ARCADIS

Infrastructure · Water · Environment · Buildings

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ENVIRONMENT

Mr. David Szymanski
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203

Subject:
2013 - 2014 Site Management- Periodic Review Report, DC Rollforms Site, Jamestown, New York (Site No. 907019)

Date:
July 31, 2014

Contact:
Marc W. Sanford
Todd M. Carignan

Phone:
518.250.7300

Email:
marc.sanford@arcadis-us.com
todd.carignan@arcadis-us.com

Our ref:
AY000219.0020

Dear Mr. Szymanski:

On behalf of Ingersoll Rand Company, ARCADIS is submitting this cover letter and accompanying attachments to satisfy the request for the Annual Site Management-Periodic Review Report for DC Rollforms Site, covering the reporting period from June 15, 2013 through June 15, 2014, as requested by NYSDEC in a May 13, 2014 letter to Ingersoll Rand Company.

The following documents have been provided to satisfy the requirements of the Site Management- Periodic Review Report Enclosures 1 and 2:

1. NYSDEC Site Management Periodic Review Report Notice, Institutional Controls and Engineering Controls Certification Form

2. 2013 Annual Monitoring Report, which covers the entire 2013 reporting period.

The First Quarter 2014 Status Report for Remedial Action covering the reporting period of January 1, 2014 through March 31, 2014 has been submitted previously under separate cover.

The Second Quarter 2014 Status Report for Remedial Action covering the reporting period from April 1, 2014 through June 30, 2014 will be submitted under separate cover upon receipt of the final laboratory analytical reports.

If there are any questions or comments regarding this status report, please do not hesitate to contact us.

Sincerely,

ARCADIS of New York, Inc.

T. Carignan

Todd Carignan
Project Engineer

Imagine the result

Marc W. Sanford
Principal Scientist

Moh Mohiuddin, Ph.D., P.E., BCEE
Principal Engineer - Engineer of Record

Attachments:

1. NYSDEC Site Management Periodic Review Report Notice, Institutional Controls and Engineering Controls Certification Form
2. 2013 Annual Monitoring Report

Copies:
Mike Goldstein, Ingersoll Rand
Scarlett Messier, NYSDOH
Jaspal Walia, NYSDEC
File

Attachment 1

Enclosure 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. **907019**

Site Name D.C. (Dow Craft) Rollforms

Site Address: 583 Allen Street Zip Code: 14701
City/Town: Jamestown
County: Chautauqua
Site Acreage: 2.4

Reporting Period: June 15, 2013 to June 15, 2014

		YES	NO
1.	Is the information above correct? If NO, include handwritten above or on a separate sheet.	X	☐
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	X
3.	Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	X
4.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	X

If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.

		YES	NO
5.	Is the site currently undergoing development?	☐	X

Box 2

		YES	NO
6.	Is the current site use consistent with the use(s) listed below? Commercial and Industrial	X	☐
7.	Are all ICs/ECs in place and functioning as designed?	X	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

____ ____________________
Signature of Owner, Remedial Party or Designated Representative Date

SITE NO. 907019 **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
307-13-2.2	Jamestown Allenco, Inc.	Site Management Plan Landuse Restriction Ground Water Use Restriction Soil Management Plan

Deed Restrictions (7/19/2005) Recorded - 11/29/2005:
1. Property use: Commercial or Industrial
2. Prohibition of use of groundwater.

Site Management Plan:Soils Management Plan and Inspections of Cover System, Rip Rap, Plantings, and Erosion.
Vacuum Enhanced
Groundwater Collection and Treatment System Operation, Maintenance, and Monitoring.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
307-13-2.2	Groundwater Containment Subsurface Barriers Groundwater Treatment System Soil Vapor Extraction System

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
X	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
X	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative _______________ Date _______________

IC CERTIFICATIONS
SITE NO. 907019

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Marc W. Sanford at 855 Route 146, Suite 210, Clifton Park, NY 12065,
print name / print business address

am certifying as ARCADIS of New York, Inc. (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

Marc W. Sanford

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

7/24/14

Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Moh Mohiuddin at Raritan Center, Plaza III, 105 Crest Field Avenue, Suite 203, Edison, NJ 08837,

print name — print business address

am certifying as a Professional Engineer for the ARCADIS of New York, Inc.

(Owner or Remedial Party)

STATE OF NEW YORK
MOH MOHIUDDIN
074527
LICENSED PROFESSIONAL ENGINEER

Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification

Stamp (Required for PE)

07/14/2014

Date

ARCADIS

Attachment 2

Imagine the result

2013 Annual Monitoring Report

D.C. Rollforms Site
Jamestown, New York
NYSDEC Site No. 907019

July 2014

2013 Annual Monitoring Report

D.C. Rollforms Site,
Jamestown, New York
NYSDEC Site No. 907019

Todd Carignan
Project Engineer

Marc W. Sanford
Principal Scientist

Moh Mohiuddin, Ph.D., P.E., BCEE
Principal Engineer-Engineer of Record
NY PE License #074527

Prepared for:
Ingersoll Rand Company

Prepared by:
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Tel 518 250 7300
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Our Ref.:
AY000219.0020

Date:
July 30, 2014

Tables

Figures

Appendices

Acronyms

AC - air compressor

acfm - actual cubic feet per minute

AGC - Annual Guidance Concentration

AS - air stripper

B - blower

BPU - Board of Public Utilities

CF - cartridge filters

COC - Constituents of Concern

DCE - Dichloroethene

DNAPL - Dense Non-aqueous Phase Liquid

DRO - Diesel Range Organics

FSP - Field Sampling Plan

gpm - gallons per minute

GRO - Gasoline Range Organics

In W.C. - Inches of Water Column

kg - kilograms

LPGOC - Liquid Phase Granular Organically Modified Clay

PLC - Programmable Logic Controller

MW - monitoring well

NAPL - Non-Aqueous Phase Liquid

ND - non-detect

NYSDEC - New York State Department of Environmental Conservation

O&G - Oil and Grease

O&M - Operation and Maintenance

OM&M - Operation, Maintenance and Monitoring

OW - observation well

OWS - oil/water separator

PCBs - polychlorinated Biphenyls

PLC - programmable logic controller

POTW - Publicly Owned Treatment Works

SMP - Site Management Plan

SP - sample port

SVE - soil vapor extraction

TCE - Trichloroethene

TP - transfer pump

TPH - Total Petroleum Hydrocarbons

TSS - Total Suspended Solids

µg/L - micrograms per liter

mg/L - milligrams per liter

USEPA - United States Environmental Protection Agency

VC - Vinyl Chloride

VEP - Vacuum Enhanced Pumping

VOCs - Volatile Organic Compounds

VPGAC - vapor phase granular activated carbon

1. Introduction

ARCADIS of New York, Inc. (ARCADIS), on behalf of the Ingersoll Rand Company, has prepared this 2013 Annual Monitoring Report for the former D.C. Rollforms Site (referred to hereafter as the Site) located in Jamestown, Chautauqua County, New York (Figure 1). The work was performed in accordance with the New York State Department of Environmental Conservation (NYSDEC) approved Groundwater Collection and Treatment System Operation, Maintenance, and Monitoring Plan (OM&M Plan; ARCADIS 2008), and Site Management Plan (SMP; ARCADIS 2008). This 2013 Annual Monitoring Report covers the period from January 1, 2013 through December 31, 2013.

The groundwater collection and treatment system (referred to herein as the ‘system’) consists of a vacuum enhanced pumping (VEP) system for the collection of constituents of concern (COC). A description of the treatment system is provided below in Section 3. The system was designed and constructed to recover and treat chlorinated volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and non-aqueous phase liquid (NAPL) present in the subsurface at the Site. The main COCs at the Site are trichloroethene (TCE), cis-1,2-dichloroethene (DCE), and vinyl chloride (VC).

This report summarizes the overall remedial system performance and documents inspections and Site activities related to the SMP. Extracted volumes of groundwater and vapor, contaminant mass removal estimates, and system performance data and evaluation are presented. The report also provides an outlook on the 2014 operating period and any recommendations for modification to the system operation and/or monitoring programs (if necessary) in order to achieve the remedial objectives of the site.

2. Background

2.1 Site Location and Description

The Site is located at 583 Allen Street in Jamestown, Chautauqua County, New York (Figure 1). The Site is approximately 2.38 acres in size, and is a vacant parcel. The vacant parcel is owned by Jamestown Allenco, LLC. and is bounded by Allen Street on the east, the Weber Knapp and Jamestown Urban Renewal Agency properties on the south, and the Chadakoin River on the west and northwest. The adjacent north parcel is owned by Heavy Press and Tool, Inc. This parcel contains a two-story building and parking lot (Figure 2). The Site is located in a mixed residential and commercial area, which is served by a public water supply and sanitary sewer. The Site was listed in the registry of Inactive Hazardous Waste Disposal Sites in New York State in 1994. The Site is currently classified as Class 4 under the NYSDEC Inactive Hazardous Waste Site program, which indicates a site that has been properly remediated and will require continued management.

2.2 Summary of Remedial System Components

The approved remedy for the Site was document the NYSDEC approved *100% Remedial Design Work Plan* (ARCADIS, 2006). The final remedy for this Site was documented in the *Engineering Construction Completion Report* (ARCADIS, 2009), which documented the remedial construction activities which were initiated in September 2006 and completed in June 2008. The final remedy implemented for the D.C. Rollforms Site includes the following elements:

- Installation of a steel interlocking sheet-pile wall (i.e., vertical barrier wall) at the top of the riverbank between the Chadakoin River and the Site;

- Vacuum Enhanced Pumping technology utilizing submersible pneumatic pumps and a regenerative blower to remediate NAPL and VOCs in groundwater and soil;

- Groundwater and soil vapor treatment system comprised an oil/water separator, solids filtration units, carbon filtration, and air stripping technologies;

- Excavation of the soil between the vertical barrier wall and Chadakoin River;

- Removal of abandoned Site storm water outfalls;

- Riverbank reconstruction/stabilization and restoration including live plantings;

- Covering and reseeding disturbed areas with 12-inches of clean soil;

- The removal of sediment from the Chadakoin River; and

- Fish habitat construction (e.g., wingwall structure) in the Chadakoin River.

The remedial system layout is shown on the site plan in Figure 2. The groundwater collection system is designed to extract groundwater impacted by NAPL and VOCs consisting primarily of TCE, total DCE, and VC. The extracted groundwater is treated via an oil/water separator (OWS), filtration, and air stripping prior to discharge to the publically owned treatment works (POTW) sanitary sewer under an Industrial Waste Water Discharge permit with the Jamestown Board of Public Utilities (BPU).

2.3 Engineering Controls

As part of the remedy as noted above in Section 2.2, engineering controls implemented and maintained at the D.C. Rollforms Site include:

- Installation of a steel interlocking sheet-pile wall (i.e., vertical barrier wall) at the top of the riverbank between the Chadakoin River and the Site;

- Vacuum Enhanced Pumping technology utilizing submersible pneumatic pumps and a regenerative blower to remediate NAPL and VOCs in groundwater and soil; and

- Groundwater and soil vapor treatment system comprised an oil/water separator, solids filtration units, carbon filtration, and air stripping technologies.

2.4 Institutional Controls

Institutional controls have been implemented as part of the Remedial Action. The Declaration of Covenants and Restrictions dated June 2005 by Jamestown Allenco addresses prohibitions on the property. The prohibitions set forth in the declaration are summarized as follows:

- The property is prohibited from ever being used for purposes other than commercial or industrial;

- The use of groundwater underlying the property is prohibited without rendering it safe for drinking water or industrial/commercial purposes; and

- The owner of the property shall continue to not interfere with any institutional and engineering controls the NYSDEC required Ingersoll Rand to put into place and maintain.

The covenants and restrictions run with the land and are binding upon all future owners of the property.

3. System Operation Overview

The general layout (e.g., wells, piping, and treatment building) of the remedial system is shown on Figure 2. The remedial system includes fourteen (14) vacuum enhanced pumping wells (VEP-1 through VEP-14).

3.1 Liquid Phase

Groundwater and NAPL from the VEP wells is extracted by total fluids pneumatic pumps conveyed via below grade in individual 1-inch diameter piping to an onsite treatment building. The groundwater and NAPL is then pumped into a common manifold inside the treatment building. The groundwater and NAPL is then conveyed into the OWS (OWS-200) for removal of NAPL. As noted in previous reports, recovery wells VEP-11, VEP-13, and VEP-14 are piped directly to the OWS. A sequestering agent (Aries 2925) is injected into the process stream on the inlet side of the OWS to prevent iron and manganese-related fouling downstream in the system (e.g., OWS, process piping, cartridge filters and air stripper).

Once the groundwater is pre-treated by OWS-200, the water flows by gravity to a storage tank (ST-300). The water is then transferred in batch mode by transfer pump TP-300 through cartridge filters (CF-400 and CF-401) for the removal of residual suspended solids. Following the cartridge filters the treatment process is equipped with a 400-pound (lb) liquid phase granular organically modified clay (LPGOC) filter vessel (ACF-400) for the treatment and removal of residual emulsified NAPL in the liquid phase process stream. As noted in previous reports, the LPGOC vessel has been bypassed since shortly after startup due to the efficiency of the OWS. However, if warranted, the LPGOC treatment process will be brought back online.

Following filtration through the cartridge filters, groundwater is pumped through a low-profile air stripper (AS-700) for the removal of dissolved phase organic compounds. Influent water enters at the top of the air stripper and flows downward by gravity through four aeration trays. A countercurrent of air is blown up through $^{3}/_{16}$-in.-diameter holes in the aeration trays to create bubbles in the water, generating a large mass-transfer surface area from which the VOCs are volatilized. VOCs are stripped from the water and discharged to the atmosphere through an 8-inch diameter stack. The treated water flows into a sump at the bottom of the air stripper and is then discharged via transfer pump TP-700 from the air stripper to local Jamestown BPU sanitary sewer manhole 3T6 located on Allen Street, through a 2-inch force main pipe located below grade (Figure 2).

3.2 Vapor Phase

Soil vapors are extracted from each VEP well and surrounding soil matrix, via vacuum generated by a regenerative blower (B-900). The soil vapors are conveyed from each well by 2-inch diameter piping which is then tied into a common 4-inch diameter header located below grade. Upon entering the treatment building the soil vapors passes through a liquid knockout tank (KT-900) which is designed to remove/collect any groundwater or condensate that may be extracted from the subsurface. Following treatment through the knockout tank the soil vapor passes through a heat exchanger (HX-500) in order to reduce the temperature of the soil vapor stream discharged by the blower, thus maintaining the temperature of the soil vapor stream within the acceptable temperature limits of the vapor phase granular activated carbon (VPGAC). The recovered soil vapor is treated via two (2) 2,000-lb VPGAC vessels (ASC-501 and ASC-502) arranged in series. The VPGAC is used to remove VOCs from the soil vapor stream prior to being discharged to the atmosphere.

3.3 Controls and Monitoring

The system is designed to allow monitoring of the operational status of critical systems on a continual basis during operation and is equipped with a programmable logic controller (PLC). System motors (e.g., air compressor, blowers, etc.) and sensors (e.g., transmitters, switches, etc.) are interlocked with the PLC. Each of the major pieces of equipment and/or sensors are programmed via the PLC to automatically shutdown the system in the event the system malfunctions or a component failure occurs. An automated system shutdown prevents the discharge of untreated groundwater or soil vapor and also protects the health and safety of system operators, should they be onsite during a system failure. Additionally, the PLC is programmed with several non-critical alarm interlocks which notify system operators that routine maintenance needs to be completed (e.g., sequestering agent drum replacement, cartridge filter change-out, etc.) or if the system is shutdown. The process and instrumentation diagrams and equipment layout record drawings are included in Appendix A.

3.4 Riverbank and Cover System Inspections

As outlined in the SMP, the following remedial design elements were constructed at the Site.

- Soil cover of 12 inches in areas disturbed during construction;
- Riverbank reconstruction including stabilization/erosion controls;
- Wingwall structure; and
- Riverbank plantings.

Each of these areas is inspected in accordance with the schedule below:

Frequency	Responsible Person	Actions
Quarterly	Project Engineer	Inspections
Annual	Professional Engineer	Certification

The cover system, riverbank, and wingwall structure were inspected for erosion, sloughing, settlement or other indication of loss of integrity. The riverbank plantings were observed for any signs of distress or lack of growth. The results of the riverbank, site cover, and well inspections are summarized Section 6.2.

3.5 Monitoring Well Inspections

Recovery well and monitoring well integrity surveys are conducted quarterly to observe the surface conditions around each well, the condition of the concrete surface seal and presence of a secure locking cap and/or bolt down road box. Periodically, the depth to bottom in all the wells is measured and compared to the original constructed well depth.

4. System Operation and Maintenance

The remedial system was operated from January to December during the 2013 reporting period with only brief periods of shutdown due to scheduled operation and maintenance (O&M) and/or alarm conditions, as well as repairs and non-routine maintenance activities as discussed in Section 4.2. Monthly O&M site visits consisted of system inspection, recording of operating parameters, influent and effluent system sampling, and investigation/troubleshooting of any alarm conditions. System alarm verification was performed remotely via desktop software. The O&M data generated during each monthly visit are summarized in quarterly progress reports as required by the Consent Order. O&M related to each of the major system components (collection system, liquid and vapor treatment) are discussed below.

4.1 Collection and Treatment System O&M

The following O&M tasks were performed monthly on the remedial system (pneumatic pumps, air compressor, regenerative blower, transfer pump, and related equipment).

4.1.1 Liquid Phase Treatment

The following OM&M tasks were performed monthly, or as needed, with regards to the liquid phase extraction and treatment portion of the system:

- Inspection of all pipes and fittings for potential leaks;
- Checking air compressor (AC-600) coolant oil level and temperature to assure proper operation;
- Inspection of pneumatic pumps (VEP-1 through VEP-14) for proper operation and repair/cleaning, as needed;
- Inspection and cleaning of air stripper (AS-700) as needed;
- Inspection of flow meter (FQI-700) to assure proper operation;
- Monitor and record the system field gauge readings to determine if the system is operating within the designed operational ranges;
- Check and record pressure readings at inlet and outlet of cartridge filters (CF-400 and 401) to assure proper operation;
- Change-out cartidge filters (CF-400 and 401), as needed;
- Record total volume of groundwater recovered and average recovery flow rates;

- Maintain sequestering agent dosing rate and change-out drum as needed;

- Collect system influent liquid phase samples and submit for laboratory analysis of site-specific COCs. These results are summarized in Section 5.3; and

- Collect system effluent liquid phase samples and submit for laboratory analysis as per the Industrial Wastewater Discharge permit, as set forth by the Jamestown BPU. These results are summarized in Section 5.4.

4.1.2 Vapor Phase Treatment

The following OM&M tasks were performed monthly, or as needed, with regards to the vapor extraction and treatment portion of the system.

- Inspection of all pipes and fittings for potential leaks;

- Recording of the blower outlet temperature (TI-901 and TI-902);

- Record extracted air flow rate (FIT-501);

- Check and record pressure readings at inlet and outlet of the heat exchanger and vapor phase activated carbon vessels (ASC-501 and ASC-502) to assure proper operation;

- Monitor the regenerative blower (B-900) for proper operation pressures and temperatures;

- Influent vapor samples are collected and submitted for laboratory analysis of site-specific COCs. These results are summarized in Section 5.5; and

- Effluent vapor samples are collected and submitted for laboratory analysis in order to monitor the system VOC emissions. The VOC emissions are compared to the allowable annual mass flow per the NYSDEC effluent air standards set forth in the Division of Air Resources (DAR-1) Guidance. These results are summarized in Section 5.5.

4.1.3 Recovery Well Inspections

The following O&M tasks were performed quarterly or as needed with regards to the system recovery wells.

- Record applied vacuum readings at individual VEP wells;
- Observe pump operation (pump cycle-counter readings) at each recovery well and record cycle-counter total; and
- Recovery well integrity surveys are conducted to observe the surface conditions around each well, the condition of the concrete surface seal and presence of a secure bolt down road box.

4.1.4 Performance Monitoring Well Monitoring

- Record induced vacuum readings at select monitoing wells; and
- Record DTW/drawdown at site monitoring wells.

4.1.5 Recordkeeping and Reporting

Monitoring data were recorded on OM&M checklists and submitted as part of the quarterly progress reports to the NYSDEC. As noted, influent and effluent liquid and vapor samples were submitted monthly for laboratory analysis. The analytical results are used to evaluate system performance and to estimate the contaminant mass removal.

