anchored to the tloor.

3. There are four main external connections to be made to the unit:

   - Vapor piping to the Inlet Separator from wells
   - Vapor piping from the Rchcat Exchanger to treatment
   - Liquid discharge piping to treatment
   - Main (480V) power supply to the control panel

4. Check all power supply connections and confirm proper voltage and overload protection is in place.

5. Check rotation on all driven equipment to confirm proper power phasing.

6. Verify final shaft alignments of all driven equipment.

7. Physically check and verify proper operation of all system interlocks and alarms including components not physically located on the unit (ventilation).

8. Confirm that all tluid levels arc in normal operating range (oil).

9. Confirm that all system isolation valves are installed and in normal operating position.

Additional pre commissioning activities may be necessary due to site specific conditions. These activities shall be included in the actual site operating instructions.

NORMAL START UP

The extraction unit has been designed for automatic. unattended operation. High groundwater recovery rates are normal during initial extraction which may require operator attention to prevent unit shutdown. It is recommcndcd the unit be observed after any start up operation to confirm stable conditions have been achieved and the system is performing properly.

Normal Start Up Procedure:

1. Confirm all system valves are in normal operating position and all extraction well isolation valves are closed.
2. Confirm all unit fluid levels are in normal operating range.
3. Close Main Circuit Breaker/Disconnect to energize unit.
   - Inlet Separator and High Temperature alarms should be illuminated.
   - System flowmeter output (if provided) should read zero.
4. Depress the Main Reset pushbutton to clear Inlet Separator alarms.
5. Depress the High Temperature Reset pushbutton to clear High Temperature alarm.
6. Set transfer pump hand-off-auto sclector to auto position.
7. Open unit vacuum breaker valve partially to provide air flow through unit.
8. System is ready for operation.
9. Depress unit Start pushbuttnn. Vacuum pump & oil cooler fan, seal circulating pump and air cooler fan should start. Vacuum pump indicator lamp (green) on control panel should be illuminated.
10. Confirm normal operating pressures and tcmpcratures with log sheet.
11. Slowly open valve(s) to extraction wells and observe changes in unit operating conditions.
12. Observe inlet separator level and confirm transfer pump start/stop at set levels.
13. When all extraction wells are on line or as needed, slowly close vent valve to increase system vacuum to desired level.
14. Record operating conditions on system log sheets for future reference.

NORMAL OPERATION CHECKS

The extraction unit is designed for unattended operation. Routine operating checks are necessary to confirm proper operation and perform preventive maintenance. Routine operating checks include the following:

1. Record operating data on log sheets provided.
2. Observe system strainers (prior to inlet separator and from separator to transfer pump) and filter pressure/vacuum gauges to determine if cleaning/changeout is necessary.
3. Set system vacuum (using the vacuum breaker valve) to achieve target levels.
4. Observe vacuum pump discharge temperature. Adjust the seal flow control valve to the vacuum pump as necessary to hold 180°F at the vacuum pump discharge.
5. Observe vapor phase outlet temperature from the unit. Adjust the seal flow control valve to the reheat exchanger as necessary to hold target temperatures for treatment (approx. 120° F).
6. Check condensate separator for recovered liquids. Drain to approved container as needed.

SYSTEM NORMAL SHUTDOWN

1. Press the unit Stop pushbutton. Unit should shutdown.
2. Position the transfer pump hand-off-auto selector to the hand position to pump away accumulated groundwater in the inlet separator. Place selector in off position when the pump stops.
3. Close all inlet valves from the extraction wells and close the vapor discharge valve from the unit to isolate the system from the well field and treatment system.
4. Open the circuit breaker/disconnect to de-energize the unit.

The preceding information is intended to be used as a guide only by qualified operators in developing specific operating procedures for each system application. Site specific conditions may require alternate procedures be used to supplement the information contained in this document. In the event additional information is required. contact the system designer and/or manufacturer.

APPENDIX C
HEALTH AND SAFETY PLAN

4-01. INTRODUCTION

This Health and Safety plan addresses health and safety personnel involved in site investigation and remediation activities at the American Filtrona Corporation Dollinger facility. These detailed health and safety procedures will help to prevent injury, illness and accidents by avoiding unnecessary risks while maintaining an efficient work environment.

This health and safety plan was developed for the American Filtrona Corporation-Dollinger Site and is intended for use during field investigations and remediation actions including water and soil sampling, soil and sediment removal, and installation and operation of the vapor extraction system (VES). All contractors working on the site are required to adopt their own Health and Safety Plans which must, as a minimum, contain the requirements of this plan.