4.2 Non-Routine O&M

During the 2013 reporting period, the following system non-routine O&M activities were performed:

- May 23, 2013 – Performed scheduled maintenance on the air compressor, including oil and filter change and air filter cleaning;
- June 20, 2013 – Cleaned iron and manganese deposits from the air stripper trays and demister pad, and replaced the tray and door gaskets;

- June 21, 2013 – Pumped approximately 35 gallons of DNAPL and impacted groundwater from VEP-11, 12, 13, and 14 well sumps;
- September 3, 2013 – Cleaning the process piping between transfer pump TP-300 and air stripper AS-700 by removing iron and manganese mineral deposits;
- October 2, 2013 – Additional riprap is placed at the top of the riverbank wall to repair areas of scour;
- December 19, 2013 – Replace transfer pump TP-300; and
- December 20, 2013 – Performed scheduled maintenance on the air compressor, including oil and filter change and air filter cleaning.

No system process modifications were made during the 2013 reporting period.

5. System Performance Monitoring

The operational data collected during the monthly inspections of the system operation are summarized in the following sections. Monthly system O&M logs have been provided with the quarterly Remedial Status Reports, and system liquid phase influent and vapor phase sample results have been submitted to NYSDEC's EIMS Administrator in the required EQuIS Electronic Data Deliverable (EDD) format. System liquid phase effluent analytical results have been provided with the Industrial Wastewater Discharge Monitoring Reports submitted on a monthly basis to the Jamestown BPU.

5.1 Objectives of Monitoring

During operation of the system, various data were collected and analyzed to evaluate the overall performance and effectiveness of the system. This performance monitoring is intended to achieve the following objectives:

- Evaluate total dissolved and vapor phase VOC and TPH, as well as NAPL recovered during the operational period;
- Evaluate performance of the remedial system;

- Determine if any modifications to the system are required to enhance the system performance; and

- Ultimately determine when remedial milestones or endpoints have been achieved.

The performance monitoring results for 2013 are summarized below.

5.2 System Operational Data

The system operational data for 2013 is summarized in Table 1. These data include the average and cumulative recovered groundwater and soil vapor flows, average applied vacuums to the recovery well network, and recovery well statuses.

5.2.1 Groundwater Recovery/Extracted Liquid Flowrate

During 2013, the groundwater collection system was operated with each VEP well online with the exception of temporary recovery well configuration changes and/or shutdowns associated with routine O&M activities, as well as non-routine O&M activities discussed in Section 4.2.

It should be noted that recovery wells which were online but were in need of routine repairs and cleaning are identified as being online in Table 1.

Total extracted groundwater flow readings were collected from the totalizing flowmeter (FQI-700). The average monthly system groundwater extraction flow rates are included in Table 1. A cumulative total of 12,121,910 gallons of groundwater has been recovered by the system from startup (January 2008) through December 18, 2013 (Table 2). The total flow recovered in 2013 was 1,890,310 gallons. The 2013 total flow corresponds to an average recovery rate of approximately 3.7 gallons per minute (gpm).

5.2.2 Vapor Recovery/Extracted Vapor Flowrate

The vapor phase extraction system was operational during the 2013 period with the exception of isolated shutdowns and/or temporary recovery well configuration changes due to routine O&M activities, as well as non-routine O&M activities discussed in Section 4.2. .

Extracted vapor flow rate readings were collected from the flowmeter (FIT-501) located in the vapor treatment system exhaust post the VPGAC vessel ASC-502 (i.e., post-blower/fresh air dilution valve) and ranged from 95 to 181 actual cubic feet per minute (acfm) during the operational months for the vapor phase extraction system during the 2013 reporting period (Table 1). These flow ranges correspond to an average recovery rate of approximately 141 acfm over the operational period for the vapor phase extraction system during 2013.

5.2.3 Applied and Induced Vacuum

The applied vacuum at the system knockout tank generated by regenerative blower B-900 generally ranged from 70 to 92 inches of water column (in.W.C.). The applied vacuum to the VEP wellheads was adjusted based on several factors which included observed vacuum at the wellhead, induced vacuum at select monitoring points, and seasonal groundwater elevations. The average monthly VEP applied wellhead vacuums are included in Table 1.

Induced vacuum measurements were recorded periodically throughout the reporting period at select monitoring wells. VEP isolation tests were conducted the week of November 18, 2013. Each VEP well was isolated for 2-3 hours, the following data was recorded:

- Applied vacuum at VEP wellhead, values ranged from 34 in.W.C. (VEP-5) to 85 in.W.C. (VEP-2)

- Induced vacuum at nearby monitoring wells, values ranged from <0.0001 in.W.C. to -0.113 in.W.C (MW-8S). Induced vacuums measured in the area of the site, near VEP-1 and VEP-2, which exhibit the highest VOC concentrations in groundwater were as follows:

    - MW-8S: -0.113 in.W.C.

    - MW-12: -0.006 in.W.C.

    - MW-13: -0.025 in.W.C.

5.3 System Influent Liquid Phase Analytical Results

As outlined above, system influent groundwater samples were collected on a monthly basis. The samples were collected from sample port SP-115 (OWS-200 influent chamber). The samples were submitted for laboratory analysis of United States

Environmental Protection Agency (USEPA) Method 624 for VOCs, USEPA Method 8015B for TPH gasoline range organics/diesel range organics (GRO/DRO), and USEPA Method 608 for PCBs (polychlorinated biphenyls). All samples were submitted to Accutest Laboratories in Marlborough, Massachusetts.

The influent sample concentrations were used to estimate total mass removal from the subsurface and to evaluate the relative changes in this mass removal rate over time. The mass removal estimate is generated using the monthly influent sample analytical data and the extracted groundwater flow totals. The liquid phase monthly influent concentrations of TCE, total DCE, VC, TPH GRO/DRO, and PCBs in groundwater are provided in Table 3 and are illustrated graphically on Figure 3.

Monthly influent system samples are collected from a single combined system influent sample port located on the influent side of the oil/water separator. Recovery well statuses during influent liquid phase sampling events have been included in Table 3.

Liquid phase influent concentrations during 2013 ranged from 4.8 to 90 micrograms per liter (μg/L) for TCE, 52 to 316 μg/L for total DCE, and non-detect to 281 μg/L for VC. Influent concentrations of TPH GRO and DRO ranged from non-detect to 0.146 mg/L and from 0.346 to 2.14 mg/L, respectively. It should be noted that the VOC and TPH concentrations detected in monthly system liquid samples are expected to vary based on what recovery wells are online during the sampling event, and cycling during the time of sample collection.

5.4 System Effluent Treated Liquid Phase Analytical Results

Pursuant to the effluent standards set by the Jamestown BPU Industrial Wastewater Discharge Permit (Permit No. 037), sampling consists of the monthly collection of four grab samples over an 8-hour period during a typical operational day. These samples are analyzed for VOCs using USEPA Method 624, oil and grease (O&G) using USEPA Method 1664A, total suspended solids (TSS) using USEPA Method 2540D, and PCBs using USEPA Method 608. All samples were submitted to Accutest Laboratories in Marlborough, Massachusetts. Prior to final discharge to local sanitary sewer manhole 3T6, the system effluent sample is collected from sample port SP-702 located post air stripper (AS-700).

During 2013, the effluent discharge monitoring parameters were non-detect, estimated, and/or reported at quantities below the permitted effluent limits. The effluent sample results are provided in Table 4.

5.5 System Vapor Influent Sampling & Analytical Results

Influent vapor samples were collected on a monthly basis during the operational period for the soil vapor extraction portion of the system, and submitted for laboratory analysis of VOCs and TPH GRO by Method AM 4.02 to Microseeps, Inc. in Pittsburgh, Pennsylvania. As with the extracted groundwater sampling, the purpose of the influent vapor sampling is to estimate the total VOC and TPH GRO mass removal from the subsurface, and to evaluate the relative changes in vapor phase mass removal rate over time as a result of the system operation. The mass removal estimate is generated using the influent sample analytical data and the vapor flow rate recorded at the time of sampling.

The monthly influent vapor concentrations of TCE, total DCE, VC, and TPH GRO are presented in Table 5, and are illustrated graphically on Figure 4. The three predominant compounds detected in the influent vapor samples have been TCE, total DCE, and TPH GRO. TCE was detected in all of the influent vapor samples with concentrations ranging from 225 to 1,074 microgram per cubic meter ($\mu g/m^3$). Influent vapor concentrations of total DCE ranged from 467 to 1,557 $\mu g/m^3$. Influent VC was below the method detection limit for each monthly influent vapor sampling event. Influent TPH GRO vapor samples ranged from non-detect to 4,403 $\mu g/m^3$.

5.6 System Vapor Effluent Sampling & Analytical Results

The purpose of the effluent sample collection is to ensure that the permit equivalent standards/guidance values are met as an air permit is not required for the Site. During 2013, regulatory guidance values were not exceeded. The monthly effluent vapor concentrations of TCE, total DCE, VC, and TPH GRO are presented in Table 5. A summary of effluent vapor concentrations as compared to guidance values is provided in Table 7.

5.7 Groundwater Monitoring

Groundwater monitoring activities were conducted on a quarterly basis in March, June, August, and November 2013. Groundwater monitoring consisted of the collection of groundwater samples from monitoring wells and the measurement of water levels in monitoring wells to evaluate the hydraulic influence of the system.

Sampling included the following thirteen (13) monitoring wells during 2013 to evaluate VOC concentration trends during remediation.

Quarterly Monitoring Wells:

- MW-12 and MW-13 (adjacent to VEP-2)
- MW-10R (adjacent to VEP-12)
- MW-14 (adjacent to VEP-1 and VEP-2)
- OW-6 (adjacent to VEP-3 and VEP-4)

Semi-Annual Monitoring Wells:

- MW-8S, (adjacent to VEP-2)
- MW-9 (adjacent to VEP-13)
- ESI-1 (adjacent to VEP-8)
- ESI-2 (adjacent to VEP-6)
- ESI-4R (adjacent to VEP-14)
- ESI-6 (adjacent to VEP-1)
- ESI-7 (adjacent to VEP-5)
- OW-5 (adjacent to VEP-3 and VEP-4)

Collection of groundwater samples was performed in accordance with the Field Sampling Plan (FSP) and consisted of purging three volumes of water from each well or purging until the well was dry. Samples were then collected using low flow sampling techniques where feasible, and select wells were sampled using disposable bailers due to lack of water. It should be noted that all groundwater sampling was conducted with the VEP system offline (i.e., static conditions). All samples were submitted to Accutest Laboratories in Marlborough, Massachusetts for analysis of VOCs using USEPA Method 8260. Groundwater analytical results are discussed in Section 6.3.2.

6. System Evaluation

The following sections summarize the remedial system performance monitoring data from January 1, 2013 through December 31, 2013.

6.1 Mass Recovery

The estimated total mass recovered was calculated using the system influent dissolved and vapor phase analytical sampling results with the corresponding extraction flow rates (summarized in Section 5.2.1) and the NAPL volumes collected.

6.1.1 Non-Aqueous Phase Liquid

During the 2013 reporting period, approximately 2.5 gallons of dense non-aqueous phase liquid (DNAPL) was recovered by the collection and treatment system in the oil/water separator (OWS-200). A summary of annual DNAPL removal is provided in Table 10.

6.1.2 Dissolved Phase

Influent groundwater laboratory analytical data were used to estimate dissolved phase VOC and TPH GRO/DRO mass recovery rates. As shown in Table 2, influent VOC and TPH GRO/DRO levels and groundwater recovery rates were used to calculate the overall mass of VOCs recovered in the dissolved phase. As indicated in Table 2, a total estimated mass of approximately 8.6 kilograms (kg) (19 lbs) of VOCs and TPH GRO/DRO were recovered in the dissolved phase during the 2013 reporting period. The breakdown of total mass removed during the 2013 reporting period is summarized as follows; TCE, 0.19 kg; total DCE, 1.118 kg; VC, 0.87 kg; TPH/GRO, 0.14 kg; and TPH/DRO, 6.3 kg.

As the data presented in Table 2 indicate, total dissolved phase mass recovery rate estimates ranged from 3 to 37 grams per day, which corresponds to an average recovery rate of 23 grams per day. The fluctuation in dissolved phase mass recovery rate is related to variability in influent mass concentrations in the extracted groundwater due to VEP well configurations, extraction rate, and precipitation recharge to the groundwater system. The cumulative dissolved phase mass recovery of VOCs and TPH [GRO & DRO] is shown on Figure 5.

6.1.3 Vapor Phase

Influent vapor sampling results, molecular weights, and total vapor extraction flow rates were utilized to estimate the vapor phase VOC and TPH/GRO mass recovery rate for the reporting period. As the data presented in Table 6 indicate, the vapor phase mass recovery rate ranged from 0 to 60 grams per day during the operational period for the vapor extraction system. As mentioned in the discussion of dissolved phase mass recovery rates, the fluctuation in vapor phase mass recovery rate is related to the VEP well configuration and groundwater elevations. As Table 6 shows, a total estimated mass of 7.0 kg (15.4 lbs) of VOCs and TPH/GRO were removed in the vapor phase during 2013, corresponding to an average vapor phase mass recovery rate of 19 grams per day over the entire reporting period. The breakdown of total mass removed during the reporting period is summarized as follows: TCE, 1.1 kg; total DCE, 1.5 kg; and TPH/GRO, 4.4 kg. The cumulative vapor phase mass recovered for VOCs and TPH [GRO] is shown on Figure 6. As expected, the mass transfer of VOCs from soil to vapor is predominantly limited to desorption and diffusion processes, as noted above for the dissolved phase. Therefore, mass removal rates in the vapor phase should be expected to decline over time as the Site is remediated.

The VOC concentrations emitted following vapor phase treatment were used to calculate the estimated actual annual impact by following procedures described in the NYSDEC DAR-1 guidance document. Neither the Short-Term Guidance Concentration (SGC) or Annual Guidance Concentration (AGC) values provided by NYSDEC DAR-1 were exceeded for the site-specific compounds. A summary of effluent vapor concentrations as compared to guidance values is provided in Table 7.

6.1.4 Total Mass Removal Trend

The VEP system has recovered a cumulative total of approximately 374 kilograms (822 lbs) and 173 kilograms (384 lbs) of dissolved and vapor phase VOCs, respectively, during the period of operation from startup in 2008 through December 2013 (Table 10). The mass removal rate had fluctuated for the liquid phase mass removed during each year of the operation from 2008 through 2012. However, in 2013 the liquid phase VOC/TPH mass removal rates dropped an order of magnitude. This drop in mass removal rates is largely attributable to the decrease in DRO in the system influent water samples. As indicated in previous reports, the rate of recovery is expected to decrease as the mass removal becomes more dependent on desorption and diffusion processes rather advective movement and capture of VOCs.

The mass removal rate had generally dropped off and plateaued for the vapor phase VOC/TPH mass removed during each year of the operation from 2008 through 2012. In 2013 the vapor phase mass removal rates had noticeably dropped as compared to the 2011 and 2012 rates. This drop in mass removal rates is most likely attributable to the decrease in GRO in the system influent vapor samples. As indicated in previous reports, the rate of recovery is expected to decrease as the mass removal becomes more dependent on desorption and diffusion processes rather advective movement and capture of VOCs, particularly for any lighter fraction VOCs and GRO compounds. Additionally, the precipitation and snow fall amounts during the 2013 season were relatively higher, as compared to 2012 period, this is evident in the reduced vapor phase extraction rates (141 acfm, 2013 and 223 acfm, 2012).

As presented in Table 10, the dissolved and vapor phase mass recovered during 2013 is estimated at 8.6 and 3.4 kg, respectively. Figure 6 also depicts annual mass recovery through 2013 for both the dissolved and vapor phases. This corresponds to a combined vapor and dissolved phase mass recovery of 12 kg (26.5 lbs) during the 2013 reporting period.

6.2 Site Cover and Riverbank Inspections

During the 2013 reporting period the Site cover material and riverbank were inspected and recorded on inspection checklists (Appendix B) on a quarterly basis for the following:

- Riverbank rip-rap stone condition;
- Wingwall deflector condition and operation;
- Riverbank live planting conditions; and
- Site cover and erosion.

6.2.1 Site Cover

Some erosion of the Site cover was observed during the reporting period and on November 2, 2013 areas of scour and exposed geotextile along the top of the rip-rap were repaired with additional rip-rap. Based on the site inspections and observations the wingwall deflector appeared to be in place, and functional.

6.2.2 Riverbank Inspections

Following the completion of the replanting efforts in November 2012, the replanting effort was evaluated during the 2013 monitoring periods. The new riverbank plantings were inspected weekly for the first two months and then monthly following installation to monitor the area for wildlife damage. During the course of the 2013 reporting period the plants have shown significant grown and the measures taken to deter wildlife have appeared to be successful.

6.3 Groundwater Monitoring Results

The results of the groundwater monitoring program during 2013 are summarized in the following sections. The groundwater monitoring program was performed in accordance with the Groundwater Collection and Treatment System OM&M Plan (ARCADIS 2008) unless otherwise noted. Groundwater sampling was conducted with the system temporarily taken offline.

6.3.1 Groundwater Elevation Data

Water level data collected from the Site monitoring wells for 2013 are summarized in Table 8. The groundwater elevations reflect the position of the water table within the fill material layer at the Site. Groundwater elevations for the November monitoring event reflect non-pumping conditions with the VEP system temporarily offline, while the March, June, and August data show the water levels under pumping conditions. Overall, the water level data indicated that the system influences water levels in the vicinity of the VEP recovery wells, with drawdown typically in the range consistent with design estimates of 2 to 6 feet in adjacent monitoring wells.

Water levels in Site wells will continue to be collected on a quarterly basis during the groundwater monitoring program, and periodically to check hydraulic influence of the VEP wells.

6.3.2 Laboratory Analytical Results

During the 2013 reporting period, groundwater samples were collected from thirteen (13) monitoring wells to monitor groundwater quality and evaluate the performance of the system. A summary of the 2013 groundwater monitoring analytical results, along with historical data, is shown in Table 9. Historical TCE, DCE (total), and VC concentration trends in groundwater for monitoring wells are depicted on Figures 7A, 7B, and 7C.

The following selected observations were made with respect to the groundwater analytical data during 2013:

- Consistent with the historical results for the Site, the primary VOCs detected in groundwater are TCE, total DCE and VC, with the majority of the VOC mass within the southern end of the Site near recovery wells VEP-1 and VEP-2.

- VOC concentrations at monitoring wells MW-8S, MW-13 and MW-14 fluctuated within ranges established since the recovery system startup, which include MW-14 VOC concentrations being approximately an order of magnitude less than before the system startup in 2008.

- While VOC concentrations at monitoring wells OW-5 and OW-6 have shown fluctuation that is attributable to recovery well operation and seasonal groundwater levels, both have shown an overall downward trend in TCE, total DCE and VC over the past four years. Concentrations of TCE were 1 µg/L, or less at OW-5 and OW-6 respectively for the November groundwater sampling event.

- VOC concentrations at replacement wells ESI-4R and MW-10R generally remained within ranges established since installation in 2010. ESI-4R has a history of being dry enabling the well to be sampled. This was the case during the March 2013 groundwater sampling event.

- Concentrations of TCE, total DCE and VC at monitoring well ESI-1 and ESI-2 which are located adjacent to the Chadakoin River and upgradient from the vertical barrier wall, continues to remain below the laboratory detection limits and the NYSDEC groundwater standards since starting up the remedial system.

- The 2013 groundwater sampling event showed VOC concentrations at well ESI-7 were consistent with other post-system startup concentrations. Results for the March and August sampling events were below the laboratory detection limits.

- Consistent with the historical Site results since the startup of the remedial system, TCE, total DCE, and VC are below or near laboratory detection levels in groundwater at the northwest corner of the Site in well MW-9 near the Chadakoin River.

- Consistent with the historical Site results since the startup of the remedial system, TCE, total DCE, and VC remain below or near laboratory detection levels in groundwater at the southeast (upgradient) corner of the Site in well ESI-6.

7. Conclusions and Recommendations

The following sections summarize the system operation during the 2013 reporting period and also the operational goals for the 2014 – 2015 reporting period.

7.1 System Performance Summary

Data from the 2013 reporting period indicate that the VEP system has been effective at recovering dissolved and vapor phase VOC mass and NAPL from the subsurface at the Site.

The performance effectiveness of the remedial system is summarized through the following metrics:

- A sustained average groundwater extraction rate of 3.7 gpm from the VEP well network was observed during the reporting period.

- An average soil vapor extraction rate of 141 acfm from the VEP well network was observed during the reporting period.

- The groundwater elevation data indicate that the VEP well network is effective at dewatering the fill material in the vicinity of the recover wells thus making more adsorbed phase mass available via vacuum extraction through in-situ stripping and bio-venting processes.

- Induced vacuums were measured at select monitoring wells which indicate pneumatic conductivity in the subsurface thus promoting lateral air flows in the sub-surface, and further indicating that lighter fraction petroleum compounds (e.g., VOCs and TPH GRO) can be stripped from the vadose soil and groundwater surface to address residual sheens. Additionally, the induced air flows in the subsurface enhances any aerobic microbial degradation (i.e., bioventing) of the remaining residual, heavier fraction petroleum compounds (e.g. TPH DRO) that are remaining in the subsurface soil and groundwater.

- Field measurements of the system influent soil vapor stream were recorded with a photoionization detector (PID), the measurements ranged from 111 ppmv (VEP-11) to 1,735 (VEP-14) ppmv indicating that SVE is successfully removing VOCs from the subsurface environment.

- Approximately 2.5 gallons of DNAPL were recovered by the remedial system during the 2013 reporting period. Since starting the system in January 2008, an estimated cumulative total of 324 gallons of DNAPL have been recovered.

- An estimated total mass of 8.6 kg and 3.4 kg were recovered in the dissolved and vapor phase in 2013, respectively. Since starting the system (January 2008) an estimated cumulative total mass of 375 kg and 173 kg have been recovered in the dissolved and vapor phases, respectively (Table 10).

- VOC concentrations in monitoring wells ESI-1, ESI-2, ESI-6, ESI-7, and MW-9 continue to remain below NYSDEC groundwater standards.

- Groundwater quality changes in the area of monitoring wells MW-8S, MW-12, MW-13, and MW-14 continue to fluctuate in response to the operation of the remedial system, however, VOC concentrations in monitoring well MW-14 remain below pre-system concentrations.

As part of the annual certification under the Site Management and OM&M Plans the Site engineering controls have been maintained and remain in place functioning as designed with the exception of noted shutdowns due to non-routine system maintenance. The engineering controls include the following:

- Soil cover and vegetative growth across the Site in previously disturbed areas;

- Riverbank and stabilization erosion controls;

- Wingwall deflector;

- Vertical hydraulic barrier wall;

- Groundwater recovery and soil vapor extraction via VEP (i.e., recovery) wells; and

- Remedial system operation and maintenance.

7.2 Goals for 2014 -2015 System Operation

System operation and performance monitoring will continue to focus on optimizing mass removal rates through the operation of VEP well network, evaluating individual recovery well mass removal rates, and continued operation and maintenance of the remedial system process equipment and components.

The goals for system operational activities during 2014/15, as well as activities already conducted in the first several months of 2014, are as follows:

- Conduct water level measurements at all monitoring wells to monitor hydraulic influence of the system. Water level measurements are generally collected during quarterly groundwater sampling events and periodically as deemed appropriate. Water level measurements have been collected during the first quarter groundwater monitoring events completed in March 2014.

- Continue to collect groundwater samples on a quarterly basis from selected monitoring wells MW-10R, MW-12, MW-13, MW-14, and OW-6. The first and second quarterly groundwater sampling events were conducted in March and June 2014, respectively.

- Continue to collect groundwater samples on a semi-annual basis from select monitoring wells ESI-1, ESI-2, ESI-4R, ESI- 6, MW-8S, MW-9, and OW-5. The first semi-annual groundwater sampling event was conducted in March 2014.

- Continue to monitor the treatment system for mass removal efficiency and VOC breakthrough based on field screening and/or laboratory analysis of samples collected from the system influent and effluent sample points.

- Collect monthly system effluent samples as required by the Jamestown BPU Industrial Wastewater Discharge Permit.

- Continue operation of the system while performing the required liquid/vapor flow and vacuum adjustments at each of the recovery wells to optimize system performance and efficiency, and maximize contaminant mass removal rates.

- Continue NAPL recovery efforts.

- Monitor COC concentrations in the system vapor phase exhaust and compare to the NYSDEC DAR-1 Annual Guidance Concentration Air Modeling Analysis to ensure that the estimated actual annual mass emitted does not exceed the allowable annual mass flow, as per NYSDEC DAR -1.

- Monitor treatment system mechanical and electrical components remotely via the PLC.

- Continue to collect monthly influent samples to track mass removal in the vapor and liquid phases.

- Perform O&M activities (e.g., liquid phase cartridge filter change-outs, pneumatic pump cleaning as needed, sequestering agent drum replacement, air stripper cleaning, air compressor/blower maintenance per OM&M plan).

- Monitor operation of the system and adjusted vacuum and pumping rates to recovery wells, as necessary, to optimize groundwater and vapor extraction rates.

7.3 Soil Vapor Investigation

On behalf of Ingersoll Rand Company, ARCADIS prepared and submitted the *Soil Vapor Investigation Work Plan* (ARCADIS, July 11, 2014) in response to the NYSDEC letter dated May 5, 2014 regarding the potential for off-site migration of soil vapor at the Site. The May 5, 2014 letter from NYSDEC requested sampling to address the potential for off-site migration of chlorinated VOCs and petroleum hydrocarbons in two areas: (1) the pipe bedding around the treatment system effluent line connecting to the public sanitary sewer on the east side of Allen Street, and (2) the neighboring Weber Knapp building complex.

8. References

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Administration Order on Consent Index #B9-0446-94-01A, D.C. Rollforms site, Site #907019, Ingersoll Rand Company, Jamestown, New York, September 21, 2004.

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Tables

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Table 1. System Operational Data for 2013, DC Rollforms Site, Jamestown, New York.

System Parameters			Date											
			1/10/13	2/24/13	3/29/13	4/16/13	5/15/13	6/19/13	7/25/13	8/22/13	9/12/13	10/29/13	11/13/13	12/18/13
SVE Blower Applied Vacuum (in. W.C.)			78	84	88	85	85	92	80	74	70	80	84	76
Vapor Extraction Flowrate (acfm)			150	132	129	129	130	125	147	180	181	138	95	155
Monthly System Flow (gallons)			213,630	367,750	286,910	147,060	16,530	209,920	194,630	131,100	43,200	87,260	32,330	159,990
Monthly System Influent (gpm)			4.8	5.7	5.7	3.0	0.5	5.0	3.8	3.4	1.1	1.3	1.5	3.2
Recovery Well Statuses[1]														
Vacuum Enhanced Pumping (VEP) Wells	VEP-1	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-2	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-3	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-4	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-5	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-6	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-7	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-8	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-9	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-10	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-11	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-12	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-13	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	VEP-14	Liquid Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Vapor Phase On (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes:

1. Recovery wells for which total fluids pneumatic pumps were online but observed to be in need of routine cleaning and/or repairs and therefore not recovering groundwater are considered to have liquid phases on in this table. Recovery well statuses do not necessarily reflect the recovery well configuration for the corresponding monthly influent sampling events.

Definitions:

"--" - not applicable
acfm - actual cubic feet per minute
gpm - gallons per minute
in.W.C. - Inches of Water Column
N - No
SVE - Soil Vapor Extraction
VEP - Vacuum Enhanced Pumping
Y - Yes

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Table 2. Cumulative Dissolved Phase VOC and TPH Mass Recovery for 2013, DC Rollforms Site, Jamestown, New York.

Date	VOC and TPH [GRO & DRO] Mass Removed																			
	Influent VOC and TPH [GRO & DRO] Concentrations					Total[1] Cumulative Flow (gallons)	Total Flow Per Reporting Period (L)	Estimated Mass Removed Per [3] Reporting Period (kg)					Estimated Cumulative Mass Removed (kg)					Estimated 2013 Cumulative Mass Removal (kg)	Cumulative Days Operating	Estimated Mass Removal Rate Per Reporting Period (kg/day)
	TCE (µg/L)	DCE[2] (total) (µg/L)	VC (µg/L)	TPH [GRO] (mg/L)	TPH [DRO] (mg/L)			TCE	DCE[2] (total)	VC	TPH [GRO]	TPH [DRO]	TCE	DCE[2] (total)	VC	TPH [GRO]	TPH [DRO]			
1/10/13	89.6	316	281	ND	0.83	10,445,230	808,677	0.046	0.196	0.182	0.000	0.336	0.046	0.196	0.182	0.000	0.336	0.761	31	0.025
2/24/13	19.5	116	75.2	ND	0.346	10,812,980	1,392,085	0.076	0.301	0.248	0.000	0.819	0.122	0.497	0.430	0.000	1.154	2.204	76	0.032
3/29/13	28.7	175	55.6	0.116	0.585	11,099,890	1,086,072	0.026	0.158	0.071	0.063	0.506	0.148	0.655	0.501	0.063	1.660	3.028	109	0.025
4/16/13	17.7	91.2	48.3	0.146	1.13	11,246,950	556,682	0.013	0.074	0.029	0.073	0.477	0.161	0.729	0.530	0.136	2.137	3.694	127	0.037
5/15/13	14.7	116	118	ND	1.23	11,263,480	62,573	0.001	0.006	0.005	0.005	0.074	0.162	0.735	0.535	0.141	2.211	3.785	156	0.003
6/19/13	21.7	119	123	0.116	1.05	11,473,400	794,633	0.006	0.093	0.096	0.000	0.906	0.168	0.829	0.631	0.141	3.117	4.886	191	0.031
7/25/13	11.7	201	ND	ND	1.10	11,668,030	736,754	0.004	0.118	0.091	0.000	0.792	0.172	0.947	0.722	0.141	3.909	5.891	227	0.028
8/22/13	4.8	64.2	100	ND	1.01	11,799,130	496,267	0.004	0.066	0.050	0.000	0.524	0.177	1.012	0.771	0.141	4.433	6.534	255	0.023
9/12/13	3.5	52.3	41.9	ND	1.25	11,842,330	163,530	0.001	0.010	0.012	0.000	0.185	0.177	1.022	0.783	0.141	4.617	6.740	276	0.010
10/29/13	13	149	186	ND	1.97	11,929,590	330,315	0.003	0.033	0.038	0.000	0.532	0.180	1.055	0.821	0.141	5.149	7.346	323	0.013
11/14/13	8.7	79.3	66.9	ND	2.14	11,961,920	122,382	0.001	0.014	0.015	0.000	0.251	0.181	1.069	0.836	0.141	5.401	7.628	339	0.018
12/18/13	7.5	82.4	52.8	ND	0.744	12,121,910	605,628	0.005	0.049	0.036	0.000	0.873	0.186	1.118	0.872	0.141	6.274	8.591	373	0.028
			2013 Total Flow (gal)			1,890,310									**2013 Cumulative Mass Recovery Rate (kg/day)**					0.023
			2013 Avg. Flow (gpm)			3.7														

Notes:

1. Total cumulative flow is estimated based on the system flowmeter FQI-700.
2. DCE (total) is the sum of 1,1-Dichloroethene, cis-1,2-Dichloroethene, and trans-1,2-Dichloroethene.
3. Estimated mass removed per reporting period is calculated from influent mass concentration and volume of groundwater recovered. Influent mass concentrations used for calculations are the average of the concentrations from the previous and current monthly events.

Definitions:

DCE - Dichloroethene
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
kg - kilograms
L - Liters
mg/L - milligrams per liter
ND - Non-detect
TCE - Trichloroethene
TPH - Total Petroleum Hydrocarbons
µg/L - micrograms per liter
VC - Vinyl Chloride
VOC - Volatile Organic Compounds
gal - gallons
gpm - gallons per minute

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Table 3. TCE, DCE (total), VC, TPH, and PCBs in System Influent Water Samples in 2013, DC Rollforms Site, Jamestown, New York.

Date	VOCs (µg/L)[1]			TPH (mg/L)[1]		PCB (µg/L)[1]	VEP Wells Online During Monthly System Influent Sampling Event
	TCE	DCE (total)[2]	VC	GRO	DRO		
1/10/2013	89.6	316	281	ND	0.83	ND	VEP-1 through VEP-14
2/24/2013	19.5	116	75.2	ND	0.346	ND	VEP-1 through VEP-14
3/29/2013	28.7	175	55.6	0.116	0.585	ND	VEP-1 through VEP-14
4/16/2013	17.7	91.2	48.3	0.146	1.13	ND	VEP-1 through VEP-14
5/15/2013	14.7	116	118	ND	1.23	ND	VEP-1 through VEP-14
6/19/2013	21.7	119	123	ND	1.05	ND	VEP-1 through VEP-14
7/25/2013	11.7	201	ND	ND	1.1	ND	VEP-1 through VEP-14
8/22/2013	4.8	64	100	ND	1.01	ND	VEP-1 through VEP-14
9/12/2013	3.5	52	42	ND	1.25	ND	VEP-1 through VEP-14
10/29/2013	13	149	186	ND	1.97	ND	VEP-1 through VEP-14
11/14/2013	8.7	79.3	66.9	ND	2.14	ND	VEP-1 through VEP-14
12/18/2013	7.5	82	53	ND	0.744	ND	VEP-1 through VEP-14

Notes:

1. Samples analyzed for VOCs using US EPA Method 624. Samples analyzed for TPH [GRO] and TPH[DRO] using US EPA Method 8015 B. Samples analyzed for PCB using US EPA Method 608.
2. DCE (total) includes the sum of 1,1-Dichloroethene, cis-1,2-Dichloroethene, and trans-1,2-Dichloroethene.

Definitions:

D - Identifies an analysis that used a secondary dilution factor
DCE - Dichloroethene
DRO - Diesel Range Organics
E - Sample concentration exceeded calibration range
GRO - Gasoline Range Organics
mg/L - milligrams per liter
ND - Non-Detect
NS - Not Sampled for
PCB - Polychlorinated Biphenyls
TCE - Trichloroethene
TPH - Total Petroleum Hydrocarbons
µg/L - micrograms per liter
VC - Vinyl Chloride
VOCs - Volatile Organic Compounds

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Table 4. TCE, DCE (total), VC, PCBs, TSS, Oil & Grease, and pH in System Effluent Water Samples in 2013,
DC Rollforms Site, Jamestown, New York.

Date	Analyte[1]								
	VOCs			PCB (µg/L)	TSS (mg/L)	Oil & Grease (mg/L)		pH (s.u.)	
	TCE (µg/L)	DCE (total)[2] (µg/L)	VC (µg/L)						
	Local Discharge Limit								
	2,130 µg/L (Total VOCs)			ND	350	100		5.5 - 10	
1/10/2013	ND	ND	ND	ND	ND	ND	ND	7.5	8.1
						ND	ND	8.0	8.0
2/24/2013	ND	ND	ND	ND	13.0	ND	ND	7.8	8.0
						ND	ND	7.6	8.0
3/29/2013	ND	ND	ND	ND	23.0	ND	ND	7.5	7.7
						ND	ND	8.1	7.9
4/16/2013	ND	ND	ND	ND	ND	ND	ND	7.2	8.1
						ND	ND	8.1	8.1
5/15/2013	ND	ND	ND	ND	ND	ND	ND	8.0	7.9
						ND	ND	8.0	8.1
6/19/2013	ND	ND	ND	ND	ND	ND	ND	7.8	8.2
						ND	ND	8.1	8.1
7/25/2013	ND	ND	ND	ND	ND	ND	ND	7.9	8.3
						ND	ND	8.3	8.3
8/23/2013	ND	ND	ND	ND	ND	ND	ND	7.9	8.4
						ND	ND	7.9	8.0
9/12/2013	ND	ND	ND	ND	ND	ND	ND	7.5	7.8
						ND	ND	7.7	8.0
10/29/2013	ND	ND	ND	ND	ND	ND	ND	8.0	8.2
						ND	ND	8.2	7.9
11/14/2013	ND	ND	ND	ND	10.0	ND	ND	7.9	8.0
						ND	ND	7.9	8.1
12/18/2013	ND	ND	ND	ND	ND	ND	ND	8.0	8.1
						ND	ND	8.2	8.1

Notes:

1. System effluent water samples collected via sample port SP-702 located after the air stripper. Samples analyzed for TCE, DCE (total), VC, PCB, and TSS consisted of four effluent samples collected during a typical operating day that were composited at the laboratory. Samples analyzed for Oil & Grease and pH were not composited. Samples analyzed for TCE, DCE (total), and VC using US EPA Method 624. Samples analyzed for PCB using US EPA Method 608. Samples analyzed for TSS using US EPA Method 160.2. Samples analyzed for Oil & Grease using US EPA Method 1664. pH measured in field.
2. DCE (total) includes the sum of 1,1-Dichloroethene, cis-1,2-Dichloroethene, and trans-1,2-Dichloroethene.

Definitions:

"--" - Indicates data not available
DCE - Dichloroethene
mg/L - milligrams per liter
ND - Non-detect
PCB - Polychlorinated Biphenyls
s.u. - standard units
TCE - Trichloroethene
TSS - Total Suspended Solids
µg/L - micrograms per liter
VC - Vinyl Chloride

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Table 5. TCE, DCE (total), VC and TPH in System Influent and Effluent Vapor Samples in 2013, DC Rollforms Site, Jamestown, New York

Date	Sample Location	TCE		DCE (total)[2]		VC		TPH [GRO]		VEP Wells Online During Monthly System Influent Sampling Event
		ppbv	µg/m^3	ppbv	µg/m^3	ppbv	µg/m^3	ppbv	µg/m^3	
1/10/2013	Influent	110	590.7	87	467.19	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	240	1288.8	ND	NA	ND	NA	
2/24/2013	Influent	110	590.7	160	859.2	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	190	1020.3	ND	NA	ND	NA	
3/29/2013	Influent	73	392.01	110	590.7	ND	NA	ND	NA	VEP-2 through VEP-14
	Effluent	ND	NA	220	1181.4	ND	NA	ND	NA	
4/16/2013	Influent	42	225.54	190	1020.3	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	64	343.68	ND	NA	ND	NA	
5/15/2013	Influent	160	859.2	100	537	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	45	241.65	ND	NA	ND	NA	
6/19/2013	Influent	83	445.71	210	1127.7	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	95	510.15	ND	NA	ND	NA	
7/25/2013	Influent	170	912.9	200	1074	ND	NA	820	4403.4	VEP-1 through VEP-14
	Effluent	ND	NA	190	1020.3	ND	NA	ND	NA	
8/22/2013	Influent	200	1074	200	1074	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	300	1611	ND	NA	ND	NA	
9/12/2013	Influent	130	698.1	180	966.6	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	250	1342.5	ND	NA	ND	NA	
10/29/2013	Influent	82	440.34	100	537	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	140	751.8	ND	NA	ND	NA	
11/14/2013	Influent	51	273.87	290	1557.3	ND	NA	ND	NA	VEP-1 through VEP 14
	Effluent	ND	NA	62	332.94	ND	NA	ND	NA	
12/19/2013	Influent	52	279.24	88	472.56	ND	NA	ND	NA	VEP-1 through VEP-14
	Effluent	ND	NA	360	1933.2	ND	NA	ND	NA	

Notes:

1. Influent vapor sample collected via sample port SP-900 located before the liquid knockout tank. Effluent vapor sample collected via sample port SP-503 located after VPGAC vessel ASC-502. Samples analyzed using Microseeps, Inc. Method AM 4.02.
2. DCE (total) includes the sum of 1,1-Dichloroethene, cis-1,2-Dichloroethene, and trans-1,2-Dichloroethene.

Definitions:

DCE - Dichloroethene
GRO - Gasoline Range Organics
J - Indicates an estimated value
ND - Non-detect
NS - Not Sampled
ppbv - parts per billion by volume
SVE - Soil Vapor Extraction
TCE - Trichloroethene
TPH - Total Petroleum Hydrocarbons
µg/m^3 - micrograms per cubic meter
VC - Vinyl Chloride

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Table 6. Cumulative Vapor Phase VOC and TPH Mass Recovery for 2013, DC Rollforms Site, Jamestown, New York.