Site activities proposed for the remedial effort include the following:

- installation of wells inside and outside the building,
- excavation of a trench for vapor extraction piping,
- excavation of soil and sediment,
- installation of vapor extraction equipment,
- monitoringlsampling groundwater, surface water, soil, sediment, water treated and released by the VES, and vapor treated and released by the VES.
- excavation for and placement of bentonite collars around the storm sewer pipe,
- monitoring and changing VES system components such as filters and carbon units for the vapor and water streams.

4-02. OBJECTIVES

The objectives of the Health and Safety Plan are:

- To establish levels of personal protection and equipment requirements for all scheduled activities and to develop contingency plans.
- To assign on-site health and safety responsibilities.
- To outline mandatory operating procedures.

The provisions of this plan are mandatory for all personnel assigned to the activities described in the respective work plans. The Health and Safety Procedures contained in this plan have been developed for the specific activities intended for the Dollinger site remedial investigation and remedial activities and will be periodically reviewed and revised as necessary to keep them current and technically correct.

4-03. SITE ACCESS

The Dollinger site is the location of the former manufacture and assembly of industrial filtration devices. The site is approximately 18.5 acres in size consisting of one building with drainage ditches, storm sewers and a "detention" pond.

Access to investigation activities where exposure to contaminated soil or water may be likely, such as during excavation and soil/rock borings, will be controlled by temporary fencing placed around each exploration location. Entrance to the exploration area will be controlled by the Contractor Coordinator designated for the particular site activity (see section 4-06 - Assignment of Responsibilities). Entrance will be allowed only to individuals directly involved with exploration tasks or oversight, who have agreed to follow the site Health and Safety Plan, and are wearing appropriate protective wear.

Water and electrical power for site activities, and a phone for emergencies are available at the Dollinger building. The emergency services may include emergency medical response and ambulance, and fire services.

4-04. POTENTIAL HAZARDS

The potential hazards at the site consist of the presence of organic solvents in the soil and groundwater underlying the site vicinity, and work activities involving the use of drilling rigs, excavation equipment and other machinery necessary for field investigations and remedial actions.

The following solvents have been identified by soil and water sampling in the site vicinity:

benzene
carbon tetrachloride
chloroform
chloromethane
1,2-Dichloroethylene
ethylbenzene
methylene chloride
tetrachloroethylene
toluene
1,1,1-trichloroethane
trichloroethylene
vinyl chloride
xylene

The potential routes of exposure for these chemicals include inhalation, skin absorption, ingestion and skin/eye contact. The potential for exposure through any one of these routes will depend on the activity conducted. Most likely routes of exposure for the activities to be conducted at the site include:

Activity	Potential Routes of Exposure
Drilling and Soil Sampling	INH, ABS, CON
Soil Vapor Sampling	INH, ABS, CON
Hydrogeologic Testing	INH, ABS, CON
Excavation of Contaminated Soil/Sediment	INH, ABS, CON
Water Quality Sampling	INH, ABS, CON
Installation and Operation of the VES	INH, ABS, CON

NOTE:

INH = Inhalation
ABS = Skin absorption
CON = Skin/eye contact

Table 1 lists the solvent found on site, possible exposure routes, odor thresholds or limits of perception, and the solvent's ionization potential. Table 2 lists potential exposure rates and associated acute and chronic health effects.

Inorganics (arsenic, chromium, copper, lead, nickel and zinc) have also been detected on site in the pond sediment. Protection measures described herein have been established to protect against exposure to these inorganics as well as the organics. Table 2A lists the exposure limits and health effects of the site inorganics.

The greatest risk to workers will occur when the work directly exposes personnel to high concentrations of solvents in contaminated soil, extracted vapors, or groundwater. The activities most likely to expose workers to these conditions would include the excavation of VES trenches, the excavation of contaminated soil/sediment, drilling, VES vapor, water stream, and soil sampling in the vicinity of the potential contaminant source area.

The risk associated with the soil vapor sampling program and VES equipment installation should be less than for the drilling activities because penetration of the ground surface is limited to a small diameter (1/2 in.) hole advanced to shallow depths below ground surface. Workers performing the soil vapor sampling can potentially be exposed by direct contact with contaminants retained on the sampling equipment.

Hydrogeologic testing potentially exposes workers to risks at two different levels, depending on the activity conducted. Water quality sampling from wells and the falling head permeability tests conducted on monitoring wells may expose workers to vapors emanating from the boreholes or to contaminants introduced onto sampling or water level measurement devices. Most of the wells are located in open areas with ample air circulation. Vapor concentrations are expected to be undetectable in the breathing zone. Wells will also be installed inside the site building which may have a decreased air circulation compared to the outside. Engineering controls to address vapor buildup, such as fans, will be evaluated if needed. Exhaust from the drilling rig will be vented to the outside. An exhaust fan has been proposed for the former degreaser room to ventilate the VES.