Date	4																										
	Influent VOC and TPH [GRO] Concentrations (ppmv)				Influent VOC and TPH [GRO][1] Concentrations ($\mu g/m^3$)				Influent VOC and TPH [GRO] Concentrations (µg/L)				Vapor Extraction Flow Rate (acfm)	Reporting Period			Mass of Component Recovered[3] Per Reporting Period (kg)				Cumulative Mass Recovered (kg)				Estimated[2] 2013 Cumulative Mass Recovery (kg)	Cumulative Days Operating	Estimated[2] Mass Recovery Rate Per Reporting Period (kg/day)
														Period Duration		Volume Of[2] Air Treated (L)											
	TCE	DCE[4] (total)	VC	TPH [GRO]	TCE	DCE[4] (total)	VC	TPH [GRO]	TCE	DCE[4] (total)	VC	TPH[5] [GRO]		(days)	(min)		TCE	DCE[4] (total)	VC	TPH [GRO]	TCE	DCE[4] (total)	VC	TPH [GRO]			
1/10/13	0.11	0.087	ND	ND	590.7	467.19	ND	ND	0.592	0.346	ND	ND	150	31	44640	189,609,293	0.077	0.078	0.000	0.000	0.077	0.078	0.000	0.000	0.16	31	0.005
2/24/13	0.11	0.16	ND	ND	590.7	859.2	ND	ND	0.592	0.636	ND	ND	132	45	64800	242,210,580	0.143	0.119	0.000	0.000	0.221	0.197	0.000	0.000	0.42	76	0.006
3/29/13	0.073	0.11	ND	ND	392.01	590.7	ND	ND	0.393	0.437	ND	ND	129	33	47520	173,584,249	0.086	0.093	0.000	0.000	0.306	0.290	0.000	0.000	0.60	109	0.005
4/16/13	0.042	0.19	ND	ND	225.54	1020.3	ND	ND	0.226	0.755	ND	ND	129	18	25920	94,682,318	0.000	0.000	0.000	0.000	0.306	0.290	0.000	0.000	0.60	127	0.000
5/15/13	0.16	0.10	ND	ND	859.2	537.00	ND	ND	0.862	0.397	ND	ND	130	29	41760	153,726,244	0.132	0.061	0.000	0.000	0.439	0.351	0.000	0.000	0.79	156	0.007
6/18/13	0.083	0.21	ND	ND	445.71	1127.7	ND	ND	0.447	0.834	ND	ND	125	34	48960	173,298,816	0.113	0.107	0.000	0.000	0.552	0.458	0.000	0.000	1.01	190	0.006
7/25/13	0.17	0.2	ND	0.82	912.9	1074	ND	4403.4	0.915	0.795	ND	2.821	147	37	53280	221,781,708	0.151	0.181	0.000	0.313	0.703	0.638	0.000	0.313	1.65	227	0.017
8/22/13	0.2	0.2	ND	ND	1074	1074	ND	ND	1.077	0.795	ND	ND	180	28	40320	205,512,008	0.205	0.163	0.000	0.290	0.908	0.802	0.000	0.603	2.31	255	0.023
9/28/13	ND	0.25	ND	ND	ND	1342.5	ND	ND	ND	0.993	ND	ND	181	37	53280	273,078,158	0.294	0.244	0.000	0.000	1.202	1.046	0.000	0.603	2.85	292	0.015
10/29/13	0.082	0.1	ND	ND	440.34	537	ND	ND	0.442	0.397	ND	ND	138	31	44640	174,440,549	0.077	0.121	0.000	0.000	1.279	1.167	0.000	0.603	3.05	323	0.006
11/14/13	0.051	0.29	ND	ND	273.87	1557.3	ND	ND	0.275	1.152	ND	ND	95	16	23040	61,979,812	0.022	0.048	0.000	0.000	1.301	1.215	0.000	0.603	3.12	339	0.004
12/19/13	0.052	0.088	ND	ND	279.24	472.56	ND	ND	0.280	0.350	ND	ND	155	35	50400	221,210,842	0.061	0.166	0.000	0.000	1.362	1.381	0.000	0.603	3.35	374	0.006
									Avgerage Flowrate (acfm)				141									2013 Cumulative Mass Recovery Rate (kg/day)					0.009

Notes:

1. Vapor results were converted to mg/m3 and mg/L using Microseeps unit conversion factors, assuming a temperature of 25 C (+ 273.15 K), and gas constant, 0.08206 l*atm/(mol*K).
2. Volumes of air treated are estimated values.
3. Estimated mass recovery rate calculated from monthly influent mass concentration and estimated vapor extraction rate. Influent concentrations used are averages of those from the previous and current monthly events.
4. DCE (total) is the sum of 1,1-Dichloroethene, cis-1,2-Dichloroethene, and trans-1,2-Dichloroethene.
5. Conversion of TPH[GRO] from ppmv to µg/L assumes molecular weight approximately equal to hexane, temperature of 25ºC, and pressure of 1 atmosphere.

Definitions:

acfm - actual cubic feet per minute
DCE - Dichloroethene
GRO - Gasoline Range Organics
kg - kilograms
L - Liters
min - minutes
ND - Non-detect
NS - Not Sampled
ppmv - parts per million by volume
TCE - Trichloroethene
TPH - Total petroleum hydrocarbons
µg/L - micrograms per liter
VC - Vinyl Chloride
VOC - Volatile Organic Compounds

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Table 7. Summary of Effluent VOC Concentrations vs. Guidance Concentrations in 2013, DC Rollforms Site, Jamestown, New York.

Volatile Organic Compound	AGC(1) ($\mu g/m^3$)	SGC(1) ($\mu g/m^3$)	Maximum Effluent Concentration (ppmv)	Maximum Effluent Concentration ($\mu g/m^3$)	Maximum (2) Emission Rate (lb/day)	Actual Annual Impact ($\mu g/m^3$)(3)	Actual Annual Impact Percentage of AGC (%)
Trichloroethene	0.5	14,000	ND	ND	NA	NA	NA
1,1-Dichloroethene	70	-	ND	ND	NA	NA	NA
cis-1,2-Dichloroethene	63	-	0.36	1,430	0.032	0.083	0.13
trans-1,2-Dichloroethene	63	-	ND	ND	NA	NA	NA
Vinyl Chloride	0.11	180,000	ND	ND	NA	NA	NA

Notes:

1. AGC and SGC values obtained from NYSDEC DAR-1 AGC/SGC Tables, dated 9/10/07.
2. Maximum emission rate calculated using the maximum concentrations for each volatile organic compound detected in 2013 system effluent samples and the maximum effluent flow rate (183 acfm) recorded for any one month during the entire 2013 reporting period.
3. Actual annual impact calculated by following procedures described in NYSDEC DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants (NYSDEC 1991). Note effective stack height of 20 feet.

Definitions:

"-" - indicates no guideline as been established
AGC - Annual Guideline Concentration
lb/day - pounds per day
NA - Not Applicable
ND - Non-Detect
ppmv - parts per million by volume
SGC - Short-term Guideline Concentration
$\mu g/m^3$ - micrograms per cubic meter

Table 8. Summary of Groundwater Elevation Data, DC Rollforms Site, Jamestown, New York.

Well ID	Measuring (1) Point Elevation (ft amsl)	Operational Conditions 3/13/2013		Operational Conditions 6/18/2013		Operational Conditions (5) 8/28/2013		Non-pumping Conditions 11/13/2013	
		Depth to (2) Water	Water-Level Elevation (3)	Depth to (2) Water	Water-Level Elevation (3)	Depth to (2) Water	Water-Level Elevation (3)	Depth to (2) Water	Water-Level Elevation (3)
ESI-1	1296.37	8.06	1288.31	8.40	1287.97	12.02	1284.35	6.92	1289.45
ESI-2	1295.08	11.25	1283.83	11.63	1283.45	11.51	1283.57	6.24	1288.84
ESI-3(4)	1295.75	5.96	1289.79	6.84	1288.91	10.73	1285.02	5.66	1290.09
ESI-4R	1294.96	DRY	NA	DRY	NA	DRY	NA	7.72	1287.24
ESI-5	1293.08	4.61	1288.47	5.18	1287.90	7.66	1285.42	4.72	1288.36
ESI-6	1295.24	5.41	1289.83	6.34	1288.90	9.73	1285.51	6.09	1289.15
ESI-7	1295.12	10.33	1284.79	10.72	1284.40	10.90	1284.22	6.21	1288.91
MW-4S	1295.75	12.45	1283.30	12.96	1282.79	12.78	1282.97	7.35	1288.40
MW-7D	1295.37	8.83	1286.54	9.02	1286.35	10.39	1284.98	6.74	1288.63
MW-8S	1295.21	6.33	1288.88	7.58	1287.63	9.34	1285.87	6.30	1288.91
MW-8D	1295.48	5.99	1289.49	6.08	1289.40	7.21	1288.27	6.01	1289.47
MW-9	1291.95	5.94	1286.01	6.74	1285.21	6.85	1285.10	5.30	1286.65
MW-10R	1295.11	8.01	1287.10	8.60	1286.51	11.77	1283.34	7.43	1287.68
MW-12	1294.91	5.93	1288.98	6.91	1288.00	8.74	1286.17	5.86	1289.05
MW-13	1294.20	5.74	1288.46	6.89	1287.31	8.26	1285.94	5.24	1288.96
MW-14	1294.59	5.58	1289.01	6.26	1288.33	8.17	1286.42	5.52	1289.07
OW-1	1292.59	12.23	1280.36	13.50	1279.09	12.39	1280.20	7.21	1285.38
OW-2	1293.96	13.23	1280.73	13.59	1280.37	13.34	1280.62	8.23	1285.73
OW-3	1292.01	4.63	1287.38	4.71	1287.30	4.93	1287.08	4.58	1287.43
OW-4	NS	9.78	NA	10.25	NA	11.05	NA	6.01	NA
OW-5	1295.59	11.01	1284.58	11.63	1283.96	11.65	1283.94	6.52	1289.07
OW-6	1295.67	10.49	1285.18	11.02	1284.65	11.49	1284.18	6.77	1288.90
OW-7	NS	10.93	NA	11.14	NA	10.96	NA	6.08	NA
IW-1	1295.32	7.90	1287.42	7.81	1287.51	9.31	1286.01	6.63	1288.69
IW-2	1295.32	5.94	1289.38	7.76	1287.56	9.13	1286.19	6.06	1289.26
IW-3	1294.93	6.49	1288.44	7.07	1287.86	8.72	1286.21	5.93	1289.00
IW-4	1294.90	7.17	1287.73	7.86	1287.04	9.78	1285.12	5.81	1289.09
IW-5	1294.81	7.43	1287.38	7.75	1287.06	9.55	1285.26	5.95	1288.86
RW-1	1292.06	4.29	1287.77	4.73	1287.33	5.61	1286.45	4.02	1288.04
RW-2	1292.52	6.01	1286.51	6.05	1286.47	6.93	1285.59	4.16	1288.36
RW-3	1292.46	5.96	1286.50	6.02	1286.44	6.96	1285.50	4.06	1288.40
PW-1	1296.93	12.58	1284.35	12.94	1283.99	12.73	1284.20	7.51	1289.42

Notes:

1. Wells ESI-1, ESI-2, ESI-4R, ESI-5, ESI-6, OW-1, OW-2, MW-9, and MW-10R: water level elevations have been estimated based on field measurements following well casing repairs made in June 2008 and 2010.
2. Depths to water are presented as feet below the measuring point.
3. Water level elevations are presented as feet above mean sea level.
4. Well ESI-3: depth to top of LNAPL 5.01 ft (3/22/11). Oil absorbent sock used for LNAPL recovery for remainder of 2011.
5. The system was restarted 45 minutes prior to beginning to conduct water level measurements.

Definitions:

NA - Not Applicable
NS - Not Surveyed

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Table 9. Summary of TCE, DCE, and VC in Groundwater Samples, DC Rollforms Site, Jamestown, New York.

Monitoring Well	Date	Analyte (µg/L)[1]		
		TCE	DCE (total)[2]	VC
MW-8S	December 1998	< 5	8,500	1,100
	January 1999	< 5	9,300	2,100
	February 1999	3,000	2,500	< 10
	March 1999	120	1,406	330
	April 1999	130	4,416	480
	May 1999	320	2,110 J	62 J
	July 1999	35 J	1,600	290
	September 1999	96 J	7,100	1,600
	January 2000	9	50	72
	July 2000	< 5	1,107 J	820
	December 2001	85	11 J	1 J
	March 2002	6	51 J	18
	July 2002	< 5	4.6 J	5 J
	October 2002	< 20	410	130
	December 2002	3 J	37 J	23
	August 2003	9	8.8	3
	December 2003	< 5	50 J	49
	June 2004	< 5	9.6 J	35
	November 2004	< 20	400	93
	July 2005	< 20	320	180
	March 2008	150 D	758 DJ	60 DJ
	June 2008	< 100	3,100 D	910
	September 2008	46 J	6,029 DJ	1,800
	December 2008	26	69 J	1.5
	March 2009	23	92	< 1
	June 2009	42	3,000	350
	September 2009	57	7,800 D	870
	December 2009	67	4,400	270
	March 2010	< 25	4,700	580
	June 2010	< 25	5,400 D	690
	October 2010	58	1,811	57
	December 2010	14	66	< 1
	March 2011	25	145	3
	June 2011	10	3,902 D	334 D
	October 2011	12	2,744 D	115 D
	December 2011	16	158	< 1
	March 2012	29.5	399.5	24.2
	October 2012	< 1	809	1270
	March 2013	16.7	121	< 1
	August 2013	1.6	3410.1	242
MW-9	March 2008	3.4 J	6.9 J	3.6 J
	June 2008	10	< 5	< 5
	September 2008	9.8 J	2.2 J	< 25
	December 2008	6.8	0.52 J	< 1
	March 2009	4.8	2.7	1.4
	June 2009	7.2	< 1	< 1
	September 2009	11	< 1	< 1
	December 2009	4.1	< 1	< 1
	March 2010	2.1	2.7	1.9
	June 2010	5.3	< 1	< 1
	October 2010	8.4	< 1	< 1
	December 2010	4.7	< 1	< 1
	March 2011	4	4.2	1.5
	June 2011	9	< 1	< 1
	October 2011	8.6	< 1	< 1
	December 2011	6.7	< 1	< 1
	March 2012	4.4	1.4	< 1
	October 2012	3.4	3.0	4.4
	March 2013	3	< 1	< 1
	August 2013	4	2.4	< 1
MW-10R[4]	June 2010	3.9	12	< 2
	October 2010	56	260	< 2
	December 2010	22	9.4	< 1
	March 2011	76	17	< 1
	June 2011	9.3	273	1.8
	October 2011	86	143	< 1
	December 2011	11	31	< 1
	March 2012	17	111	< 1
	May 2012	13.2	157	< 1
	October 2012	< 1	1.7	< 1
	December 2012	1.1	41	< 1
	March 2013	79.3	38.6	< 1
	June 2013	9.6	19.4	< 1
	August 2013	< 1	23	< 1
	November 2013	1.5	2.1	< 1
MW-12	December 1998	81	524 J	260
	January 1999	60	460	120
	February 1999	4,400 B	9,800	< 10
	March 1999	66 J	4,516	380
	April 1999	510	9,200	710 J
	May 1999	300	7,438 J	360 J
	July 1999	6	29 J	83
	September 1999	56	1,000	120
	January 2000	12 J	1,100	920
	July 2000	< 5	< 5	< 10
	December 2001	< 5	15 J	< 10
	March 2002	7	172 J	120
	July 2002	< 5	35	24
	October 2002	10	48 J	37
	December 2002	64	301 J	130
	August 2003	42	40	100
	December 2003	22	140	220
	June 2004	< 5	11	26
	November 2004	32	140	140
	July 2005	0.76	51	86
	March 2008	44	1,808 DJ	400
	June 2008	< 100	1900	470
	September 2008	< 50	810	410
	December 2008	1,600 D	1,808 D	30
	March 2009	540	760	14
	June 2009	280	2300	140
	September 2009	< 20	5,800 D	230
	December 2009	470	3,500	59
	March 2010	510	3800	140
	June 2010	110	4,800	440
	October 2010	36	970	310
	December 2010	230	1,200	< 10
	March 2011	127	620.4	9.4
	June 2011	194	3,843 D	364 D
	October 2011	1,750 D	1,942 D	15
	December 2011	828 D	2,032 D	25
	March 2012	188	1,580	25.3
	May 2012	5870	9,958	106
	October 2012	< 1	2,685	3860
	December 2012	692	1,244	5.8
	March 2013	130	745	< 1
	June 2013	393	2,092	76.7
	August 2013	198	1,016	460
	November 2013	1010	1,810	58.4
MW-13	July 2000	< 5	6	4 J
	December 2001	24	< 5	< 5
	July 2002	0.9 J	< 5	< 5
	October 2002	< 5	< 5	< 5
	December 2002	51	3 J	< 5
	August 2003	3	< 5	< 5
	December 2003	< 5	< 5	< 5
	June 2004	< 5	< 5	< 5
	November 2004	< 5	< 5	< 5
	July 2005	< 5	< 5	< 5
	March 2008	2.7 J	48 J	24
	June 2008	6.7	1,306 DJ	85
	September 2008	< 100	1,700 D	890
	December 2008	61	523 DJ	200 D
	March 2009	41	1,700	630
	June 2009	< 50	6,200	1,700
	September 2009	< 25	2,600	170
	December 2009	< 5	900	400
	March 2010	< 5	510	170
	June 2010	< 5	1,400 D	530
	October 2010	< 10	5,157 D	4,500 D
	December 2010	< 25	4,500 D	4,300
	March 2011	5.8	363	612
	June 2011	5.7	325	377
	October 2011	85	1,538 D	1,310 D
	December 2011	79	916 D	494 D
	March 2012	36.7	392	243
	May 2012	495	3,116	682
	October 2012	< 1	2,554	3,100
	December 2012	72.2	316	15
	March 2013	52.8	350	27.7
	June 2013	40.9	971.3	60.2
	August 2013	< 1	1,564	1,000
	November 2013	29.5	125	8.2
MW-14	July 2000	13 J	4,700	1,400
	December 2001	< 5	3,000	610
	March 2002	< 5	6,600	1,100
	July 2002	NA	14,000	3,800
	October 2002	< 500	8,400	2,000
	December 2002	< 250	6,816 J	1,400
	August 2003	< 1,200	20,000	1,900
	December 2003	< 500	16,000	2,200
	June 2004	< 1,000	19,000	2,500
	December 2004	< 500	16,000	2,300
	March 2008	1.7 J	1,009 DJ	340
	June 2008	< 100	1,800	550
	September 2008	< 100	1,814 J	3,900 D
	December 2008	3.7	975 DJ	390 D
	March 2009	< 5	620	150
	June 2009	< 10	1,100	450
	September 2009	< 2.5	190	300
	December 2009	< 2.5	710 D	310
	March 2010	< 5	1,307 D	510
	June 2010	< 2	220	280
	October 2010	< 1	85	170
	December 2010	3.4	1,607 D	390 D
	March 2011	66	1,809	451
	June 2011	< 1	1,419 D	544
	October 2011	3.4	2,230 D	476 D
	December 2011	3.1	1,282 D	353
	March 2012	< 1	3401.3	1260
	May 2012	< 1	568	209
	October 2012	< 1	24.9	65
	December 2012	2.9	1828.7	194
	March 2013	< 1	801	158
	June 2013	< 1	2512.5	611
	August 2013	< 1	888.2	526
	November 2013	< 1	2310	1190
ESI-1	July 2002	< 100	210	2,300
	October 2002	< 20	21	460
	August 2003	< 20	16	420
	December 2003	< 5	1 J	1 J
	June 2004	< 500	92 J	1,300
	December 2004	< 5	< 5	< 5
	July 2005	< 50	70	1,200
	March 2008	< 50	< 50	< 50
	June 2008	< 50	< 50	< 50
	September 2008	< 50	< 50	< 50
	December 2008	< 1	< 1	< 1
	March 2009	< 1	< 1	< 1
	June 2009	< 1	< 1	< 1
	September 2009	< 1	3.2	< 1
	December 2009	< 1	< 1	< 1
	March 2010	< 1	3.6	< 1
	June 2010	< 1	< 1	< 1
	October 2010	< 1	< 1	< 1
	December 2010	< 1	< 1	< 1
	March 2011	< 1	< 1	< 1
	June 2011	< 1	< 1	< 1
	October 2011	< 1	< 1	< 1
	December 2011	< 1	< 1	< 1
	March 2012	< 1	< 1	< 1
	October 2012	< 1	10.9	11.8
	March 2013	< 1	< 1	< 1
	August 2013	< 1	< 1	< 1
ESI-2	July 2002	< 20	21	390
	October 2002	< 10	< 10	52
	August 2003	< 5	< 5	36
	December 2003	< 20	230	500
	June 2004	< 5	5 J	190
	December 2004	< 5	< 5	12
	July 2005	< 5	< 5	75
	March 2008	< 25	< 25	< 25
	December 2008	< 1	< 1	< 1
	March 2009	< 1	< 1	< 1
	March 2010	< 1	< 1	< 1
	June 2010	< 1	< 1	< 1
	October 2010	< 1	< 1	< 1
	December 2010	< 1	< 1	< 1
	March 2011	< 1	< 1	< 1
	June 2011	4.1	< 1	1.1
	October 2011	< 1	< 1	< 1
	December 2011	< 1	< 1	< 1
	March 2012	< 1	< 1	< 1
	October 2012	< 1	< 1	< 1
	March 2013	< 1	< 1	< 1
	August 2013	< 1	< 1	< 1
ESI-4R[3]	October 2010	150	186	38
	December 2010	12	410	39
	March 2011	134	410	52
	June 2011	15	1,165 D	248 D
	October 2011	4.2	391	102
	December 2011	2.5	480 D	101
	March 2012	3.5	2,070	825
	August 2013	< 1	98	9.2
ESI-6	December 1998	2 J	19	13
	January 1999	< 5	30	34
	February 1999	360	22	< 10
	March 1999	390	82	50
	April 1999	520	75	45 J
	May 1999	280	39	42
	July 1999	120	12	11
	September 1999	610	8 J	< 10
	January 2000	130	46	24
	July 2000	< 5	< 5	< 10
	December 2001	3	14	5
	March 2002	< 5	49	26
	July 2002	1 J	4 J	2 J
	October 2002	< 5	1 J	< 5
	December 2002	< 5	14	9
	August 2003	< 5	2	< 5
	December 2003	4 J	67	23
	June 2004	< 5	6	12
	November 2004	< 5	43	11
	July 2005	< 5	14	6
	March 2008	< 5	1.6 J	3.6 J
	June 2008	< 5	< 5	1.5 J
	September 2008	< 5	2.6 J	3.2 J
	December 2008	< 1	2.2	1.1
	March 2009	9.1	6.8	2.4
	June 2009	1.4	1.1	< 1
	September 2009	< 1	< 1	< 1
	December 2009	< 1	2.1	< 1
	March 2010	< 1	< 1	< 1
	June 2010	< 1	< 1	< 1
	October 2010	< 1	< 1	< 1
	December 2010	< 1	1.6	< 1
	March 2011	1.1	2.5	< 1
	June 2011	< 1	< 1	< 1
	October 2011	< 1	< 1	< 1
	December 2011	< 1	1.5	< 1
	March 2012	< 1	< 1	< 1
	October 2012	< 1	< 1	< 1
	March 2013	< 1	< 1	< 1
	August 2013	< 1	1.3	< 1
ESI-7	December 1998	320	8	< 10
	January 1999	< 5	3	< 10
	February 1999	16	19	< 10
	March 1999	100	40	2 J
	April 1999	180	37	4 J
	May 1999	77	83 J	88
	July 1999	89	2.5 J	4 J
	September 1999	190	4 J	< 10
	January 2000	33	49.7 J	3 J
	July 2000	4 J	14	< 10
	December 2001	7	17 J	2 J
	March 2002	65	261 J	2 J
	July 2002	9	204 J	33
	October 2002	1 J	7	2 J
	December 2002	24	83 J	1 J
	August 2003	10	93	5
	December 2003	13	171 J	4 J
	July 2004	< 5	17 J	11
	November 2004	10	66	< 5
	July 2005	< 5	19	18
	March 2008	2.2 J	20	2.4 J
	June 2008	< 5	< 5	< 5
	September 2008	< 5	1.1 J	0.55 J
	December 2008	0.79 J	3.2	< 1
	March 2009	7.9	5.7	< 1
	June 2009	< 1	< 1	< 1
	September 2009	< 1	1.4	< 1
	December 2009	< 1	1.8	1.4
	March 2010	1.1	5.6	3.2
	June 2010	< 1	1.1	1.2
	October 2010	< 1	2.6	1.2
	December 2010	7.3	13	< 1
	March 2011	44	168	6.8
	June 2011	< 1	1.3	1.6
	October 2011	< 1	1.2	< 1
	December 2011	1.2	9.1	< 1
	March 2012	8.5	10.1	1.5
	October 2012	< 1	2.1	4.4
	March 2013	< 1	< 1	< 1
	August 2013	< 1	< 1	< 1
OW-5	March 2008	< 5	< 5	< 5
	June 2008	< 5	6,656 DJ	11,000 D
	September 2008	< 25	7,213 DJ	11,000 D
	December 2008	< 1	< 1	< 1
	March 2009	< 1	< 1	< 1
	June 2009	< 5	930	780
	September 2009	< 5	3,200 D	5,400 D
	December 2009	< 1	130	130
	March 2010	< 1	1,709 D	1,400 D
	June 2010	< 10	5,100 D	4,200 D
	October 2010	< 2	46	110
	December 2010	< 1	< 1	< 1
	March 2011	< 1	< 1	< 1
	June 2011	1	2,558 D	1650
	October 2011	< 1	187	137 D
	December 2011	< 1	< 1	< 1
	March 2012	< 1	1207.5	1030
	October 2012	< 1	2554.2	4060
	March 2013	< 1	9.3	< 1
	August 2013	< 1	1868.8	2,710
OW-6	March 2008	42	343 DJ	76
	June 2008	11 J	100	310
	September 2008	14 J	130	330
	December 2008	230 D	98 D	0.8 J
	March 2009	480	210	< 2.5
	June 2009	94	290	40
	September 2009	35	300	120
	December 2009	200	640 D	9.8
	March 2010	59	606	150
	June 2010	20	420	120
	October 2010	32	223	220
	December 2010	190 D	180	1.4
	March 2011	3.6	6.1	< 1
	June 2011	15	249	17
	October 2011	2.7	11.7	< 1
	December 2011	610 D	362 D	< 1
	March 2012	298	314	4.3
	May 2012	66.8	414	57.5
	October 2012	9.6	93.6	100
	December 2012	13.8	85.5	57.6
	March 2013	27.8	46	< 1
	June 2013	35	157	87.5
	August 2013	28.5	207.0	290
	November 2013	1	2.1	1.6