4-05. GENERAL HEALTH AND SAFETY

Protective clothing and respiratory protection help prevent workers from coming in contact with potential hazards. Personnel protective equipment must be appropriate to protect against the anticipated hazards for each of the activities outlined above.

4.5.1 Air Monitoring

At the initiation of the site work activities H&A will survey ambient air at the work area, upwind at the property line using an Hnu (11.7 lamp) or flame ionization detector (OVA). If organic vapors are detected, samples will be collected and analyzed with the H&A portable 10S70 gas chromatograph.

Air monitoring will be performed during the activities for which inhalation has been identified as a potential exposure route.

Volatiles

Monitoring shall be conducted with a photoionization detector equipped with an 11.7 eV lamp or a flame ionization detector. These instruments are capable of detecting all of the chemical compounds identified in Section 4-04 above to an approximate detection limit of 1 ppm. The Threshold Limit Values (TLV's) established by OSHA for an eight hour work day, for all of the compounds listed in the attached table, are above the detection limit of the proposed equipment. The rapid response of the instrument allows for quick determination of potential contaminants in the air, and changes in safety procedures can be implemented if needed.

Air Particulates

Air particulates at the site will be monitored with a MDA P-5 digital dust indicator (or similar). Air particulate monitoring will performed continuously during the mass soil excavation activities. Monitoring will be conducted adjacent to excavation activities, and at the downwind site perimeter as defined in Section 4-07. If dust levels exceed 150 ug/m^3 or are 100 ug/m^3 above upwind background, necessary measures such as water misting of the soils will be implemented. A steam cleaner or hand held sprayer is capable of providing a sufficient mist to moisten soils and suppress dust without saturating the excavation. If the action level of 150 ug/m^3 is exceeded, the Division of Air Resources will be notified in writing within five working days; the notification will include a description of the control measures implemented.

4.5.2 Personnel Protective Equipment

The minimum level of personnel protection to be implemented at the site will be Level D as described in "Standard Operating Safety Guidelines" (USEPA November 1984). The required equipment includes:

Leather or chemical resistant boots/shoes.

Hard hat.

Safety glasses.

Chemical resistant gloves (inner vinyl and outer Bayprene for sampling activities).

For the drilling, soil vapor, soil sampling, and soil/sediment removal or other activities which may potentially expose workers to contaminated soil, the Level D program will be modified to include, in addition to the items listed above, the following:

Chemical resistant clothing (Tyvex or Saranex suit).

Respirator availability.

Hearing protection will be included in noisy environments.

Respiratory Protection

The decision to don respirators during a particular activity will be based on the results of the continuous air monitoring performed during the site activity. Detection of organic vapors in excess of 1 part per million (ppm) above background concentrations monitored in the breathing zone during the site activity will trigger further vapor evaluation using draeger tubes and/or the portable gas chromatograph to identify the chemicals present. If vinyl chloride or benzene are identified, work will be stopped until a decision can be made to upgrade the level of personnel protection to Level C and/or additional engineering controls implemented to prevent vapors from building up in the breathing zone. If vapors are not benzene or vinyl chloride, a 3 ppm vapor concentration action level will be used to determine the need to either don air purifying respirators (APR) or immediately evacuate the work area as defined in Section 4-07. Table 3 lists hazard guidelines and action response levels.

If APR's are required, work activities will continue after upgrading to Level C unless organic vapor concentrations are detected in excess of 50 ppm above background levels in the breathing zone. If this level of organic vapors is reached in the breathing zone during the site activities, the exploration area will be secured and immediate evacuation of the work area will be required. Work will resume once the health and safety plan has been modified to provide the level of protection necessary to protect the health and safety of the workers.

Contingency Plan

If concentrations of non-benzene or vinyl chloride organic vapors above 50 ppm are detected in the breathing zone, the Health and Safety Plan will be modified to provide the level of protection necessary to protect the health and safety of the workers prior to the resumption of site activities. Such conditions may necessitate a modification of the investigation procedure in progress, or increase the level of protection to Level B health and safety requirements, which would include the use of positive pressure self contained breathing apparatus. The final decision to modify will be made on a case by case basis. NYSDEC will be advised of any necessary changes.

4.5.3 Building Tenant Plan

Since it is understood that the Dollinger Building may be occupied during the site work, it is necessary to include notification measures for changes in air quality due to work conducted inside the building. The site owner and site tenant representative will be notified if work is upgraded to Level C or B. The site tenant will be notified when VES maintenance that has a potential to result in a vapor, or water release is being done.