Notes:

1. Samples analyzed using US EPA Method 8260.
2. DCE (total) includes the sum of 1,1-Dichloroethene, cis-1,2-Dichloroethene, and trans-1,2-Dichloroethene.
3. ESI-4R was installed as a replacement to ESI-4 in the First Quarter 2010.
4. MW-10R was installed as a replacement to MW-10 in the First Quarter 2010.

Definitions:

< - Indicates the sample concentration was less than the laboratory detection limit
D - Identifies an analysis that used a secondary dilution factor
DCE - Dichloroethene
J - Indicates an estimated value
TCE - Trichloroethene
µg/L - Micrograms per liter
VC - Vinyl Chloride

Table 10. Annual Mass Recovery, DC Rollforms Site, Jamestown, New York.

Year	Estimated Annual Mass Recovery[1]		
	Dissolved Phase (kg)	Vapor Phase (kg)	DNAPL (gallons)[2]
2008	30.4	116.2	117
2009	90.7	27.5	135
2010	72.0	8.1	39
2011	133.2	8.8	18
2012	39.9	9.3	12.5
2013	8.6	3.4	2.5
Total	**374.7**	**173.3**	**324.0**

Notes:

1. Estimated cumulative mass recovery includes mass recovered since the system was brought online at the beginning of 2008.
2. Total volume of DNAPL recovered is based on volumes removed and containerized from oil/water separator (OWS-200) during the reporting period.

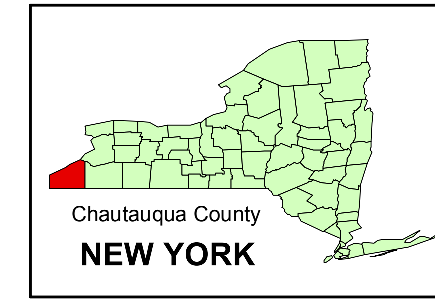
Definitions:

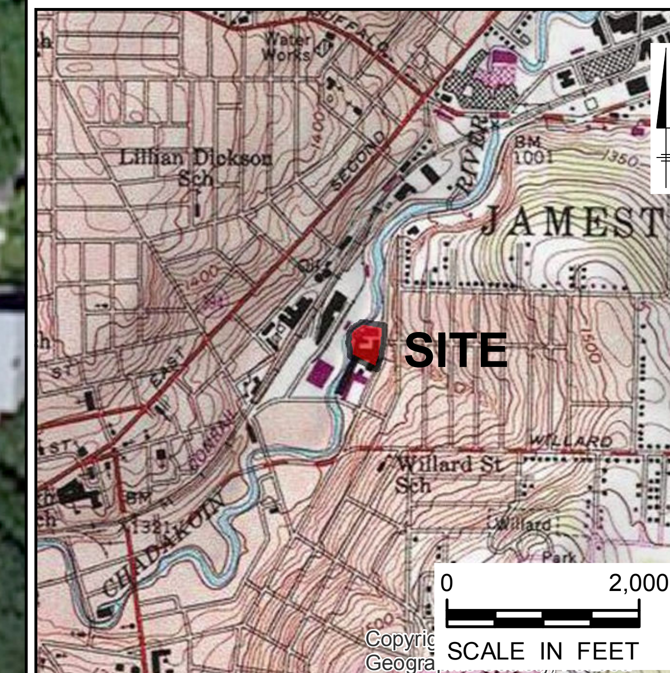
DNAPL - Dense Non-Aqueous Phase Liquid

kg - kilograms

ARCADIS

Figures





LEGEND

- Property Line
- Riverbank
- Flow Direction

0 60 120
SCALE IN FEET

PROJECTION: NAD 1983 StatePlane New York West FIPS 3103 Feet

SOURCE: ESRI Online Imagery (June 2010).

INGERSOLL RAND - DC ROLLFORMS SITE
NYSDEC SITE NO. 907019
JAMESTOWN, NEW YORK

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: (KNOXVILLE) DIV/GROUP:(ENV/GIS) PIC:(.) PM:(M.SANFORD) TM:(T.CARIGNAN)
PROJECT: AY000219.0020 PATH: G:\GIS\DC ROLLFORMS\MAPDOCS\F1 DCR SITE LOCATION.MXD SAVED: 7/8/2014 BY: BALTOM

LEGEND

- Monitoring Well
- Recovery Well (passive)
- Injection Well (inactive)
- Observation Well
- Vacuum Enhanced Pumping Well
- VEP Valve Box
- Property Line
- Sheet Pile Wall
- High Water Mark
- Bundled Process Line
- Discharge Line
- Recovery Well Piping
- Vacuum Line
- Overhead Electrical/Telecom Line
- Sanitary Sewer Line
- Bollard Pipe
- Effluent Pipe Clean Out
- Fire Hydrant
- Sewer Manhole
- Utility Pole

NOTE:
All locations are approximate.

0 40 80
SCALE IN FEET

PROJECTION: NAD 1983 StatePlane New York West FIPS 3103 Feet

SOURCE: ESRI Online Imagery (June 2010).

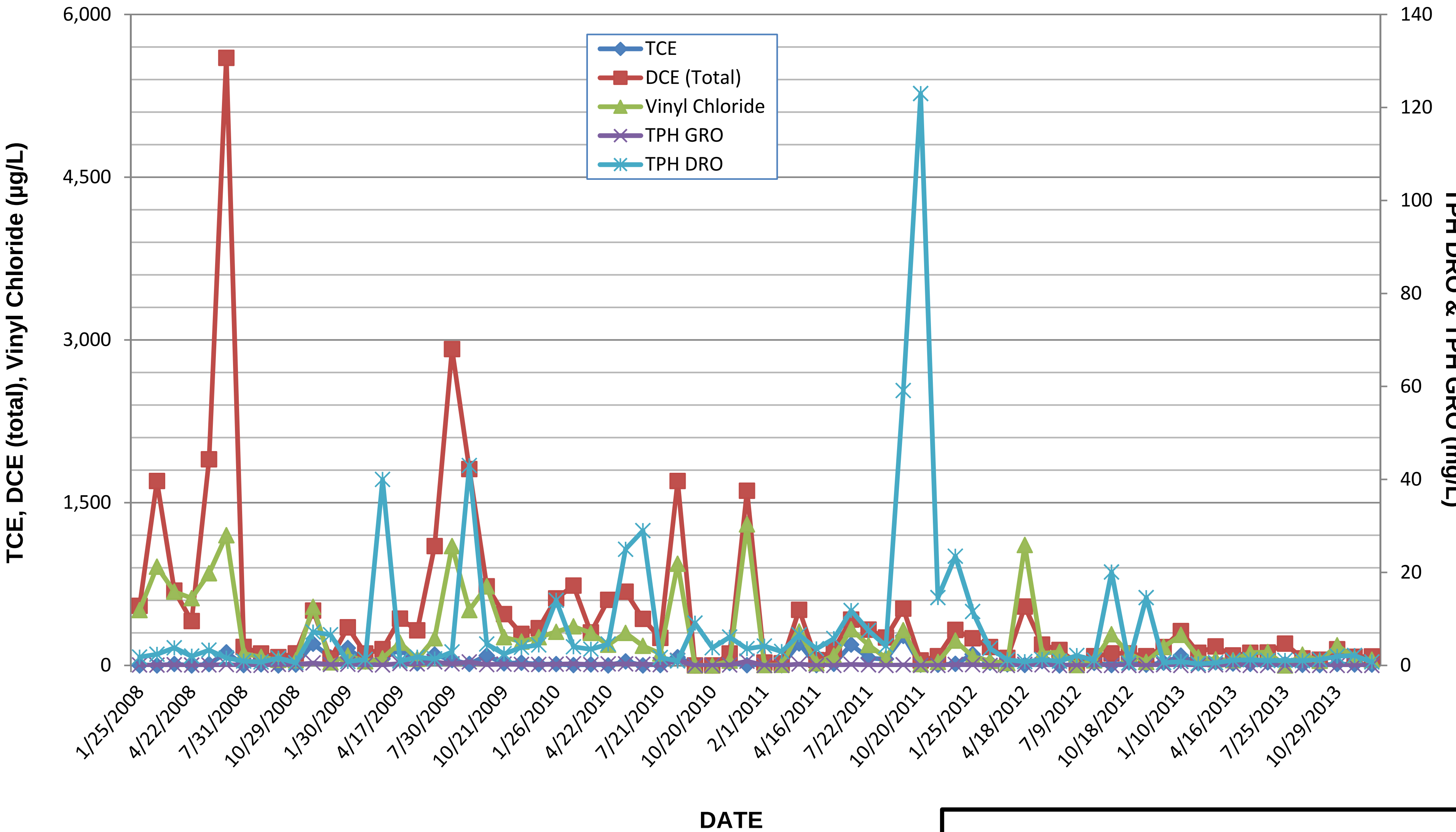
INGERSOLL RAND - DC ROLLFORMS SITE
NYSDEC SITE NO. 907019
JAMESTOWN, NEW YORK

Site Plan

ARCADIS

FIGURE
2

CITY: (KNOXVILLE) DIV/GROUP:(ENV/GIS) PIC:(,) PM:(M.SANFORD/M.WACKSMAN) TM:(T.CARIGNAN) BY: BALTOM
PROJECT: AY000219.0020 PATH: G:\GIS\DC ROLLFORMS\MAPDOCS\2014\MISC\F2 DCR_MISC SITE PLAN.MXD SAVED: 7/29/2014



Abbreviations:

DCE – Dichloroethene
DRO – Diesel Range Organics
GRO – Gasoline Range Organics
mg/L – milligrams per liter
TCE – Trichloroethene
TPH – Total Petroleum Hydrocarbons
µg/L – micrograms per liter

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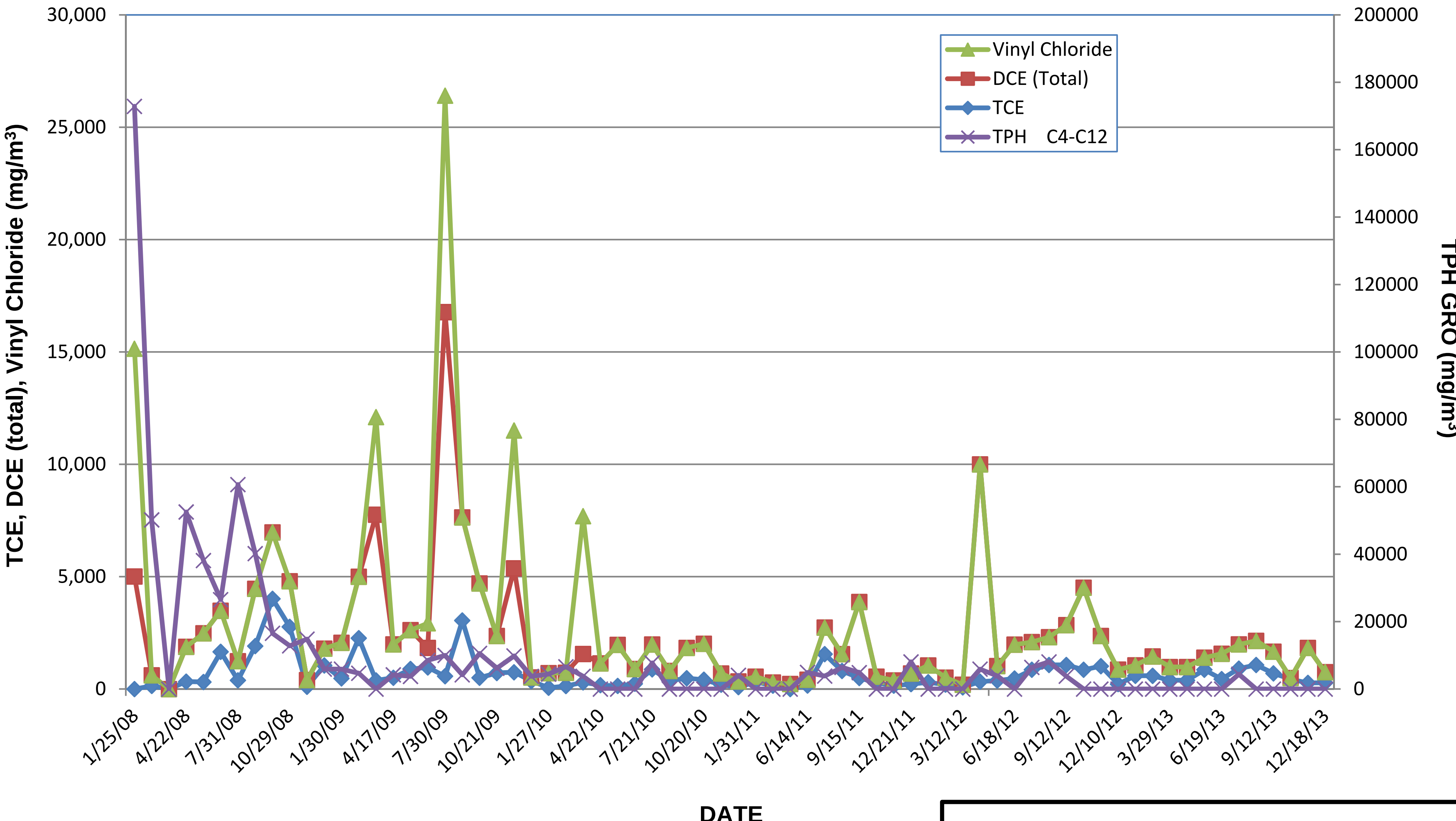
JAMESTOWN, NEW YORK
2013 ANNUAL MONITORING REPORT

System Influent Dissolved Phase Concentrations

ARCADIS

FIGURE
3



Abbreviations:
DCE – Dichloroethene
GRO – Gasoline Range Organics
mg/m^3 – milligram per cubic meters
TCE – Trichloroethene
TPH – Total Petroleum Hydrocarbons

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JAMESTOWN, NEW YORK
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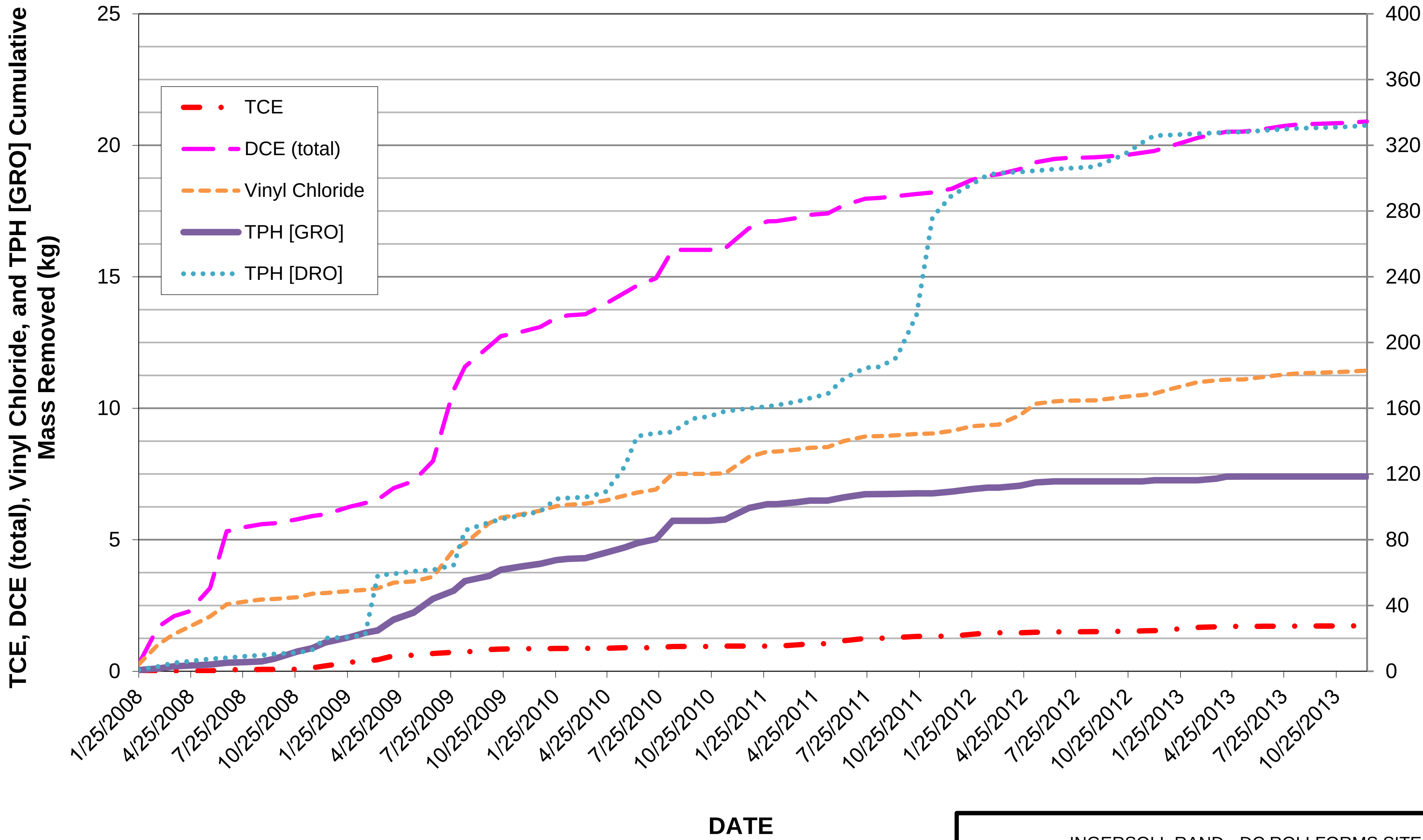
System Influent Vapor Phase Concentrations

ARCADIS

FIGURE
4



Abbreviations:
DCE – Dichloroethene
DRO – Diesel Range Organics
GRO – Gasoline Range Organics
kg - kilograms
TCE – Trichloroethene
TPH – Total Petroleum Hydrocarbons

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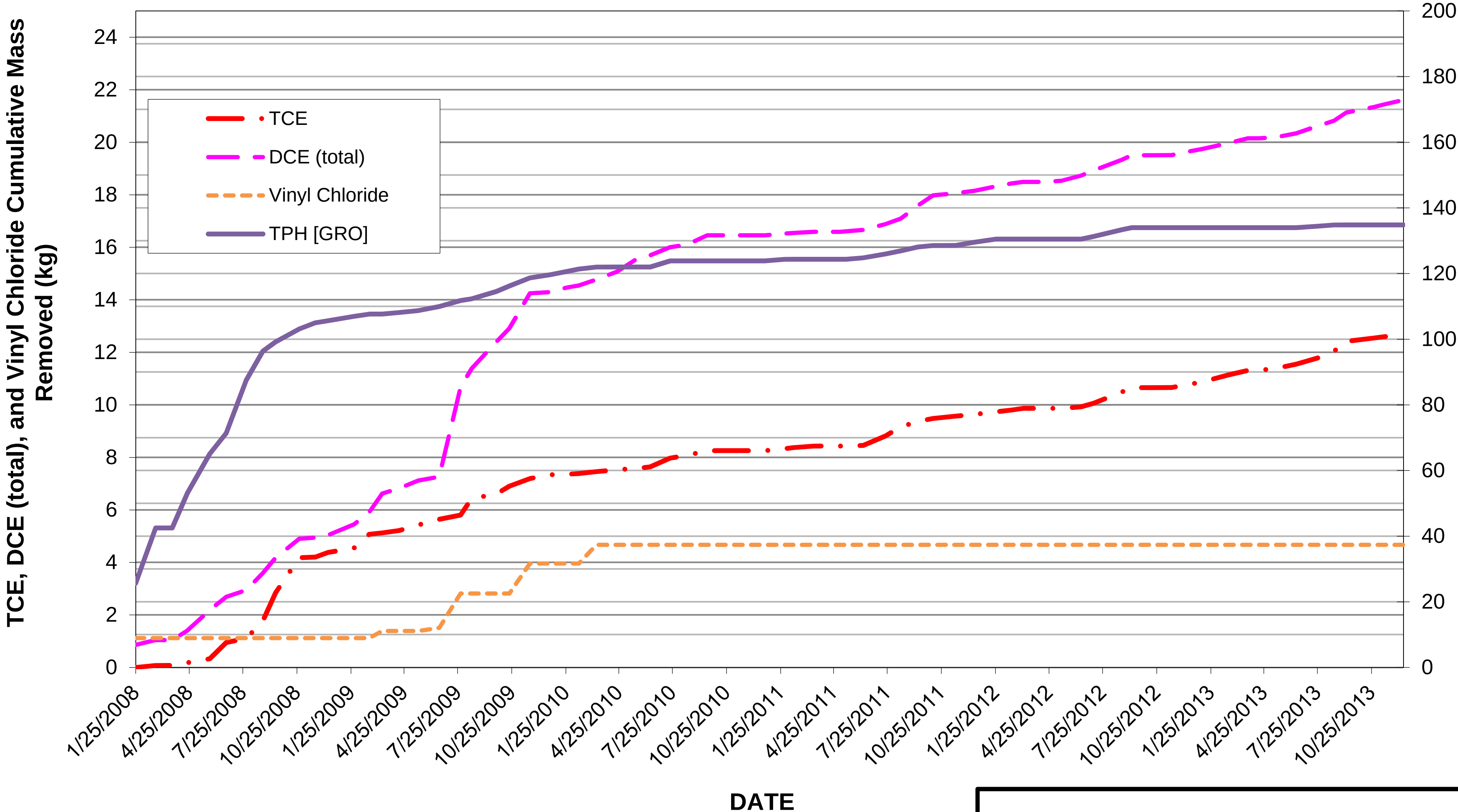
JAMESTOWN, NEW YORK
2013 ANNUAL MONITORING REPORT

Cumulative Dissolved Phase VOC and TPH [GRO & DRO] Mass Recovery

ARCADIS

FIGURE
5



Abbreviations:
DCE – Dichloroethene
GRO – Gasoline Range Organics
kg - kilograms
TCE – Trichloroethene
TPH – Total Petroleum Hydrocarbons

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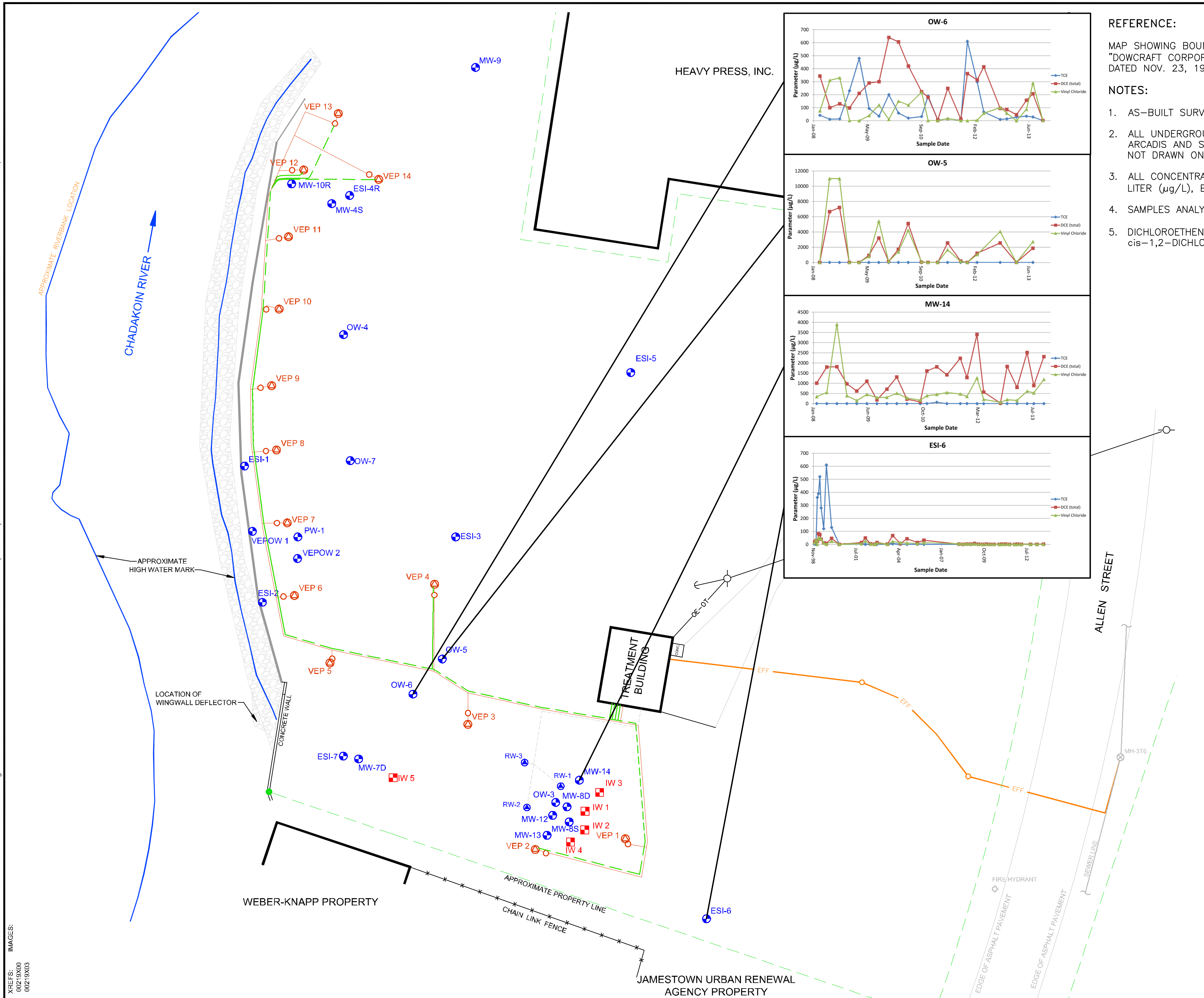
JAMESTOWN, NEW YORK
2013 ANNUAL MONITORING REPORT

Cumulative Vapor Phase VOC and TPH [GRO] Mass Recovery

ARCADIS

FIGURE
6



REFERENCE:

MAP SHOWING BOUNDARY & TOPOGRAPHIC SURVEY AT ALLEN STREET "DOWCRAFT CORPORATION PROPERTY" BY PAUL W. SCHRECKENGOST, LS DATED NOV. 23, 1996 AND LAST REVISED DEC. 21, 1998.

NOTES:

1. AS-BUILT SURVEY PERFORMED BY MICHAEL J. RODGERS LAND SURVEYOR, PC.
2. ALL UNDERGROUND UTILITY LOCATIONS ARE PER INFORMATION PROVIDED BY ARCADIS AND SHOULD BE CONSIDERED APPROXIMATE. UNDERGROUND UTILITIES ARE NOT DRAWN ON PLAN BASED ON DIRECT LOCATION OF PIPELINES, CONDUITS, ETC.
3. ALL CONCENTRATIONS DETECTED IN GROUNDWATER REPORTED IN MICROGRAMS PER LITER (µg/L), EQUIVALENT TO PARTS PER BILLION (ppb).
4. SAMPLES ANALYZED USING USEPA METHOD 8260.
5. DICHLOROETHENE (TOTAL) INCLUDES THE SUM OF 1,1-DICHLOROETHENE, cis-1,2-DICHLOROETHENE, AND trans-1,2-DICHLOROETHENE.

LEGEND:

- MONITORING WELL\OBSERVATION WELL
- RECOVERY WELL (PASSIVE)
- INJECTION WELL (INACTIVE)
- VACUUM ENHANCED PUMPING WELL (ACTIVE)
- VEP VALVE BOX
- IRON STAKE/MONUMENT
- FIRE HYDRANT
- –OE/OT– OVERHEAD ELECTRIC/TELEPHONE
- UTILITY POLE
- GUY WIRE
- SANITARY SEWER MAIN
- BUNDLED PROCESS LINE (AIR/WATER)
- VACUUM PROCESS PIPE (SOIL VAPORS)
- RECOVERY WELL PROCESS PIPE
- –EFF– TREATMENT SYSTEM EFFLUENT PIPE (TREATED GROUNDWATER)
- SHEET PILE WALL
- HIGH RIVER WATER MARK
- APPROXIMATE PROPERTY LINE
- RIP RAP

0 40' 80'

GRAPHIC SCALE

INGERSOLL RAND - DC ROLLFORMS SITE
NYSDEC SITE NO. 907019 JAMESTOWN, NEW YORK
2013 ANNUAL MONITORING REPORT

GROUNDWATER MONITORING ANALYTICAL RESULTS

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FIGURE
7A

CITY: SYRACUSE, NY DIV/GROUP: ENV/CAD DB: P.LISTER G.STOWELL PM: M.SANFORD TM: T.CARIGNAN TR: C.DAVERN LYR: ON=*, OFF=REF
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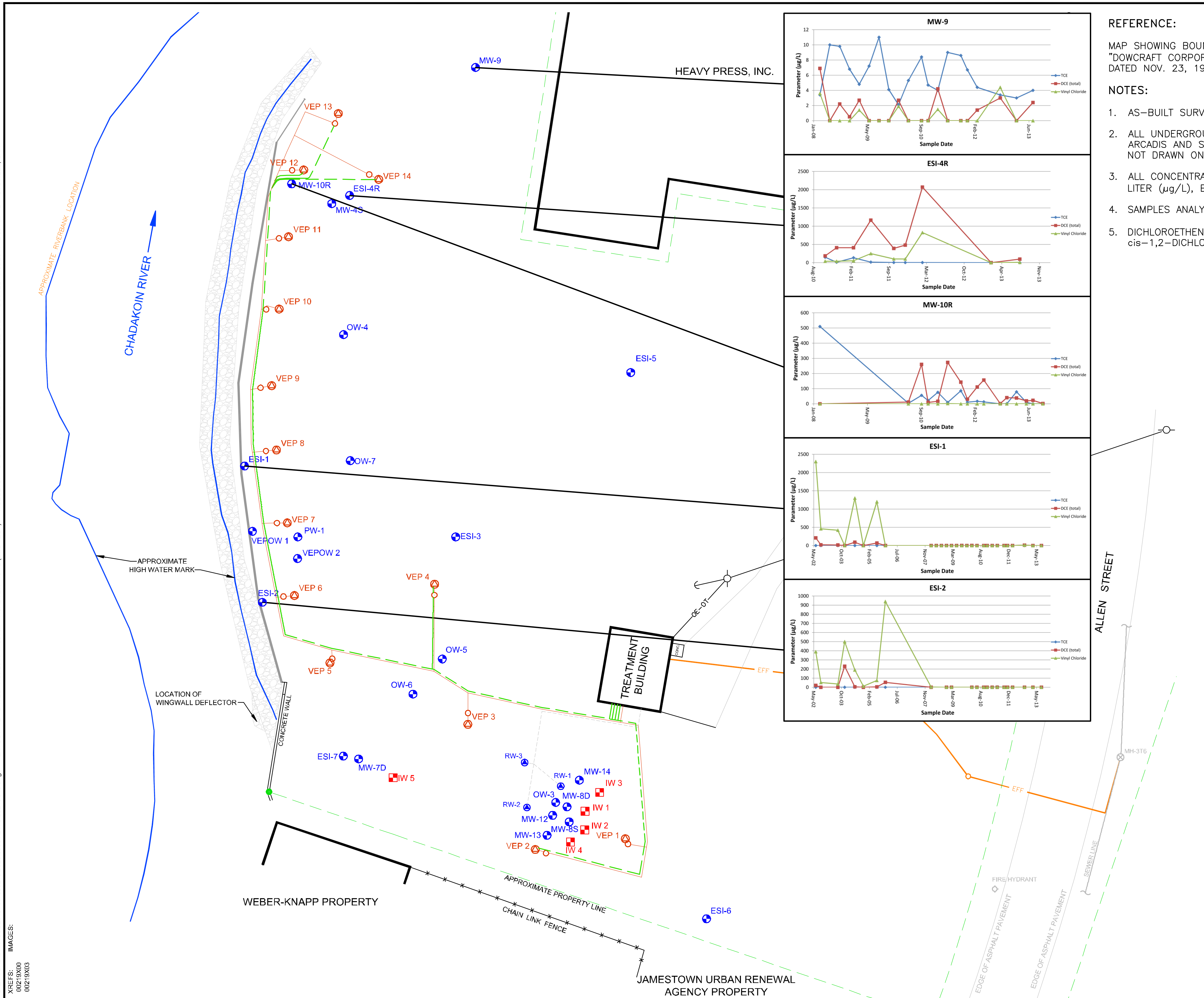

REFERENCE:

MAP SHOWING BOUNDARY & TOPOGRAPHIC SURVEY AT ALLEN STREET "DOWCRAFT CORPORATION PROPERTY" BY PAUL W. SCHRECKENGOST, LS DATED NOV. 23, 1996 AND LAST REVISED DEC. 21, 1998.

NOTES:

1. AS-BUILT SURVEY PERFORMED BY MICHAEL J. RODGERS LAND SURVEYOR, PC.
2. ALL UNDERGROUND UTILITY LOCATIONS ARE PER INFORMATION PROVIDED BY ARCADIS AND SHOULD BE CONSIDERED APPROXIMATE. UNDERGROUND UTILITIES ARE NOT DRAWN ON PLAN BASED ON DIRECT LOCATION OF PIPELINES, CONDUITS, ETC.
3. ALL CONCENTRATIONS DETECTED IN GROUNDWATER REPORTED IN MICROGRAMS PER LITER (µg/L), EQUIVALENT TO PARTS PER BILLION (ppb).
4. SAMPLES ANALYZED USING USEPA METHOD 8260.
5. DICHLOROETHENE (TOTAL) INCLUDES THE SUM OF 1,1-DICHLOROETHENE, cis-1,2-DICHLOROETHENE, AND trans-1,2-DICHLOROETHENE.

LEGEND:

- MONITORING WELL\OBSERVATION WELL
- RECOVERY WELL (PASSIVE)
- INJECTION WELL (INACTIVE)
- VACUUM ENHANCED PUMPING WELL (ACTIVE)
- VEP VALVE BOX
- IRON STAKE/MONUMENT
- FIRE HYDRANT
- –OE/OT– OVERHEAD ELECTRIC/TELEPHONE
- UTILITY POLE
- GUY WIRE
- SANITARY SEWER MAIN
- BUNDLED PROCESS LINE (AIR/WATER)
- VACUUM PROCESS PIPE (SOIL VAPORS)
- RECOVERY WELL PROCESS PIPE
- –EFF– TREATMENT SYSTEM EFFLUENT PIPE (TREATED GROUNDWATER)
- SHEET PILE WALL
- HIGH RIVER WATER MARK
- APPROXIMATE PROPERTY LINE
- RIP RAP

0 40' 80'

GRAPHIC SCALE

INGERSOLL RAND - DC ROLLFORMS SITE
NYSDEC SITE NO. 907019 JAMESTOWN, NEW YORK
2013 ANNUAL MONITORING REPORT

GROUNDWATER MONITORING ANALYTICAL RESULTS

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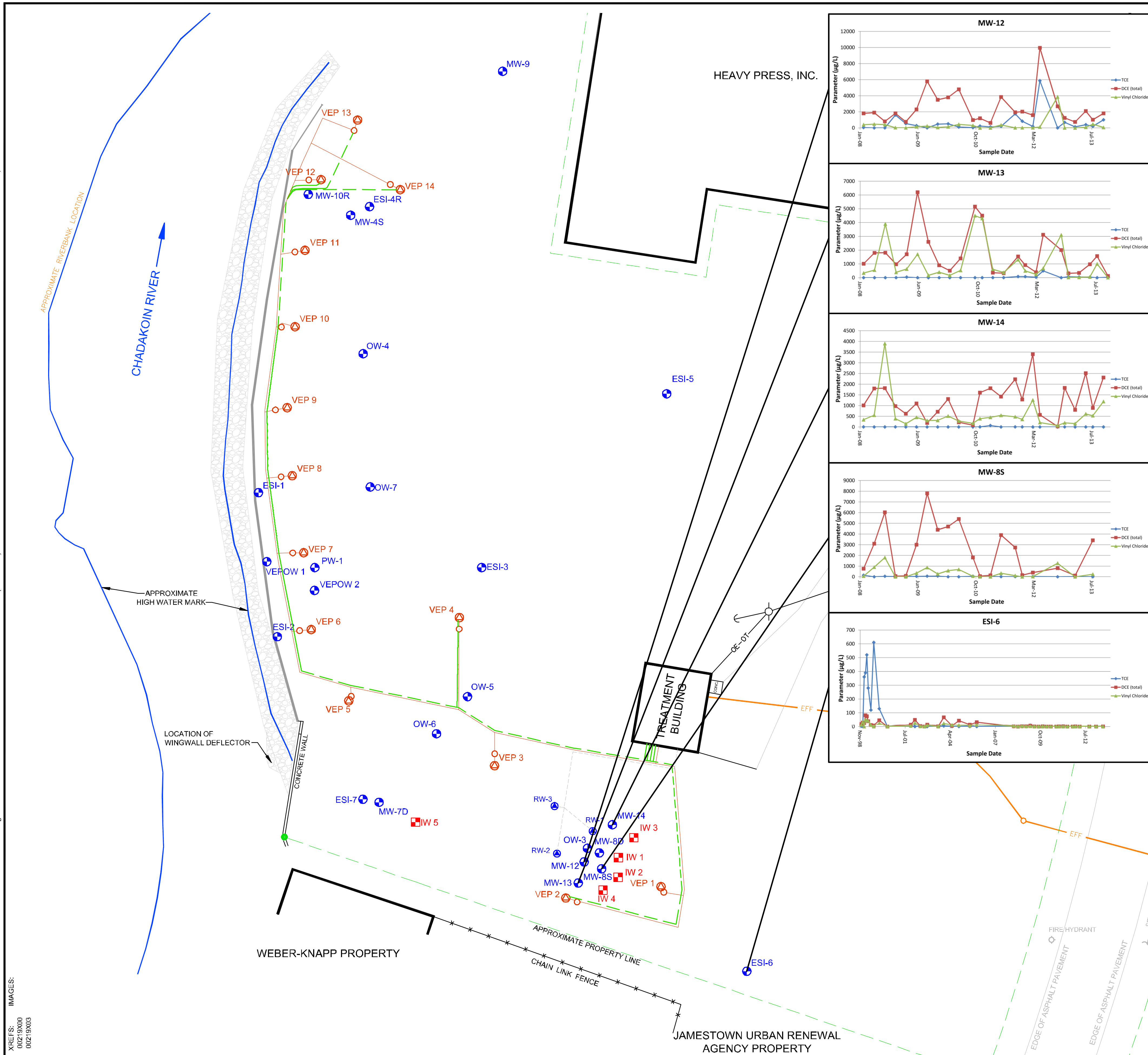
FIGURE **7B**