4.5.4 Community Air Monitoring Plan

In addition to the continuous monitoring performed at the work zone during all intrusive site work, real-time air monitoring for volatile organic compounds will also be conducted at the downwind site perimeter (Exclusion Zone as described in Section 4-07), daily at a minimum of (2) hour intervals during excavation activities. If total organic vapor concentrations in the breathing zone, attributable to excavation or drilling activities conducted at the Dollinger site, exceed 5 ppm above background, work activity must be halted and monitoring continued under the provision of the Vapor Emissions Response Plan. If the sustained organic vapor concentrations in the breathing zone levels equal or exceed 5 ppm at the site perimeter or in the rest of the site building, work activities will be halted and air samples taken to determine the chemical species present. The air samples will be analyzed with the H&A gas chromatograph. Work activities at the site will proceed only after the following conditions are met:

- Sustained organic vapor levels fall below 5 ppm at the site perimeter, or
- More frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

If organic vapor concentrations are above 25 ppm at the perimeter of the Exclusion Zone and are attributable to the borehole, excavation or other site work, work activities must shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure the vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the major vapor emission section below.

Major Vapor Emission

If any organic concentrations greater than 5 ppm over background, attributed directly to excavation or drilling activities conducted at the Dollinger site, are identified 200 feet downwind from the survey site, half the distance to the nearest residential or commercial property, or in the remainder of the site building as measured adjacent to the degreaser room, all excavation must be halted.

Efforts shall be undertaken to abate the breathing zone vapor concentrations such as capping the borehole or backfilling the excavation.

If, following the cessation of the excavation activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind, half the distance to the nearest residential or commercial property from the Exclusion Zone or in the remainder of the site building, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone) or in the building immediately adjacent to the former degreaser room.

The Major Vapor Emissions Response Plan will be automatically placed into effect if organic vapor concentrations, attributed to excavation or drilling activities conducted at the Dollinger site, exceed 10 ppm in the 20 foot zone for more than 30 minutes.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

a. The local police authorities, the MCHD, and NYSDEC will immediately be contacted by the Safety Officer and advised of the situation.

b. Frequent air monitoring will be conducted at 30 minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

c. Site personnel will assist local police authorities as necessary to identify wind direction and potentially affected areas that may require excavation.

4-06. ASSIGNMENT OF RESPONSIBILITIES

To coordinate the health and safety aspects of the project, the following individuals are necessary:

- H&A Project Manager

  The H&A Project Manager (Suzanne B. Wheatcraft - (716) 232-7386, alternate - Vincent B. Dick) is responsible for project management and communicating site requirements to H&A personnel, contacting the appropriate medical, fire and emergency personnel, and coordinating with contractors.

- Contractor Site Coordinator

  The Site Coordinator (Timothy Crowl - H&A (716) 232-7386, alternate - Suzanne B. Wheatcraft) will be responsible for the day to day implementation of the Health and Safety Plan during the various field activities. The responsibilities of the Site Coordinator will include:

  Observe that the appropriate personnel protective equipment and monitoring equipment is available and is properly utilized.

  Monitor the safety performance of all field personnel.

  Bring any observed work practices or conditions that may result in injury or exposure to hazardous substances to the attention of workers and the H&A Project Manager, and (if applicable) the contractor's project manager. This does not relieve contractors of their responsibility for health and safety of contractors' personnel.

  Prepare and submit accident/incident reports.

- Health & Safetv Representatives

  Each contractor working on site will be required to identify a Health & Safety Representative who will be responsible for preparation and oversight of each company's respective Health & Safety plan.

- Field Personnel

  The personnel needed to perform the activities outlined above will be briefed on the anticipated hazards and trained on available respirator equipment, safety practices, emergency procedures and communication pathways. Training will be accomplished in a health and safety briefing prior to starting site work and attendance will be required for all personnel.

4-07. WORK AREAS

Work areas for the above outlined activities shall include a minimum *50* ft. radius around drilling and soil sampling operations (Exclusion Zone). All workers and personnel within the *50* ft. work area radius shall be required to comply with site health and safety procedures. The work areas associated with the soil vapor sampling, water quality sampling and hydrogeologic testing activities shall include a minimum *25* ft. radius of the site activity.

Access to the site is controlled by the site owner, Wilray. Access to all work areas within the site shall be controlled by the Contractor Coordinator. When respirator use is required in a work area, access shall be restricted by means of barricades or fencing. Any excavation or drilling rig activity shall be barricaded during periods of non-activity. Regardless of organic vapor concentrations, OSHA regulations governing excavations and other aspects of construction shall be observed. Continuous air monitoring will be conducted within a *20* foot zone.

4-08. PERSONNEL DECONTAMINATION

Personnel decontamination activities will be conducted during all site activities to reduce the potential for contamination of personnel and/or transmission of contaminants off site.

Disposable personal protective clothing such as tyvex suits, outer gloves or other material used on the site that has come in contact with hazardous materials at the site shall be placed in 55-gallon drums and disposed of as a hazardous waste.

If respirators are required during site activities, the organic vapor cartridges shall be replaced after each day's operations, or more frequently, if needed. The cartridges shall be disposed as previously described.

4-09. EQUIPMENT DECONTAMINATION PROCEDURES

A project decontamination area will be located on the east side of the Dollinger building as approved by the site owner and/or tenant.

All drilling rigs and backhoes which will come in contact with contaminated soil or ground water shall be required to be steam cleaned prior to arriving at the site. Prior to leaving the site and between exploration locations, the steam cleaning shall be conducted in the decontamination area.

Hollow stem augers will be cleaned with steam between each exploration. All split spoons and soil sampling equipment which will come in contact with contaminated soil or groundwater shall be decontaminated between each exploration location by the following sequence of cleaning solutions: alconox detergent wash, and tap water rinse. In addition, all soil sampling equipment shall be decontaminated between each soil sample with the same sequence of cleaning solutions.

All equipment decontamination rinses will be collected and drummed for appropriate disposal.

4-10. MEDICALEMERGENCYPLAN

During site activities, unpredictable events such as physical injury, chemical exposure, fire or explosions may occur. The emergency plan is described in order to provide prompt responses to emergency situations. The emergency plan provides information concerning Dollinger site phone and first aid locations, emergency contacts, a map of the site area showing access routes for ambulance response and contacts for medical and fire emergencies.

4.10.1 Personnel Injury

In case of personnel injury at the site the following procedures shall be followed:

Field team members trained in first aid should administer care to the injured worker.

Dial **911** (Ambulance) for emergency assistance.

Injured personnel should be transported to the nearest medical center (Strong Memorial Hospital) as directed by the Site Coordinator.

The Site Coordinator will assist the H&A Project Manager in preparation and submittal of an Accident Report.

4.10.2 First Aid and Emergency Fire Equipment

First aid kits are maintained in H&A of New York field vans and on the drilling rigs. Emergency fire equipment is maintained on the drilling rigs and will be available at the majority of site excavations.

4.10.3 Chemical Exposure

If a member of the field crew is exposed to chemicals, the procedure outlined below should be followed:

Another team member, outfitted in upgraded protection, should remove the individual from the immediate area of contamination.

Precautions should be taken to avoid exposure of other workers to the chemical.

If the chemical is on the individual's clothing, the clothing should be removed if it is safe to do so.

If the chemical has contacted the skin, the skin should be washed with copious amounts of water, preferably under a shower. In case of eye contact, emergency eye wash should be used. Eyes should be washed for at least 15 minutes. Skin wash and emergency eye wash can be made available by transporting the injured personnel to the Dollinger building.

If necessary, the victim should be transported to the nearest hospital or medical center (Strong Memorial Hospital). If necessary, an ambulance should be called to transport the victim.

All chemical exposure incidents will be reported in writing by the On-Site Coordinator. The Contractor Coordinator shall assist the H&A Project Manager in completing an Accident Report for all chemical exposure incidents that occur.

4.10.4 Weather Related Conditions

Since the site activity may be conducted during the winter and summer months, precautions should be taken by the workers to prevent frostbite and heatstroke.

Frostbite

Frostbite can be categorized into:

Frostnip or incipient frostbite characterized by sudden blanching or whitening of the skin.

- Superficial frostbite - skin has a waxy or white appearance is firm to the touch but tissue beneath is resilient.

  Deep frostbite - tissues are cold and hard indicating an extremely serious injury.

First aid for frostbite will include bringing the victim indoors and rewarming affected areas quickly with warm (not hot) water according to first aid procedures. Medical help should be called immediately.

Frostbite can be prevented by the use of insulated gloves, socks and other protective clothing. All protective clothing should be chosen so that it is compatible with the chemical resistant clothing required for certain site activities.

Heatstroke

Heatstroke is characterized by:

Reduction in perspiration and clammy skin.

Disorientation and/or incoherence.

Heatstroke can be treated by removing the affected individual to a shaded area and removing protective clothing. For extreme heat stroke, the individual's body temperature should be lowered artificially with ice packs and/or cold water applied in accordance with standard first aid practices.

4-11. FIRSTAIDANDDECONTAMINATION

There is a possibility that decontamination procedures may interfere with medical treatment or cause more serious health effects in an emergency situation. If prompt lifesaving first aid and medical treatment is required, decontamination procedures may be modified by the onsite health and safety representative on a case by case basis. All emergency and response personnel will be advised of the contamination/ decontamination status. If emergency site evacuation is required for health and safety reasons, decontamination of personnel protective clothing and equipment may be delayed until it is safe to do so.