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- RECOVERY WELL (PASSIVE)
- INJECTION WELL (INACTIVE)
- VACUUM ENHANCED PUMPING WELL (ACTIVE)
- VEP VALVE BOX
- IRON STAKE/MONUMENT
- FIRE HYDRANT
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- UTILITY POLE
- GUY WIRE
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- SHEET PILE WALL
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- APPROXIMATE PROPERTY LINE
- RIP RAP

0 40' 80'

GRAPHIC SCALE

INGERSOLL RAND - DC ROLLFORMS SITE
NYSDEC SITE NO. 907019 JAMESTOWN, NEW YORK
2013 ANNUAL MONITORING REPORT

GROUNDWATER MONITORING ANALYTICAL RESULTS

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FIGURE
7C

CITY: SYRACUSE, NY DIV/GROUP: ENVCAD DB: P.LISTER G.STOWELL PM: M. SANFORD TM: T. CARIGNAN TR: C. DAVERN LYR: ON=*, OFF=REF
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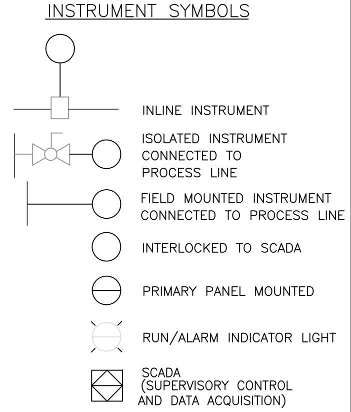
Appendix A

Record Drawings

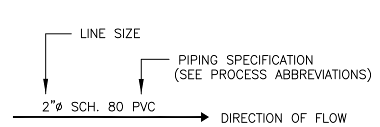
ABBREVIATIONS

AS AIR STRIPPER
B BLOWER
BV BALL VALVE
CS CARBON STEEL
CV CHECK VALVE
FAL FLOW ALARM LOW
FL FAULT LIGHT
FIT FLOW TOTALIZER INDICATOR
FT FLOW TRANSMITTER
G GREEN LIGHT
GAC GRANULAR ACTIVATED CARBON
GALV GALVANIZED
GPM GALLONS PER MINUTE
HDPE HIGH DENSITY POLYETHYLENE
HP HORSE POWER
HOA HAND-OFF-AUTO
HZ HERTZ
HC HOSE CONNECTION
HS HAND SWITCH
LAHH LEVEL ALARM HIGH HIGH
LALL LEVEL ALARM LOW LOW
LSH LEVEL SENSOR HIGH
LSHH LEVEL SENSOR HIGH HIGH
LSL LEVEL SENSOR LOW
M MOTOR
PAHH PRESSURE ALARM HIGH HIGH
PAH PRESSURE ALARM HIGH
PAL PRESSURE ALARM LIGHT LOW
PI PRESSURE INDICATOR
PRV PRESSURE RELIEF VALVE
PSL PRESSURE SWITCH LOW
PSH PRESSURE SWITCH HIGH
PT PRESSURE TRANSMITTER
PVC POLYVINYL CHLORIDE
QD QUICK DISCONNECT
R RED LIGHT
SCH SCHEDULE
SG SIGHT GAUGE
SP SAMPLE PORT
SV SOLENOID VALVE
SDR STANDARD DIMENSION RATIO
TAH TEMPERATURE ALARM HIGH
TI TEMPERATURE INDICATOR
TP TRANSFER PUMP
TYP TYPICAL
UN UNION
VI VACUUM INDICATOR
V VOLT
YL INDICATING LIGHT

INSTRUMENT SYMBOLS

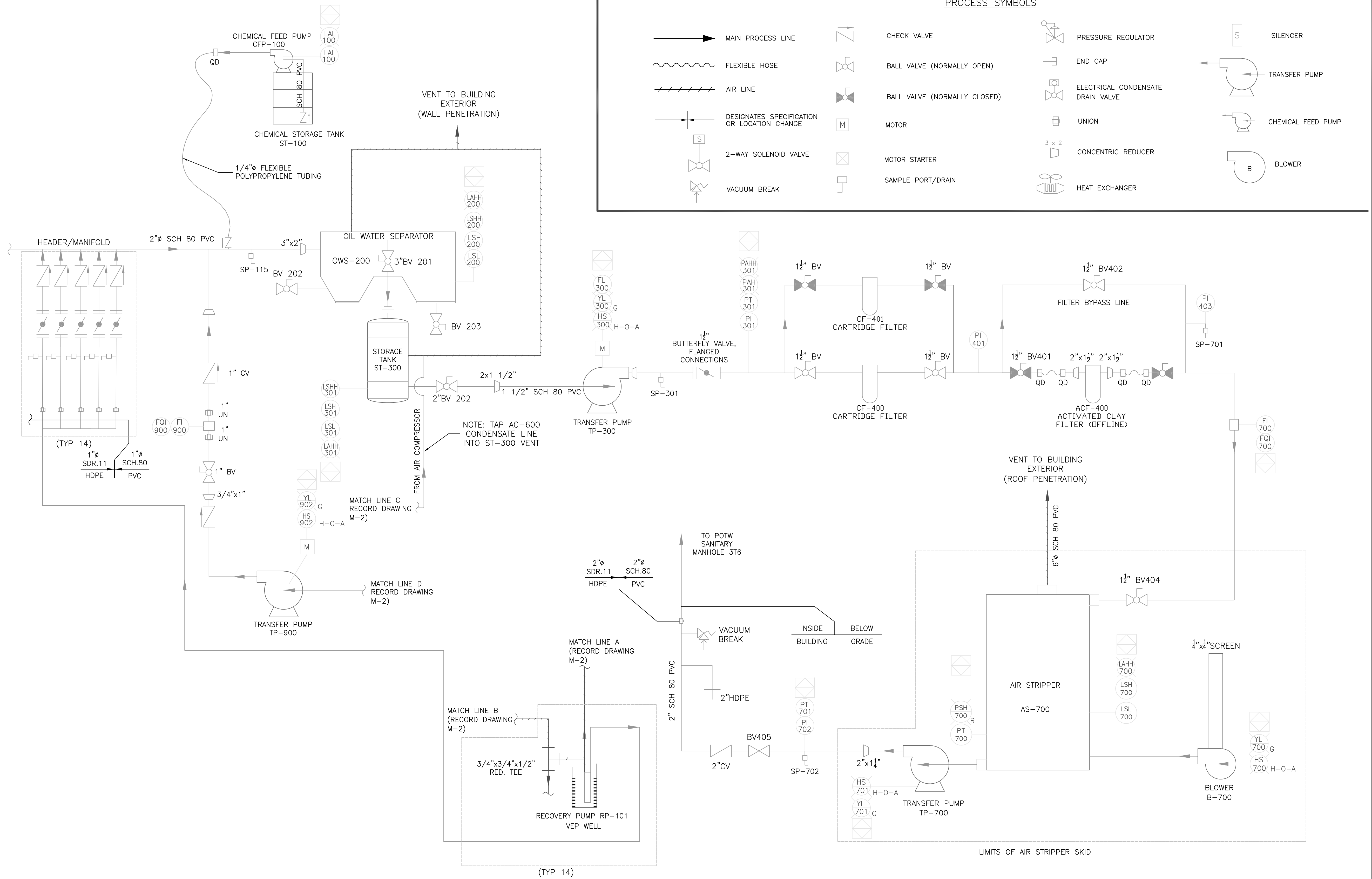


PIPE IDENTIFICATION



PROCESS SYMBOLS

MAIN PROCESS LINE
FLEXIBLE HOSE
AIR LINE
DESIGNATES SPECIFICATION OR LOCATION CHANGE
2-WAY SOLENOID VALVE
VACUUM BREAK
CHECK VALVE
BALL VALVE (NORMALLY OPEN)
BALL VALVE (NORMALLY CLOSED)
MOTOR
MOTOR STARTER
SAMPLE PORT/DRAIN
PRESSURE REGULATOR
END CAP
ELECTRICAL CONDENSATE DRAIN VALVE
UNION
CONCENTRIC REDUCER
HEAT EXCHANGER
SILENCER
TRANSFER PUMP
CHEMICAL FEED PUMP
BLOWER



LIQUID PHASE PROCESS FLOW

DRAWING NOT TO SCALE

CITY:ALBANY DIV/GROUP:SER-1 DB:TP/TC/LE LD:T.CARIGNAN PIC:M.SANFORD PM:M.SANFORD
G:\APROJECT\INGERSOLL\DC Rollforms\AY000219.0014 2008\Engineering Construction Completion Report\As-built Construction Drawings

SCALE(S) AS INDICATED

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No.	Date	Revisions	By	Ckd
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4	6.12.08	RECORD DRAWING SUBMITTAL TO NYSDEC	TC	MM
3	5.30.06	100 % REMEDIAL DESIGN SUBMITTAL TO NYSDEC	TC	KL
2	4.17.06	BID SUBMISSION TO CONTRACTORS	TC	KL
1	2.9.06	90% SUBMITTAL TO NYSDEC	TC	KL
0	1.13.06	DRAFT	TC	KL

Professional Engineer's Name: MOH MOHIUDDIN
Professional Engineer's No.: 074527

State	Date Signed	Project Mgr.
NY	11/18/08	M.SANFORD
Designed by	Drawn by	Checked by
T.CARIGNAN	TP/TC/LE	C.DAVERN

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INGERSOLL RAND • D.C. ROLLFORMS
JAMESTOWN, NEW YORK

LIQUID PHASE PROCESS & INSTRUMENTATION DIAGRAM, AND GENERAL LEGEND

MECHANICAL

ARCADIS Project No. AY000219.0014.00006

Date 11.18.08

ARCADIS OF NEW YORK, INC.
465 NEW KARNER ROAD
FIRST FLOOR
ALBANY, NEW YORK
TEL. 518.452.7826

M-1

CITY:ALBANY DIV/GROUP:SER-1 DB:TP/TC/LE LD:T.CARIGNAN PIC:M.SANFORD PM:M.SANFORD
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ALARMS

Alarm #	Alarm Name	Alarm Description
0	LAHH-901	High High liquid level alarm in SVE knockout tank. Alarm shuts down SVE blower B-900 and heat exchanger HX-500.
1	LAHH-200	High high liquid level in oil/water separator OWS-200. Alarm shuts down air compressor AC-600, chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
2	LAHH-301	High high liquid level in storage tank ST-301. Alarm shuts down air compressor AC-600, chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
3	LAHH-700	High high liquid level in air stripper sump. Alarm shuts down transfer pump TP-300.
4	PAH-301	High pressure alarm indicating pressure greater than 22 psi for pressure transmitter PT-301. Alarm only sends warning and does not affect system components.
5	PAHH-301	High high pressure alarm indicating pressure greater than 27 psi for pressure transmitter PT-301. Alarm shuts down transfer pump TP-300, air compressor AC-600, and SVE blower B-900. Alarm also disables SVE knockout tank transfer pump TP-900 and relieves pressure to pneumatic pumps in recovery wells.
6	PAH-501	High pressure alarm indicating pressure greater than 35 psi for pressure transmitter PT-501. Alarm only sends warning and does not affect system components.
7	PAHH-501	High high pressure alarm indicating pressure greater than 50 psi for pressure transmitter PT-501. Alarm shuts down SVE blower B-900 and heat exchanger HX-500.
8	PAL-601	Low pressure alarm indicating pressure less than 40 psi for the air compressor AC-600. Alarm shuts down only air compressor AC-600.
9	TP-300 Fault	Transfer pump TP-300 motor fault. Alarm shuts down chemical feed pump CFP-100, SVE blower B-900, heat exchanger HX-500, transfer pump TP-300, and transfer pump TP-900. Alarm also relieves pressure to pneumatic pumps in recovery wells.
10	Power Failure	Power failure alarm. Alarm de-energizes chemical feed pump CFP-100, SVE blower B-900, heat exchanger HX-500, and air compressor AC-600. Alarm also relieves pressure to pneumatic pumps in recovery wells.
11	HX-500 Fault	Heat exchanger motor fault. Alarm shuts down chemical feed pump CFP-100, SVE blower B-900, heat exchanger HX-500, and air compressor AC-600. Alarm also relieves pressure to pneumatic pumps in recovery wells.
12	B-900 Fault	SVE blower B-900 motor fault. Alarm shuts down chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
13	TP-900 Fault	Transfer pump TP-900 motor fault. Alarm shuts down transfer pump TP-900, SVE blower B-900, heat exchanger HX-500, and air compressor AC-600.
14	FSL-100	Low flow chemical feed pump alarm. Alarm shuts down only chemical feed pump CFP-100.
15	AC-600 Fault	Air compressor AC-600 motor fault. Alarm shuts down SVE blower B-900 and heat exchanger HX-500.
16	TP-300 Thermal	Transfer pump TP-300 overheat alarm. Alarm shuts down transfer pump TP-300, chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
17	B-900 Thermal	SVE blower B-900 overheat alarm. Alarm shuts down chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
18	HX-500 Thermal	Heat exchanger HX-500 overheat alarm. Alarm shuts down chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
19	PAL-700	Low pressure alarm for air stripper sump. Alarm shuts down transfer pump TP-300, chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
20	LSHH-201 Prod.	High high product level in oil/water separator OWS-200. Alarm shuts down chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.
21	LAH-200	High liquid level in oil/water separator OWS-200. Alarm only sends warning and does not affect system components.
22	PAHH-701	High high pressure alarm indicating pressure greater than 30 psi for pressure transmitter PT-701. Alarm shuts down transfer pump TP-300, chemical feed pump CFP-100, SVE blower B-900, and heat exchanger HX-500. Alarm also relieves pressure to pneumatic pumps in recovery wells.

DRAWING NOT TO SCALE

ALARM LOGIC:

The air compressor, which supplies air to the pneumatic pumps in each VEP recovery well, automatically shuts down in the event of the following alarm conditions for system parameters: high–high level alarm in oil/water separator OWS–200 (LAHH–200), high–high level in storage tank ST–300 (LAHH–301), high–high product level in the oil/water separator oil capturing reservoir (LAHH–201 PROD), low pressure alarm in air compressor AC–600 (PAL–601), high–high level alarm in the air stripper (AS–700) sump (LAHH–700), low pressure alarm in the air stripper (AS–700) sump (PAL–700), high–high pressure alarm after the storage tank transfer pump from pressure transmitter PT–301 (PAHH–301), and a high–high pressure alarm after the discharge pump from PT–701 (PAHH–701). A pair of two–way solenoid valves (SV–1 and SV–2) located between the air compressor and the recovery wells are also interlocked with the above alarms. Upon the occurrence of any of these alarms, one of the solenoid valves closes to shut off the air supply from the compressor, while the other solenoid valve opens to allow the air supply line to the recovery wells to de–pressurize.

The SVE blower (B–900) automatically shuts down in the event of any of the critical alarm conditions listed above for the air compressor and solenoid valves. Given that the vapor extraction pipeline at each VEP well is located above the water recovery pipeline, operation of the SVE blower while the recovery well pumps are not dewatering the wells could result in the unwanted extraction of groundwater by the SVE blower. In addition to the alarm conditions listed above for the air compressor and solenoid valves, the following conditions will result in the automatic shutdown of only the SVE blower: high–high level alarm in SVE knock–out tank KT–900 (LAHH–901) and a high–high pressure alarm directly upstream from the vapor phase granular activated carbon units from pressure transmitter PT–501 (PAHH–501).

In addition to the alarm conditions that will disable components of the remediation system, alarm conditions have been established to provide early warning that a system component may require servicing. The following alarm conditions result in only a notification to operating personnel, and do not cause a system shutdown: a low flow alarm from chemical feed pump CFP–100 (FSL–100), a high pressure alarm from pressure transmitter PT–301 (PAH–301), a high pressure alarm from pressure transmitter PT–501 (PAH–501), a high pressure alarm from pressure transmitter PT–701 (PAH–701), and a high level in oil/water separator OWS–200 (LAH–200).

PROCESS DESCRIPTION:

Groundwater and non–aqueous phase liquid (NAPL) from the vacuum enhanced pumping (VEP) wells is conveyed via underground piping to an on–site treatment building. Prior to reaching the first component of the treatment system (i.e., the oil/water separator OWS–200) a sequestering agent is injected into the process stream. The purpose of the sequestering agent is to prevent iron and manganese related fouling downstream in the system (e.g. process piping, cartridge filters and the air stripper). The groundwater and NAPL is then pumped directly into the oil/water separator (OWS–200) for removal of residual non–emulsified NAPL.

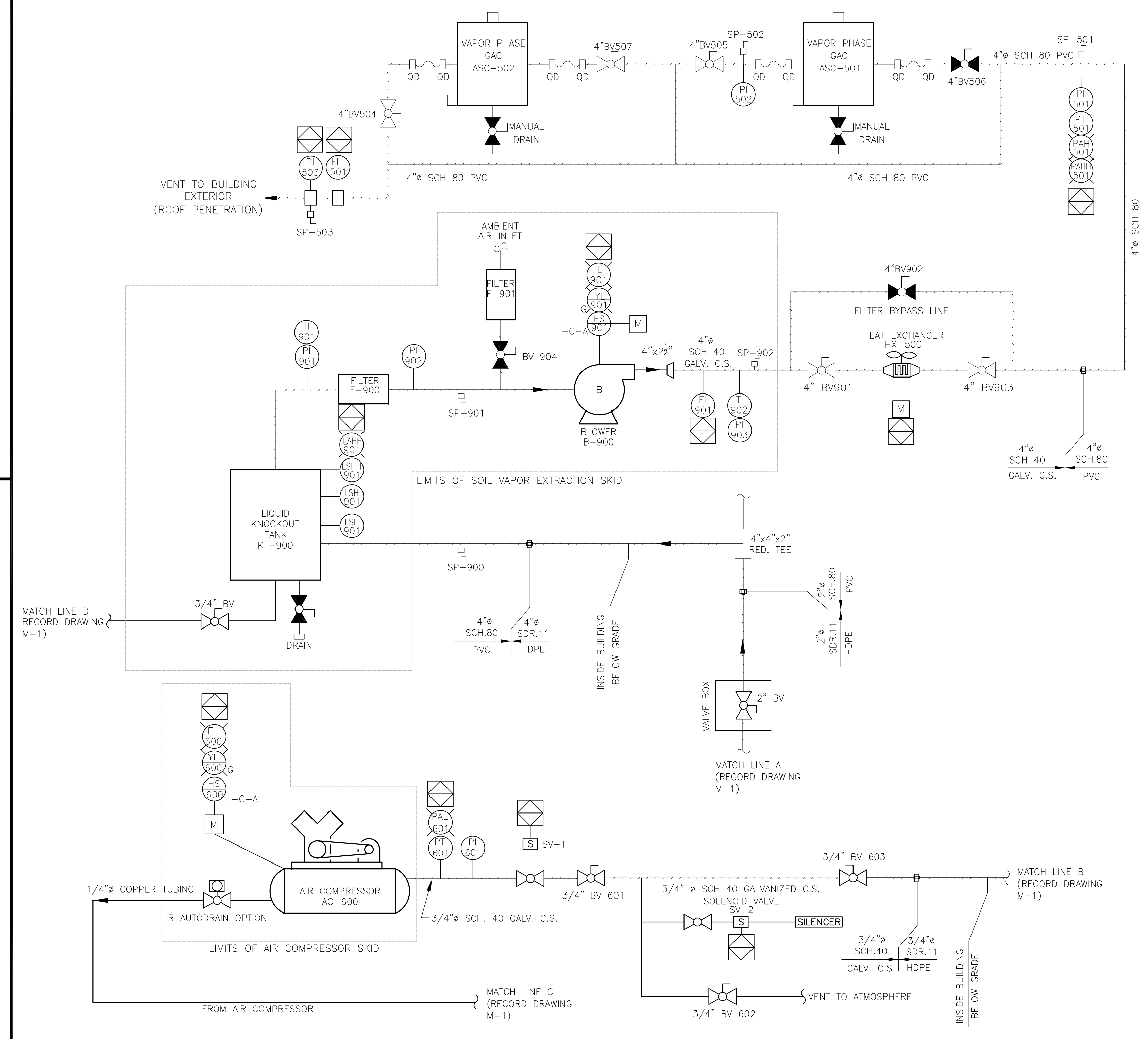
Once the groundwater has passed through the oil/water separator, the water flows by gravity to the storage tank (ST–300). The water is then transferred in batch mode by transfer pump TP–300 through two cartridge filters housings (CF–400 and CF–401) arranged in parallel for removal of residual suspended solids. Following the cartridge filters, groundwater and residual emulsified NAPL is pumped through a liquid phase granular organically modified clay (LPGOC) filter vessel for the removal of emulsified NAPL. Groundwater is pumped through a low–profile air stripper (AS–700) series for the removal of dissolved phase organic compounds. Treated groundwater is then discharged to the local POTW sanitary sewer manhole 3T6 via a single 2–inch standard dimension ratio (SDR) 11 high density polyethylene (HDPE) below grade pipe.