4-12. HEALTH AND SAFETY TRAINING

All personnel involved in site activities shall be required to have been trained and met the minimum Health & Safety requirements established by OSHA for hazardous waste site work. In addition, all field personnel should participate in a Medical Monitoring Program including, at a minimum:

- Medical and Occupation History Form
- Physical examination
- Blood analysis
- Urine analysis
- Chest X-ray
- Pulmonary function test
- Audiogram

In addition to the health and safety training and medical monitoring programs, at least one individual on site during a site activity shall have completed and be currently certified in Multimedia First Aid and Cardiopulmonary Resuscitation.

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HEALTH & SAFETY PLAN
TABLE 1

EXPOSURE LIMITS AND RECOGNITION QUALITIES

Compound	OSHA Permissible Exposure Limit (ppm)	ACGIH TWATLV	IDLH (ppm)	Odor	Odor Warning Concentration (ppm)	LEL,	UEL	Ionization Potential (ev)	Maximum Concentration Identified	
									Groundwater (ppm)	Soil (ppm)
Benzene	1	10	Cn	Aromatic	82	1.3	7.1	9.25	0.0006	0.47
Carbon Tetrachloride	2	5	Cn	Ether	340	NC	NC	---	---	1.03
Chloroform	2	10	Ca	Sweet	50-307 fatigue (<4096)	NC	NC	11.42	0.0006	2.5
Chloromethane	50	50	Ca	Sweet	10-maybe	7.6	19	---	---	---
1,2-Dichloroethene (1,2-DCE)	200	200	4000	Ether	0.085-500	9.7	12.8	9.65	11.0	40.6
Ethylbenzene	100	100	2000	Ether	0.09-0.6	1.0	6.7	8.76	---	8.1
Methylene Chloride	500	50	5000 (Ca)	Chloroform	160	1.2	19	11.35	0.011	0.23
Tetrachloroethene	25	50	500 (Cn)	Sweet	---	---	---	9.32	0.008	0.25
Toluene	100	100	2000	Aromatic	40	0.9	9.5	8.82	0.012	303.0
1,1,1-Trichloroethane	350	350	1000	Sweet	390	7	16	10.2	0.16	1.1
Trichloroethylene (TCE)	50	50	1000	Sweet	21.4-400	11	41	9.47	50.0	291.0
Vinyl Chloride	1 5(15 min. Ceil)	5	Ca	Sweet	260	3.6	33	9.995	0.16	0.48
Xylene	100	100	1000	Aromatic	0.4-20	1	6	8.44	---	451.0

HEALTH & SAFETY

TABLE 2

ACUTE AND CHRONIC EFFECTS
AND FIRST AID TREATMENT

Compound	Routes of Entry	Eye Irritant	Acute Effects	Chronic Effects
Benzene	Con, Ing, Inh	Yes	Dizzy, weak, Euphoria, headache, nausea/vomit, skin irritation, tight chest	Loss of appetite, drowsy, nervous, pallor, anemia, petechiae leukemia, abdominal bleeding
Carbon Tetrachloride	Con, Ing, Inh	Yes	Headache, Intox, narcotic, liver/kidney damage, skin damage	Anemia, blurred vision, tremors, liver damage, potential carcinogen
Chloroform	Con, Ing, Inh	Yes	Dizziness, mental dullness, nausea, headache, fatigue	Liver, kidneys, heart, eyes, skin
Chloromethane	Con, Ing, Inh	Yes	Dizzy, vomit abdominal pain, convulsions, unconsciousness, liver/kidney/blood damage	Dizzy, headache, mental confusion, blurred vision, narcotic
1,2-DCE	Con, Ing, Inh	Yes	Irritates respiratory system, CNS depression	CNS, respiratory system, eyes
Ethylbenzene	Con, Ing, Inh	Yes	Weak, dizzy, drowsy, narcotic	Skin rash, inflammation
Methylene Chloride	Con, Ing, Inh	Yes	Mental confusion, nausea/vomit, headache, stagger, heart palpitation	Skin irritation, potential carcinogen
1,1,1-Trichloroethene	Con, Ing, Inh	Yes	Irritation of eyes, skin, mucous membranes, incoordination, nausea, confusion, loss of consciousness	Dermatitis, liver/kidney damage
TCE	Con, Ing, Inh	Yes	Headache, vertigo, tremors, nausea, vomiting	CNS, respiratory system, heart, liver, kidneys, potential human carcinogen
Tetrachloroethene	Con, Ing, Inh	Yes	Headache, drowsiness, incoordination, unconscious, irritation of eyes, nose, throat, flushing of face, neck	Dermatitis, liver, kidney damage, CNS effects
Toluene	Con, Ing, Inh	Yes	Fatigue, weak, vision disturb, anemia, narcotic	Dry/cracking skin, fatty degeneration of heart, liver, anemia
Vinyl chloride	Inh	No	Weak, abdominal pain, GI bleeding	CNS, liver, blood, respiratory system
Xylene	Con, Ing, Inh	Yes	Dizzy, headache, cough, nausea/vomit, abdominal cramps	Possible liver/kidney damage pulmonary congestion

Explanation

Con - Skin Contact
Ing - Ingestion
Inh - Inhalation
CNS - Central Nervous System

General First Aid Treatment (a first-aid kit will be kept in the site vehicle).

Eye	Irrigate immediately (a portable eye-wash unit will be kept in the site vehicle.)
Skin	Soap wash promptly.
Inhalation	Move to fresh air.
Ingestion	Get medical attention.

HEALTH & SAFETY PLAN
TABLE 2A

EXPOSURE LIMITS, RECOGNITION QUALITIES,
AND HEALTH EFFECTS OF SITE METALS

Metal	OSHA Permissible Exposure Limit (mg/m^3)	ACGIH TWA/TLV	IDLH	Maximum Concentration Identified in Sediment (ppm)	Route of Entry	Eye Irritant	Acute Effects	Chronic Effects
Aresenic	0.01	0.002	100	12.0	INH, ARS, CON, INC	Yes	Ulceration of nasal septum, dermatitis, gastro-intestinal disturbances, respiratory irritant, hyperpignientation of skin.	Lymphatic system, liver, kidneys, skin, and lung daniage.
Chromium	1.0	NA	NE	70.0	INH. INC	Yes	Histologic fibrosis of lungs.	Respiratory systeni damage.
Copper	1.0	NA	NE	174.0	INH, ING, CON	Yes	Irritant to the nasal membranes, pharynx and nasal perforation, eye irritant, dermititis.	Respiratory system, skin, liver, and kidney damage.
lead	0.05	0.1	700	137.0	INH, ING, CON	Yes	Weakness, insomnia, racial pallor, malnutrition, constipation, colic, abdominal pain, anemia, hypotension, irritated cycs, cncephalopathy, nephropathy.	Gastiointestinal tract, central nervous system, kidneys, blood, and gingival tissue damage.
Nickel	1.0	0.015	NE	93.0	ING, ING	Yes	Vertigo, headache, nausea, vomiting, epigastric pain, substernal pain, cough, weakness, convulsions.	Central nervous system, lungs, and paranasal sinus damage.
Zinc	5.0	NA	NE	2890.0	INH	Yes	Dry throat, cough, chills, fever, tight chest, reduced pulmonary function, headache, blurred vision, muscle cramps. low hack pain, nausea, vomiting, fatigue.	Respiratory system daniage.

Explanation

Con - Skin and/or eye contact
Ing - Ingestion
Inh - Inhalation
ABS - Skin absorption
CNS - Central Nervous System
NA - Not Available
NE - Not Established

General First Aid Treatment

Eye	Irrigate immediately
Skin	Soap wash promptly
Inhalation	Move to fresh air
Ingestion	Get medical attention

All of the metals listed are odorless solids that are not explosive (LEL and UEL values do nto apply) and not ionized by detection equipmenent (no ionization potential).

HEALTH & SAFETY PLAN
TABLE 3

MONITORING METHOD, ACTION LEVELS AND PROTECTIVE MEASURES

Type of Instrument	Type of Hazard	Action Response Level[1]	Action Response
Respirable Dust Monitor	Contaminated Particulates	>.05 mg/m^3	Upgrade to Level C protection immediately or evacuate site
OVA Hnu Photoionizer[2]	Organic Vapors/Gases	Background	Level D
		3 ppm over background or the lowest recorded OSHA permissible exposure limit, whichever is lower	Upgrade to Level C protection immediately or evacuate site.
		50 ppm over background unless lower values are dictated by respirator protection factors	Upgrade from Level C to Level B protection immediately'')
Combustible Gas Indicator[4]	Explosive Atmosphere	10% scale reading	Proceed with work.
		10-15% scale reading	Monitor with extreme caution.
		Greater than 15% scale reading	Evacuate from work zone immediately.
Oxygen Meter[5]	Oxygen Deficient Atmosphere	19.5% O_2 by volume	Monitor with caution.
		19.5-25% O_2 by volume	Continue investigation with caution.
		Less than 19.5% O_2	Terminate work O_2 deficient atmosphere.
		Greater than 25% O_2 by volume	Terminate work; fire hazard.