Soil vapors are collected from each VEP well via a regenerative blower (B–900). The recovered soil gas is treated via two (2) vapor–phase granular activated carbon units (VPGAC) arranged in series (ASC–501 and ASC–502).

The system has been designed to monitor the operational status of critical systems on a continual basis during operation. The system is interlocked with sensors and alarms which can temporarily shut down the system in the event the system malfunctions. A system component failure results in a system shutdown to assure that the discharge of untreated groundwater or soil vapor is prevented and also to protect system operators.

GENERAL NOTE:

SEE RECORD DRAWING M–1 FOR GENERAL ABBREVIATIONS, PROCESS SYMBOLS, INSTRUMENT SYMBOLS, AND PIPE IDENTIFICATION.



VAPOR PHASE PROCESS FLOW

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4	6.12.08	DRAFT RECORD DRAWING SUBMITTAL TO NYSDEC	TC	TC
3	5.30.06	100 % REMEDIAL DESIGN SUBMITTAL TO NYSDEC	TC	KL
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0	1.13.06	DRAFT	TC	KL

Professional Engineer's Name: MOH MOHIUDDIN
Professional Engineer's No.: 074527
State: NY | Date Signed: 11/18/08 | Project Mgr.: M.SANFORD
Designed by: T.CARIGNAN | Drawn by: TP/TC/LE | Checked by: C.DAVERN

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VAPOR PHASE PROCESS & INSTRUMENTATION DIAGRAM, AND CONTROL LOGIC

MECHANICAL

ARCADIS Project No. AY000219.0014.00006
Date 11.18.08

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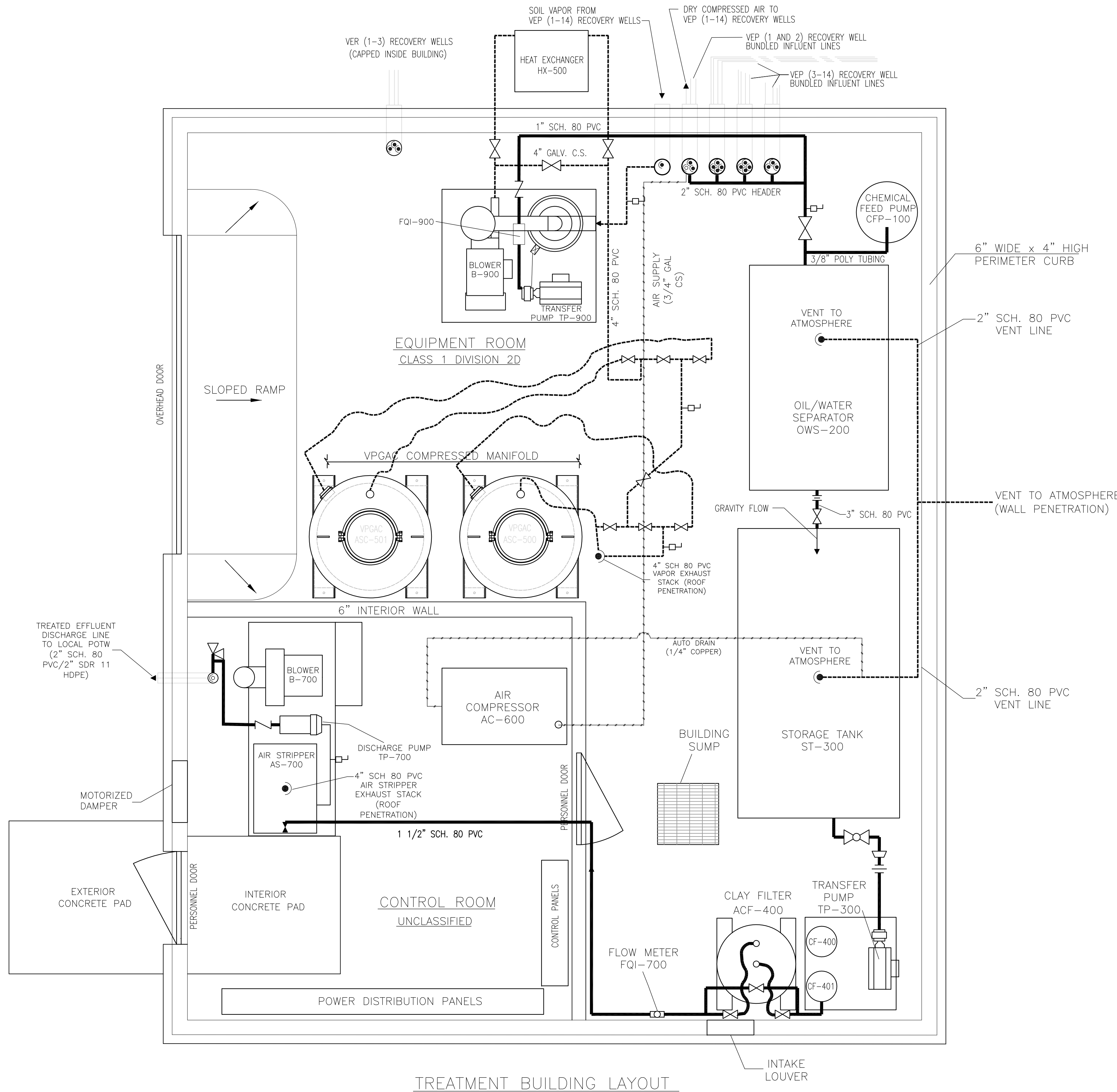
M-2



TREATMENT BUILDING LAYOUT

SCALE: 1" = 2'

LEGEND

- WATER PROCESS LINE
- VAPOR PROCESS LINE
- COMPRESSED AIR PROCESS LINE

EQUIPMENT DESCRIPTIONS

FILTRATION UNITS

VAPOR PHASE CARBON UNITS
ASC-500 AND 501
MAKE: US FILTER
MODEL: VSC-2000
SIZE: 2000-LB

STORAGE TANK
ST-300
MAKE: CHEM-TAINER INDUSTRIES, INC.
MODEL: ST-300
TYPE: ROUND HORIZONTAL BULK STORAGE W/ SUMP
SIZE: 1300 GALLONS

ACTIVATED CLAY/CARBON FILTRATION UNIT
ACF-400
MAKE: US FILTER
TYPE: LIQUID PHASE ADSORBER
MODEL: PV-500

OIL/WATER SEPARATOR
OWS-200
MAKE: HYDROFLO
MODEL: EVS-036-SS34P
TYPE: SS, RECTANGULAR CHANNEL
CAPACITY: 70 GPM
MEDIA: COALESCING PVC MEDIA

CARTRIDGE FILTERS
CF-400 AND CF-401
MAKE: HARMSCO
MODEL: HIF-14
FILTER: 20 MICRON CARTRIDGE
CAPACITY: 60 GPM

MISCELLANEOUS

TRANSFER PUMP
TP-300
MAKE: GOULDS
MODEL: G&L SERIES NPE 316SS
TYPE: POSITIVE DISPLACEMENT
CAPACITY: 20 GPM, 75 FT TDH
MOTOR RATINGS: 1 HP, 3Ø, 460V, EXP

RECOVERY PUMP
RP-1-14
MAKE: QED
TYPE: PNEUMATIC
MODEL: SPECIAL SHORT AP-4T TOP LOADING
CAPACITY: 4 GPM @ 20 PSI.

CHEMICAL HOLDING TANK
CT-100
CHEMICAL: ARIES 2925 SEQUESTERING AGENT
TYPE: PLASTIC DRUM
SIZE: 55 GALLON

CHEMICAL FEED PUMP
CFP-100
MAKE: LMI
TYPE: ELECTRONIC METERING PUMP
MODEL: E70-1-30
MOTOR RATINGS: 1Ø, 120V
CAPACITY: 1.3 GPH (4.9 L/H), 300 PSI
OPTIONS: LMI MICROPACE, MP-100 W/ DIGI-PULSE FLOW MONITOR SERIES FM-200

HEAT EXCHANGER
HX-500
MAKE: XCHANGER, INC.
CAPACITY: 322 SCFM, 150 F IN/80F OUT
MODEL: AA-500 (REF#83360)
MOTOR RATINGS: 3Ø, 460V, XP

AIR COMPRESSOR SKID

AIR COMPRESSOR
AC-600
MAKE: INGERSOLL-RAND
MODEL: UP6-10TAS-125
CAPACITY: 80 GALLON, 38 ACFM, 125 PSI
MOTOR RATINGS: 10 HP, 1Ø, 120 V
OPTIONS: INTERNAL AIR DRYER

SVE SKID

AIR FILTER
F-900
MAKE: SOLBERG
MODEL: CSL-235P-300
CAPACITY: 300 CFM

AIR FILTER
F-901
MAKE: EM PRODUCTS
MODEL: EMF-2

LIQUID KNOCKOUT TANK
KT-900
MAKE: J.E. GASHO & ASSOC.
MODEL: GX-90
SIZE: 90 GALLON

REGENERATIVE BLOWER
B-900
MAKE: ROTRON
MODEL: EN 858 BD72WL
MOTOR RATINGS: 10 HP, 3Ø, 460 V, 60 HZ

TRANSFER PUMP
TP-900
MAKE: OBERDORFER
MODEL: 992R
CAPACITY: 4 GPM
MOTOR RATINGS: 0.5 HP, 3Ø, 460 V

AIR STRIPPER SKID

AIR STRIPPER
AS-700
MAKE: QED
MODEL: EZ-4.4SS
TYPE: LOW PROFILE
CAPACITY: 1.0-25 GPM
MOTOR RATINGS: 3Ø, 460 V, 60HZ

TRANSFER PUMP
TP-700
MAKE: GOULDS
MODEL: NPE SERIES 316L
TYPE: POSITIVE DISPLACEMENT
CAPACITY: 30 GPM, 50 FT TDH.
MOTOR RATINGS: 1 HP, 3Ø, 460 V

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EQUIPMENT LAYOUT AND DESCRIPTIONS

MECHANICAL

ARCADIS Project No. AY000219.0014.00006
Date 11.18.08

ARCADIS OF NEW YORK, INC.
465 NEW KARNER ROAD
FIRST FLOOR
ALBANY, NEW YORK
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M-3

CITY:ALBANY DIV/GROUP:SER-1 DB:TP/TC/LE LD:T.CARIGNAN PIC:M.SANFORD PM:M.SANFORD
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Appendix B

Site Cover and Riverbank Inspection Checklist

Site Cover and Riverbank Inspection Checklist

DC Rollforms Site, Jamestown, New York

Section 1: General Information

Figure Reference:	Weather:
Date / Time Monitoring Performed: 1/10/13 1410	SUNNY, 40°F

Cover material(s)	☐ Soil	X Vegetated Topsoil	X Rip Rap Stone

Section II. Observations

Observation	Yes	No	N/A	Provide Comments As Necessary (use additional space below if needed)
Erosion and Sedimentation Controls				
Are erosion and sedimentation (E&S) controls present? If yes:				
Are they functioning as intended?	X			
Are they still required (i.e., has a healthy stand of vegetation been established)?				
Vegetated Topsoil Isolation Cover				
Are there areas of scour?			X	~ 6" of SNOW COVER
Is any geotextile fabric exposed?			X	SAA
Is vegetation effectively covering the intended area? Provide percent growth for seeded areas.			X	SAA
Is there any sign of distressed vegetation?		X		
Do any areas require seeding?			X	SAA
Photograph Numbers (if applicable)				
Rip Rap Stone Cover				
Are there areas of scour?			X	SAA
Is any geotextile fabric exposed?			X	SAA
Photograph Numbers (if applicable)				
Wing Wall Deflector				
Are there areas of scour?			X	SAA
Is 30" dia. Rip Rap in place?	X			
Photograph Numbers (if applicable)				
Riverbank Plantings				
Are the live stake cuttings thriving?	X			
Photograph Numbers				
Chadakoin River (USGS 03014500, Falconer, NY)				
Discharge, Cubic Feet Per Second?	445 ft³/s			
Gage Height, Feet?	1.78 ft			

Other Observations: Describe any other relevant observations noted during this monitoring period.

NO SIGNS OF BEAVER DISTRUCTION SINCE LAST SITE VISIT. BEAVER REPEL APPLIED TO PLANTS IN/ABOVE RIVERBANK. RAN OUT BEFORE TREES ALONG SOUTHERN BOARDER WERE TREATED.

Performed by: ADAM LAVELLE	Signature: Adam Lavelle	Date: 1/10/13

Site Cover and Riverbank Inspection Checklist

DC Rollforms Site, Jamestown, New York

Section 1: General Information	
Figure Reference:	Weather: OVERCAST, FLURRIES, 2"-4" SNOW COVER
Date / Time Monitoring Performed: 2/24/13 1405	

Cover material(s)	☐ Soil	X Vegetated Topsoil	X Rip Rap Stone

Section II. Observations

Observation	Yes	No	N/A	Provide Comments As Necessary (use additional space below if needed)
Erosion and Sedimentation Controls				
Are erosion and sedimentation (E&S) controls present? If yes:	X			
Are they functioning as intended?	X			
Are they still required (i.e., has a healthy stand of vegetation been established)?	X			
Vegetated Topsoil Isolation Cover				
Are there areas of scour?			X	~ 2"-4" OF SNOW COVER
Is any geotextile fabric exposed?			X	SAA
Is vegetation effectively covering the intended area? Provide percent growth for seeded areas.			X	SAA
Is there any sign of distressed vegetation?		X		
Do any areas require seeding?			X	SAA
Photograph Numbers (if applicable)				
Rip Rap Stone Cover				
Are there areas of scour?			X	SAA
Is any geotextile fabric exposed?			X	SAA
Photograph Numbers (if applicable)				
Wing Wall Deflector				
Are there areas of scour?			X	SAA
Is 30" dia. Rip Rap in place?	X			
Photograph Numbers (if applicable)				
Riverbank Plantings				
Are the live stake cuttings thriving?	X			
Photograph Numbers				
Chadakoin River (USGS 03014500, Falconer, NY)				
Discharge, Cubic Feet Per Second?	545 ft³/s			
Gage Height, Feet?	1.98 Ft			

Other Observations: Describe any other relevant observations noted during this monitoring period.

Performed by: ADAM LAVELLE	Signature: Adam Lavelle	Date: 2/24/13

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Site Cover and Riverbank Inspection Checklist

DC Rollforms Site, Jamestown, New York

Section 1: General Information			
Figure Reference:		Weather: SUNNY, 70°F	
Date / Time Monitoring Performed: 6/19/13 1620			
Cover material(s)	☐ Soil	X Vegetated Topsoil	X Rip Rap Stone

Section II. Observations

Observation	Yes	No	N/A	Provide Comments As Necessary (use additional space below if needed)
Erosion and Sedimentation Controls				
Are erosion and sedimentation (E&S) controls present? If yes:	X			
Are they functioning as intended?	X			
Are they still required (i.e., has a healthy stand of vegetation been established)?		X		
Vegetated Topsoil Isolation Cover				
Are there areas of scour?		X		
Is any geotextile fabric exposed?		X		
Is vegetation effectively covering the intended area? Provide percent growth for seeded areas.	X			90 - 100%
Is there any sign of distressed vegetation?		X		
Do any areas require seeding?		X		
Photograph Numbers (if applicable)				
Rip Rap Stone Cover				
Are there areas of scour?	X			
Is any geotextile fabric exposed?	X			
Photograph Numbers (if applicable)				
Wing Wall Deflector				
Are there areas of scour?		X		
Is 30" dia. Rip Rap in place?	X			
Photograph Numbers (if applicable)				
Riverbank Plantings				
Are the live stake cuttings thriving?	X			ONLY ~5 GROUPINGS NOT THRIVING
Photograph Numbers				
Chadakoin River (USGS 03014500, Falconer, NY)				
Discharge, Cubic Feet Per Second?	255 ft^3/sec			
Gage Height, Feet?	1.30 ft			

Other Observations: Describe any other relevant observations noted during this monitoring period.

RIVER HEIGHT APPEARS AVERAGE

Performed by: ADAM LAVELLE	Signature: Adam Lavelle	Date: 6/19/13

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Site Cover and Riverbank Inspection Checklist

DC Rollforms Site, Jamestown, New York

Section 1: General Information			
Figure Reference:		Weather:	
Date / Time Monitoring Performed: 9/12/13 13^{40}		OVERCAST, RAIN, 70°F's	
Cover material(s)	□ Soil	X Vegetated Topsoil	X Rip Rap Stone

Section II. Observations				
Observation	Yes	No	N/A	**Provide Comments As Necessary** (use additional space below if needed)
Erosion and Sedimentation Controls				
Are erosion and sedimentation (E&S) controls present? If yes:	X	X		
Are they functioning as intended?	X	X		
Are they still required (i.e., has a healthy stand of vegetation been established)?	X			
Vegetated Topsoil Isolation Cover				
Are there areas of scour?		X		
Is any geotextile fabric exposed?		X		
Is vegetation effectively covering the intended area? Provide percent growth ~~for~~ seeded areas.	X			
Is there any sign of distressed vegetation?		X		
Do any areas require seeding?		X		
Photograph Numbers (if applicable)				
Rip Rap Stone Cover				
Are there areas of scour?	X			
Is any geotextile fabric exposed?	X			
Photograph Numbers (if applicable)				
Wing Wall Deflector				
Are there areas of scour?		X		
Is 30" dia. Rip Rap in place?		X		
Photograph Numbers (if applicable)				
Riverbank Plantings				
Are the live stake cuttings thriving?	X			~70%
Photograph Numbers				
Chadakoin River (USGS 03014500, Falconer, NY)				
Discharge, Cubic Feet Per Second?	67 Ft³/s			
Gage Height, Feet?	0.60 Ft			

Other Observations: Describe any other relevant observations noted during this monitoring period.

RIVER HEIGHT APPEARS AVERAGE

Performed by: ADAM LAVELLE	Signature:	Date: 9/12/13

Site Cover and Riverbank Inspection Checklist

DC Rollforms Site, Jamestown, New York

Section 1: General Information			
Figure Reference:		Weather: 3"-5" SNOW COVER, MID 30°F's, SUN	
Date / Time Monitoring Performed: 11/14/13 1235			
Cover material(s)	☐ Soil	X Vegetated Topsoil	X Rip Rap Stone

Section II. Observations

Observation	Yes	No	N/A	Provide Comments As Necessary (use additional space below if needed)
Erosion and Sedimentation Controls				
Are erosion and sedimentation (E&S) controls present? If yes:	X			
Are they functioning as intended?	X			
Are they still required (i.e., has a healthy stand of vegetation been established)?		X		
Vegetated Topsoil Isolation Cover				
Are there areas of scour?		X		
Is any geotextile fabric exposed?		X		
Is vegetation effectively covering the intended area? Provide percent growth for seeded areas.	X			
Is there any sign of distressed vegetation?		X		
Do any areas require seeding?		X		
Photograph Numbers (if applicable)				
Rip Rap Stone Cover				
Are there areas of scour?		X		
Is any geotextile fabric exposed?		X		
Photograph Numbers (if applicable)				
Wing Wall Deflector				
Are there areas of scour?		X		
Is 30" dia. Rip Rap in place?		X		
Photograph Numbers (if applicable)				
Riverbank Plantings				
Are the live stake cuttings thriving?	X			~75%
Photograph Numbers				
Chadakoin River (USGS 03014500, Falconer, NY)				
Discharge, Cubic Feet Per Second?	750 ft³/sec			
Gage Height, Feet?	2.40 ft			

Other Observations: Describe any other relevant observations noted during this monitoring period.

RIVER APPEARED HIGH/WELL ABOVE AVG.

Performed by: Adam Lavelle	Signature: ADAM LAVELLE	Date: 11/15/13

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