Type of Instrument	Type of Hazard	Action Response Level[1]	Action Response
Radiation Survey Meter [6]	Ionizing Radiation	0.1 mR/hr. 1 mR/hr. or greater	If radiation is detected above this level, radiation sources may be present [7]. Potential radiation hazard; evacuate site immediately.
Colormetric Tubes	Organic and Inorganic Vapors/Gases especially vinyl chloride	Depends on species	Consult standard reference manuals for air concentration/toxicity data. Use Draeger tubes to distinguish vinyl chloride if organic vapors detected in breathing zone.
Tedlar Bag-Chromatograph Analysis	Compound Specific	3 ppm over background or the lowest recorded OSHA permissible exposure limit, whichever is lower	If VC suspected use tedlar bag to obtain air sample analyze for VC in lab.

Notes:

1. Monitored in breathing zone.
2. Some inorganic species can also be ionized with this analyzer.
3. Positive pressure demand self-contained breathing units are required (+SCBA).
4. LEL - Lower explosive limit where the (scale) range is 0-100%. The LEL for most gases is between 1-15%.
5. 0, - Normal atmospheric oxygen concentration at sea level is approximately 20% oxygen by volume.
6. mR/hr. - Milliroentgen per hour where normal background gamma radiation is approximately 0.01-0.02 mR/hr.
7. Contact H&A Health & Safety Staff immediately.

HEALTH & SAFETY PLAN
TABLE 4

AMERICAN FILTRONA CORPORATION - DOLLINGER SITE
HEALTH AND SAFETY PLAN
COMMUNITY AIR MONITORING PLAN SUMMARY

	Condition	Response
o	5 ppm or greater at site perimeter (attributed to Dollinger boring, well installation or excavation)	- halt work, notify Health and Safety officer - take air sample, analyze with GC - resume work if levels fall below 5 ppm and compounds identified fall below TLV's - increased perimeter monitoring to be initiated - monitoring will be initiated 200 feet downwind from the survey site or half the distance to the nearest downwind residential/commercial property
o	5 ppm or greater 200 feet downwind of work site, or half the distance to the nearest residential/commercial property (attributed to Dollinger site boring, well installation or excavation).	- all drilling/excavation to halt - if levels persist above 5 ppm air quality must be monitored within 20 feet of nearest downwind Residential/Commercial Structure. (20 foot zone) - take air sample, analyze with GC.
o	5 ppm for 30 minutes or exceeding 10 ppm, measured at the 20 foot zone. (attributed to Dollinger site boring, well installation or excavation).	- initiate Major Vapor Emission Plan. - Health and Safety Officer to contact local police - Monitor 20 foot zone at 30 minute intervals or less. - take air sample, analyze with portable GC.
o	2 successive monitoring readings (20 foot zone) below 5 ppm	- initiate reduced air monitoring as per Health and Safety Officer.

HEALTH & SAFETY PLAN
TABLE 5

EMERGENCY PHONE NUMBERS

Monroe County Emergency Services	
Ambulance Service	911
Fire Department	911
Police Department	911
H&A of New York Project Manager Suzanne Wheatcraft	232-7386
H&A of New York Health & Safety Representative Margaret Bonn	232-7386
New York State Department of Environmental Conservation David Crosby, Project Manager	(518) 457-3373
Town of Brighton Engineer Tim Keef	473-8800
Hospital - Strong Memorial Hospital 601 Elmwood Avenue Rochester, New York Emergency Room	275-4551
Monroe County Health Department Richard Elliott	274-6904
New York State Department of Health David Napier	(716) 423-8071
Poison Control	275-5151
New York State Department of Environmental Conservation - Region 8	226-2466

NAME _____ DATE _____

EMPLOYER _____

ACKNOWLEDGMENT

TO BE SIGNED AND RETURNED TO

H&A OF NEW YORK SITE SAFETY OFFICER

I have received and carefully read the Site Health and Safety Plan. I agree to abide by these safety rules, regulations, and guidelines while working on the site, and understand that any violation of these rules will result in my removal from the facility.

I have completed and understand the training program and have checked below those subjects addressed during the course of site specific training.

- o Work Rules and Safety Requirements
- o Personal Protective Equipment (PPE)
- o Potentially Hazardous Chemicals
- o Emergency Equipment
- o Reporting of Injuries and Illnesses
- o Emergency Procedures
- o Job Assignment
- o Personal Hygiene
- o Motor Vehicle Equipment
- o Standard Operating Procedures

I further affirm that at a minimum, a respirator qualitative fit test has been performed and a respirator of the same type has been assigned for my use.

Signature _____

Print Name _____

This individual has received training in all aspects of this Health and Safety Plan and has indicated he/she is knowledgeable in the use and care of personal protective equipment.

SAFETY OFFICER

Signature _____ Date _____

Print Name _____

ROUTE TO STRONG HOSPITAL

- From Townline Circle turn Right onto Brighton-Henrietta Townline Road
- At traffice light turn right onto Route 15 (West Henrietta Road)
- Turn left onto Crittendon, go approximately two blocks
- The hospital and emergency room entrance will be on your right.